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Improvement in Setting Blocks for Saw Mills.

Fig. 1 of the accompanying engravings presents a perspective view of an improved device for setting logs to be sawed to any required thickness. The setting frame, it will be seen, is not in proportion to the carriage and frame, as the representation was taken from a model; practical sawyers will, however, readily understand the operation of the device. Fig. 2 is a top plan of the setting device.

The machine is driven by a belt on the pulley, A, on the same shaft of which is another pulley, driving by the belt, B, a loose pulley, C, the hub of which is a clutch engaging with a similar clutch forming part of the pinion, D. A lever, E, serves to ship the gear and clutch, D, from contact with the gear, F, and pulley, C, when the machine is to be operated by hand. A belt from the pulley, G, the shaft of which carries the gear, F, drives the pulley, H, Fig. 1, and this, by means of the gear, I, same figure, turns the screws that move the head blocks, J, the two screws being connected by pulleys and belt as seen in both figures. The connection between the driving power and the movable heads is thus sufficiently explained; the automatic setting of the log is assured by the device to be described.

Fig. 1.

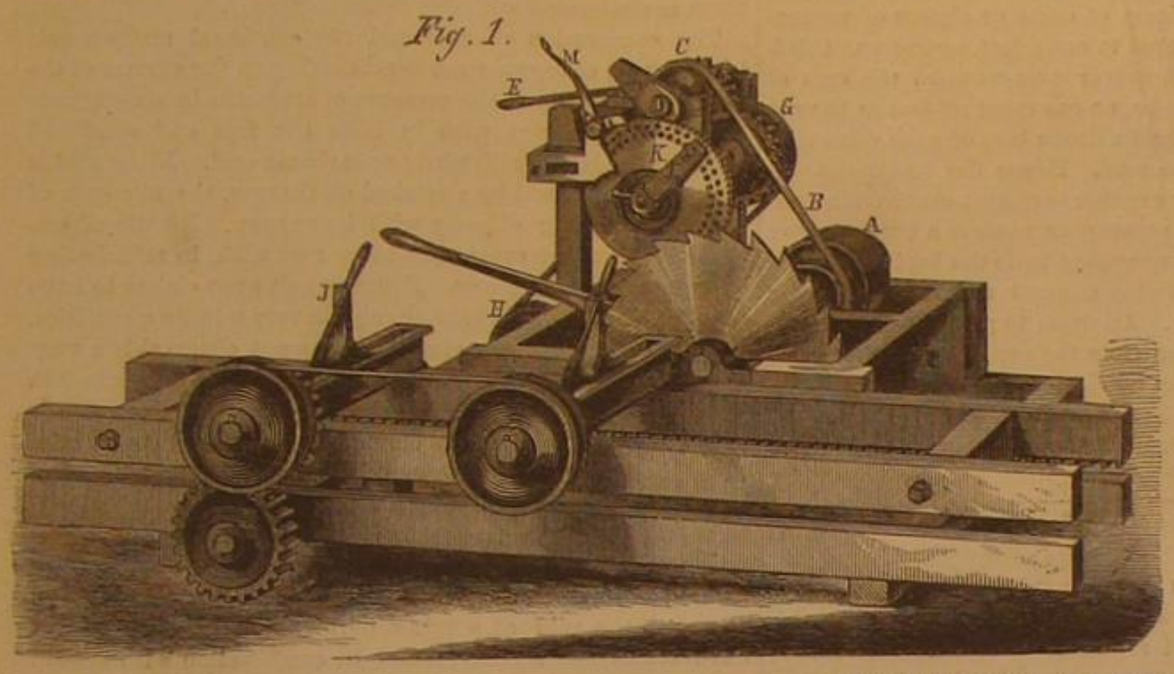
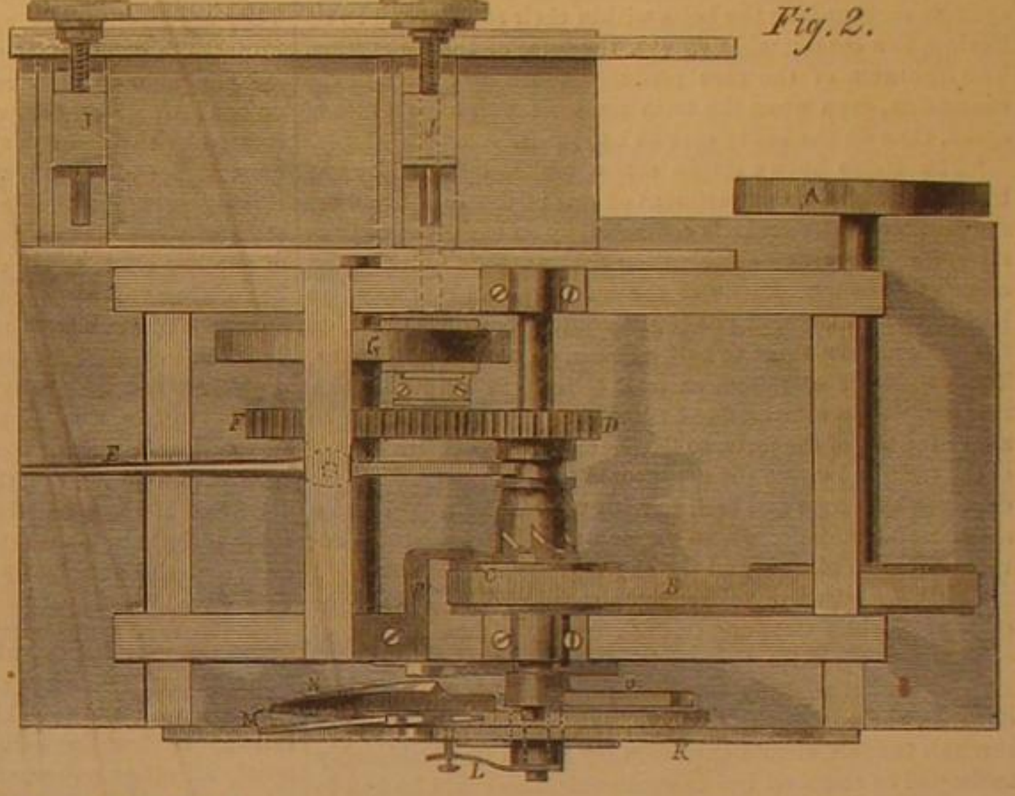


Fig. 2.



WHITMORE'S PATENT HEAD-BLOCKS.

On the shaft that carries the pulley, G, is an index plate, K, perforated with holes, and having a toothed or serrated edge. In the holes fits a pin passing through a slot in the spring, L. A pawl lever, M, held to the periphery of the index wheel, K, by a spring, engages with the ratchet teeth on the disk. Attached to the disk or index is a cam, N, seen in Fig. 2, that operates an arm, O, secured to the shaft on which are the wheels, D and C, and moves the clutch on the same shaft to disconnect it with the pulley, C, which is held in place by the guide, P, Fig. 2.

The holes in the disk are numbered, and spaced to correspond with the pitch—four to the inch—of the screws which move the head-blocks, J. Of course the gears, D and F, have teeth, in number conforming to regular proportions, those in the first being just half as many as those in the latter. Consequently, for every turn of the screws, the wheel, D, makes two revolutions, while the gear, F, makes one. By these means unfailing accuracy is secured.

When any given thickness of lumber is required, the pin in the spring, L, is set in that hole in the index numbered to correspond to half the number of revolutions of the pinion, D. If, for example, ten revolutions are required to move the log the distance desired, the pin is set in the hole numbered five. The two halves of the clutch are then engaged, and the machine put in motion, when a little dog on the shaft, carrying the arm, O, successively, moves one tooth after another with each revolution of the shaft, and the movement being completed, the cam, N, engages with the arm, O, and instantly disconnects the clutch, and stops the transverse motion of the log. Then, by drawing back the pawl lever, M, the index is thrown back to its starting point by means of a coiled spring, and engaging bar on its face—seen in Fig. 1. When only half a turn is desired, the pin is set in one of the inner circle of holes in the index

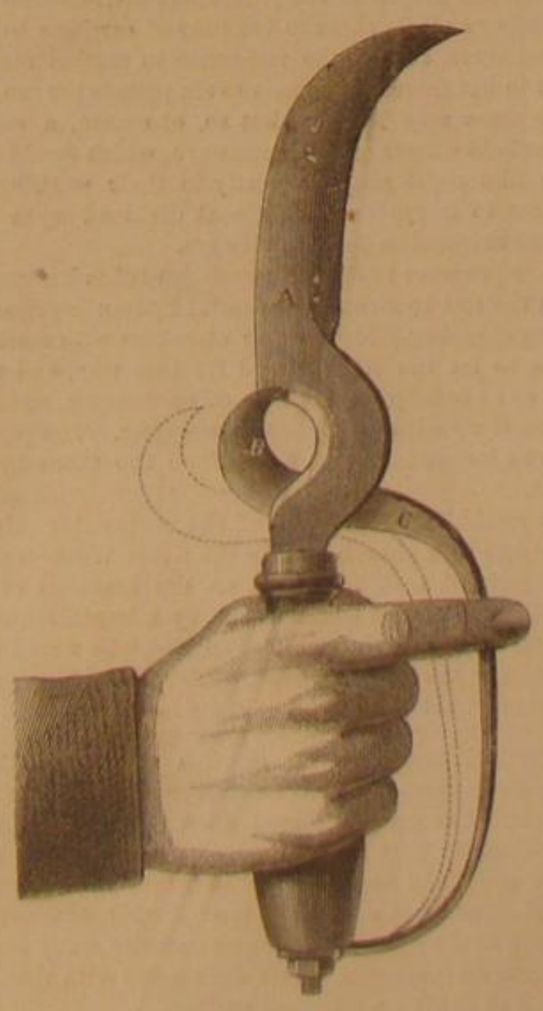
The inventor claims, that with this machine the work can be done quicker and better than by hand, that the device sets the log always accurately, and its use dispenses with the labor of one man or boy. It can be changed instantly, while the machine is running, from one grade or thickness of lumber to another. Lumber sawed by a machine provided with this attachment is much more even in thickness than that which is sawed on the ordinary mill where the stock is fed to the saw by hand. The patentee will sell the right for the Eastern States. The letters patent, dated Sept. 17, 1807, were procured through the Scientific American Patent Agency by Titus Whitmore, Dubuque, Iowa, whom address for further information.

Important Patent Suit.

A patent case of great importance to stave manufacturers has recently been decided in the United States Circuit Court for the western district of Michigan. This was a suit in chancery between parties residing at Kalamazoo, for the infringement of a patent for a stave machine, granted to Wm. Sisson, of Fulton, N. Y., on the 24th of Sept., 1861, under which the complainants claimed. The defense denied that the improvement was invented by Wm. Sisson, and also alleged that if he was the inventor he had abandoned the invention to the public before making application for his patent. The case came on for a final hearing at the October term, and the Court fully sustained the patent, and issued an injunction to restrain the defendants from the further use of the machine.

BARLEY'S CANE STRIPPING AND PRUNING KNIFE COMBINED.

The improvement illustrated in the engraving is intended for topping, stripping, and cutting off the cane of sorghum or the ordinary sugar cane to prepare it for the grinding or squeezing process. The blade used for topping the cane is



curved as at A, similar to the blade of a pruning knife. Its back at the rear end next the handle is formed into a curved edged jaw, in connection with which the spring jaw, B, completes a device for stripping the cane of its leaves.

In operation, after topping the cane with the blade, A, a pressure of the index finger on the spring, C, opens the jaw, B, to receive the cane, when the tension of the spring, C, will grasp the stalk, and a downward motion of the hand holding the stripping knife cleans off the leaf blades, and a drawing motion toward the operator will cut the cane off at any required point. By removing the spring and blade, B and, C the implement becomes an efficient pruning knife. The dotted lines show the position of the spring blade when brought up to receive the cane. This blade with its spring is attached by a nut and screw or some other suitable device to the end of the shank of the knife proper, and is constructed so as to pass freely by the main blade and to have its point engage with the opposite side of the blade, which gives it a firm hold in the act of stripping.

This improvement was patented through the Scientific American Patent Agency, Sept, 24th, 1867, by J. H. Barley, who will reply to all communications addressed to him at Sedalia, Mo. Territorial and manufacturing rights for sale.

PASSENGER TRAVEL ON BRITISH RAILWAYS.

From the columns of an exchange we transfer the following interesting correspondence respecting English railways as compared with those of our own country. The rolling stock on the English roads when contrasted with that found on American railways at first strikes the stranger unfavorably. The locomotive without polish, painted with a dull, gray, stone paint, illustrates the contempt for appearances as to attractiveness in color or model characteristic of English ideas.

"Cars with like dark, dingy color, improved by coal smoke, and ugly baggage railings on top, with some tarpaulin coverings thrown over the unsightly piles of old trunks and furniture, make up even the first-class trains. Coal is burned in these locomotives, in furnaces at the rear within the exterior circle of the tubular boiler, the heat being conducted through the boiler by a multitude of small tubes terminating in front, in a common air or smoke chamber, from which a funnel or flue, about twelve inches in diameter, with a top shaped like an inverted bell, rises perpendicular about three feet above the top of the boiler. Of course they need no spark arresters, and seem to require less draft in running their fires than ordinary wood engines.

"These engines are scarcely two-thirds as high as locomotives on American roads. It seems to be a desideratum to place the weight of the machine and the water of its boiler, as near the track as can be done, and still leave the necessary space for its wheels and machinery. The cars are about twenty-five feet in length, and run on double trucks like ours, but on two pairs of wheels to each car, with a shaft passing through a frame on which the car body rests, with intervening springs. The wheels are not as large or so heavy as those used on American roads, bringing the body of the cars some eight to ten inches nearer the track.

"Each car is divided into three compartments or 'carriages,' each carriage with two seats across the car, facing each other—the entrance being on the side, between the seats. Each seat will accommodate three first-class passengers, or four second or third-class. The interiors of the first-class carriages are luxuriously upholstered, the seats being finished as easy chairs with side arms, so that the seats occupy the width of the car, and eighteen sittings will fill an entire car. The second-class cars or carriages, for first, second and third-class carriages or compartments, are sometimes found in the same car, and are furnished with cushioned seats and cushions for the back, but have no divisions into separate seats, so that eight passengers can sit quite comfortably in each carriage, or 24 in each car when full. Third-class cars have either plain board seats, or in some cars, none at all.

"The gage of English railways is four feet, eight and one half inches, and while cars on American roads have a projection of over a foot on each side beyond the track, the English cars project only from six to eight inches, not measuring the plank step on each side, extending along the car outside, on which the guard or conductor passes the entire length of the train when necessary, while it is in motion.

"The English cars are much lighter in structure than ours, and by their momentum when in motion have less force against the control of the train by the engineer. It will be seen that these cars have no front or rear platform, but are kept apart from each other by spiral-spring railroad buffers. These consist of a turned iron bolt, about 2½ inches in diameter, around which is a coiled steel spring. The bolts and the coiled spring around them are inserted in a socket a foot to a foot and a half at each end of the lower side timbers of the cars, making four buffers to each car, projecting some six or eight inches beyond their sockets in the end of the timbers, and presenting a disk in the form of a bolt head toward the next car in the train some eight inches in diameter, with a wood face sunk in a circular case of iron. As the train slackens speed these disks come in contact and force back the bolts bearing them into their sockets, compressing the spiral springs surrounding the bolts within their sockets and so relieving, to a considerable extent, the force of the concussion. The lightness of the cars produces much less force in the concussion, even when the train slackens from a high rate of speed, than do the heavy cars on our roads.

"The trains have a single screw brake, operated by one brakeman inside a compartment of one of the cars fitted for the purpose. The brake is controlled by an effective power of a screw and leverage combination that answers quickly and effectively the movements of the machine. In this way two brakeman to a train, or one if the route to be run is short, do the work of from three to half a dozen, on our express trains. The conductor or guard, as he is called, has his seat in the rear car, with a compartment sometimes elevated a foot or so above the top of the train, so that he can see the entire length of the train and direct the engineer in any exigency. This is done not by a rope and bell, as with us, but the guard has a shrill metal whistle, whose various sounds are well understood between himself and the engineer.

"Most American travelers have a dread of danger by fire or otherwise, while traveling on such trains, without means of communicating with the engineer or guard. They have a kind of notion that if a kerosene lamp, which is usually let down in the top of the carriage, to light them by night or through tunnels, should explode, they would be considerably suffocated or scorched before communication could be had to stop the trains and facilitate their escape. On the trains from London to distant principal towns, a second guard, who has charge of the baggage, usually goes through. His office answers to that of baggage master with us; though he is of the same grade and authority in running trains as the captain of the train, in case it is put into his hands or the captain should be sick. Hence, the long-travel English trains have two competent guards or conductors, two brakemen, a fireman and engineer, with casual supernumeraries as porters and the like passing over the road. Next to the police, I found the guards on the railways the most obliging men in England. Their responsibility ends with the safe conducting of their train to its destination. They collect no fare by the way, and run their trains by the instructions of the head railway officer of the company in London.

"At the head office, and at the depots along the route, are a class of railway officials called 'booking agents' and porters. Half of these officials either fill sinecures or are employed in red tape details which add nothing to the income of the company. Two ticket agents at depots within our large cities, and the station agent at each intermediate station, are found amply sufficient to conduct the sale of tickets on our most traveled roads. But in Great Britain, first-class, second-class, and third-class tickets must each have a separate agent for their sale at most of the stations, and where night as well as day trains are run, a double number of these officials are usually employed. There are also nearly as many porters as booking agents, thus illustrating the proverb, that 'where the carcass is there will the buzzards be gathered together.'

"The 'luggage vans,' as they are called, are not provided in sufficient size and numbers to accommodate travel on the great thoroughfares, and this custom of loading the tops of the passenger cars has sprung up to meet the exigency. Since I am on the subject of baggage, I may as well note here that all responsibility as to the safe transportation and delivery of baggage by British railroads, is avoided as far as possible. Their system, or rather lack of system, is most villainous. The system of checking baggage, as prevailing in this country and on the continent, is entirely excluded, and the responsibilities of the company are limited by acts of Parliament to the narrowest limits. You may see your baggage put into the 'van,' but what railroad employé knows that it is yours? If a confidence man should turn up at your destination, he might carry off your baggage under claim of ownership, and you have no check by which you can identify your baggage or repel the theft. The English custom in this department seems to make the baggage say to every wanderer, 'come and steal me.'

"The English railways are constructed at a greater expense per mile than those in America. The road beds are better prepared for their superstructures, rails are laid with more uniform and even supports, and the joints of the rails, while sufficient allowance is made for contraction and expansion by heat and cold, are so fished as to present a uniform surface to the wheels of the cars, so that little motion or jolting of the cars is felt by the passengers, and traveling is far less fatiguing than on our roads. On most of the lines the expense of construction is greatly increased by tunnelling and excavations to avoid curves or ascents and descents in the structure. Of course, the tunnels have to be protected by heavy masonry, and the excavations are sloped down from the surface of the ground at an angle of some 45 degrees, the slope being neatly sodded or cultivated with grass, flowers or grain, by the station men along the road. Then the stations are stone structures, erected at great expense; in many instances far beyond the necessities of the business of the roads. Every crossing of the track by highways is either tunneled under the road or bridged over it, as we stated, and at all stations are foot bridges over the road, which passengers and others who have occasion to cross the track must take, as it is a misdemeanor to cross the track otherwise, except by the employés of the road.

"The speed on English railroads varies from twenty to fifty miles an hour, according to the condition of different roads and the exigencies affecting the business interests. On the whole, their speed is about one third greater than that of trains on our own roads.

"I have stated that the rolling stock is much lighter than ours; and ordinary freight cars are limited to five tuns burthen by law, or by a legal inspection required by statute. They are mostly flats, relying upon tarpaulin coverings to protect the goods transported from wet weather.

"The fares on these railways are nearly double the fares on our own. The cost of transportation is considerably increased by the English system of caste or classes of passengers. They must go prepared to carry first, second and third-class passengers, while however over-crowded the cars of some of these classes may be, no one must set foot in the car of another class, though half a dozen cars of such class may be running vacant over the road. Hence the transportation of vacant cars is a wasting expense to almost every train run. This division of classes in passengers renders a much larger number of trains each day necessary to do the business of the road. No less than five trains stopped at Stafford on their way to Rugby and London. All were to pass over the same road within an hour of time from the earliest to the latest of the five. If there had been no classes with the passengers, three of these trains would have accommodated all the passengers, and the expense of running two of them would have been saved."

Omnibus Subways.

Mr. Peter Barlow has published the prospectus of a scheme which, if we could take his word for it, would revolutionize railway engineering—dispensing with steam, and, indeed, nearly all other power, and reducing wear and tear to almost next to nothing. He proposes to drive a system of tubular subways under London—first of all under the Thames, near the Tower, and to work carriages through them, each weighing two tuns, loaded, and containing twelve passengers, the motive power to be that of *one man!* Mr. Barlow estimates the friction of his omnibus, running on a very accurately laid railway, as four pound only per tun, and the resistance of the air at two pound more, or six pound per tun in all, or twelve pound only for the loaded carriage! He proposes to make the quarter-mile run of the Tower subway in 2½ minutes, or at the rate of six miles only an hour. With "two and half men," however, which means, we suppose, two men and a boy, the run can, he says, be made in one minute, or at the rate of fifteen miles an hour, which is more like what the public would require.

Of course, if safe railway carriages can be made to weigh no more than the weight of the passengers carried—the present ratio being as from three to five tuns of carriage to one tun of passengers, and if the resistance to motion may be diminished to but from four pounds to six pounds per tun, Mr. Barlow's scheme may answer; but so, of course, a reform could be made in all our ordinary railways, which would save something like eight millions yearly in their working expenses, equal to 2 per cent additional dividend upon the £400,000,000 invested in British railways.

Mr. Barlow proposes to drive his cast-iron tubes horizontally through the soil by means of powerful hydraulic pressure; and between stopping-places (for he dispenses with stations) he proposes to let the line descend for half way, and then rise again, so as to help the carriage off on starting, and help also to bring it up without brakes in stopping. The passengers are to be lowered to and lifted from the tubes by hydraulic lifts.

The plan reminds us somewhat of the proposition printed a few years ago by a shareholder in the Great Western Company, who insisted that the trains on the branches of the company's lines might be worked each by a horse, mounted on an endless railway in the guard's van, and who would thus work the train at ten miles an hour, while, "if whipped up," the poor brute would "easily" do twenty!—*Engineering.*

NEW LETTER ENVELOPE.—An English patent has been granted for an improved adhesive envelope named the Camden Envelope. The gum is placed upon the lower fold instead of the flap, so that the tongue comes in contact with clean paper when the flap is wetted to secure the envelope. The general form of the envelope is admirably adapted for the protection of the contents. Those who write many letters will appreciate an invention which does away with the disagreeable task of licking a gummed surface.

A FLOURISHING VINE.—In Santa Barbara, California, is a grape vine planted forty years ago, and which now measures, at four feet from the ground, three feet around it. At the hight of six feet it branches out, and the branches, which are supported by scaffoldings, spread over an area of from 1,000 to 1,200 feet. The annual crop from this vine averages four tuns, and has at some seasons exceeded 12,000 pounds.

Correspondence.

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

For the Scientific American.

ON SNOW, RAIN, AND HAIL, IN THEIR RELATIONS TO THE ATMOSPHERE.

The condensed moisture of the air is never pure water (H O) alone, as it is generally supposed, it even presents in its composition the same if not a greater variety than the springs flowing from the interior of the earth. This is easily understood when we consider that the elastic fluid which envelops the earth in an aerial ocean is not simply a mixture of nitrogen and oxygen and a small amount of carbonic acid, but also contains though in small quantities, a great many other substances, which are readily absorbed by the descending precipitates, and as the atmosphere itself is modified in its condition according to adjacent circumstances, so also the condensed moisture, which we perceive in the form of snow, rain, or hail. Though the amount of foreign substances in the air may often almost be infinitesimal, they are not always to be considered as altogether insignificant.

Nitrogen and oxygen are not met with in the same proportions in the many forms which moisture assumes, there being about one-fifth less of the former, one-third more of the latter, with still a greater proportion of carbonic acid contained in them as contrasted with dry atmospheric air.

The combustion of fuel and the continual cremecaresis (slow decay) of organic matter occurring on the surface of the globe is the origin of the presence of ammonia in atmospheric moisture. It is met with in both the free and combined state, in the latter with nitric or carbonic acid. Nitric acid is known to be formed by electrical discharges, the nitrogen of the air combining directly with its oxygen. Nitrate of ammonia is therefore constantly to be met with in rain during and after thunder storms. Boussingault even claims to have found it always in the rain, though in very minute quantities. Its amount is, however, almost always not observable a very great time after the storm has ceased, but the converse has been found to be true of a fine shower.

In snow and hail more ammonia is present than in rain, probably owing to the greater cold in which they are formed, ammonia being more readily absorbed by cold than by heat. Rain falling after a dry season abounds with ammonia, often containing six milligrams to the liter (1 milligram=0·0154 grains; 1 liter=1·0567 wine measures), this not being the case with the rain of a rainy period. Nitric acid is, as we have mentioned already, found in combination with ammonia, but only in its free state, during heavy thunder storms, when the rain will sometimes redden blue litmus paper. The average quantity of nitric acid in rain water is stated to be one-millionth part of its entire bulk. Snow has been found to contain more nitric acid than rain, and hail more than rain.

Traces of sulphuric acid have been discovered in the rain of London and Manchester, and Dr. August Smith is accounting for its presence, which doubtless finds its explanation in the sulphurous vapors produced by the combustion of coal, with the rapid disintegration of buildings in those cities. Sulphuric acid has been detected in larger proportions in the rain of Manchester than in that of London; though London is the greatest city of the world, Manchester is the largest manufacturing town and the center of a manufacturing district comprehending many hundred square miles; hence we must not be surprised to find the products of combustion existing in a larger proportion in the latter than in the former city.

The atmospheric air is also most generally impregnated with the saline products arising from sea water. Near the coast salt is found to be present in rain water to the amount of seven parts to the million, but less then half that proportion some hundred miles in the interior. The French chemist, Barral, calculates that near Paris forty pounds of salt are yearly descending in the rain on one hectare of land (1 hectare —2·471 acres), and according to Chatin the rain water in Paris during the prevalence of westerly gales is even more impregnated with salt than is the water of the Seine. Snow and hail always contain less salt, as they are formed in more elevated regions.

Chatin also holds that iodine is present in all atmospheric precipitates, which assertion, however, is contradicted by most investigators, they attributing its supposed presence to the impure reagents employed in its detection.

Sulphuretic hydrogen has been observed in the atmospheric precipitates of some parts of the western coast of Africa, where the rivers which empty into the sea abound in decaying organic matter, and phosphoric acid has been detected by Wiegmann in noxious fogs and mists.

Organic substances of an unknown nature are often found in atmospheric precipitates, but Boussingault claims to have discovered marsh gas in the rain of miasmatic sections to the amount of 0 0017 per cent, and Ehrenberg describes the inky rain falling on the 14th of April, 1849, in Ireland over an area of 700 English square miles as putrescent vegetable organism, probably brought there by passing winds.

Non-volatile substances, as meteoric, volcanic, and ordinary dust have often been found in rain, snow, and hail, but they are not of general occurrence. "Photo-chemical analysis," that recent and wonderful discovery, will surely reveal to us many other natural wonders occurring in atmospheric air.

The Hoosac Tunnel Drills.

MESSRS. EDITORS:—I noticed in your paper a short time ago a short account of the Hoosac Tunnel and drills, and credited them to Mr. Burleigh, of Fitchburg. I would merely say that I am the original inventor of the Hoosac Tunnel

Drill that they are now using. I obtained my patent in 1851 and showed a working machine to a number of the legislators at that time. They thought favorably of it, but were too skeptical. I was a number of years ahead of the times. If they had adopted it at that time they would have had a hole through the mountain and trains running a long time ago. I got my patent extended, and have since sold out to Mr. Burleigh, who had taken out a patent which he thought was an improvement. But the drills are made now substantially as I made mine over seventeen years ago. The main idea was using the direct action of the steam or air in a direct line with the drill, so that I could drill horizontally or at any angle up or down, as wanted. Mr. Burleigh, of Fitchburg, now holds the patent, and the machines are made by the Putnam Machine Company, of which he is one of the partners and superintendent, I believe. JAS. W. FOWLE.

Boston, Mass.

Replies to Questions on the Day Line.

MESSRS. EDITORS:—On page 387, Vol. XVII. of your valuable paper will be found several questions relative to the day line, which are asked by Mr. Lyman Thayer, of Burlington, Vt.; I suppose for the purpose of bringing out the thoughts of its readers on this interesting question. I think I can solve these questions to the satisfaction of all.

If a man start from New York on Monday noon, and goes west, keeping pace with the sun, he would pass from Monday to Tuesday, when he crossed the day line, which I have taken as the 180th meridian.

If the 180th meridian be taken as the day line, it is 12 minutes of 1 o'clock on Tuesday morning at Pekin, China, when it is noon at New York.

When it is Monday noon at New York, the same day (Monday) extends just 180° east of New York, or about to the 105th degree of east longitude, reckoning from Greenwich, at which point (105° E.) it is just midnight. And the same day of the week will extend west of New York to the 180th meridian, to the east of which line it is a small fraction after 5 o'clock on *Monday morning*, while on the west side it is 5 o'clock *Tuesday morning*; thus making about 24 hours difference in time between the two sides of the day line.

To the question whether there is a point of time in the revolution of the globe when it is Monday, for example, on the entire globe, I would reply that there is such a point of time, but so inconceivably short that it is totally inappreciable to our senses, but for all practical purposes such a point of time may be considered to exist, and just 12 hours from this time it is Monday on one half of the globe while it is Tuesday on the other.

In regard to the day line itself, I cannot think such a line does really exist; but for this very reason it becomes more important to define such a line by legislation; and the one which answers the purpose best, I think, is the 180th meridian from Greenwich. If reference be made to a map of the world it will be seen that the only land through which this meridian passes, is the extreme eastern part of Siberia, where it would not much interfere with the day question. Another reason is that if this meridian (180th) be taken to represent 12 o'clock midnight, it brings the meridian of Greenwich at 12 o'clock noon, which is the most convenient starting point in applying the device, seen on page 324, Vol. XVII. of this paper, to all maps, as there briefly hinted at.

Much more could be said on this subject, but I will not occupy your valuable time and space.

W. R. SHELMIRE.

Philadelphia, Pa.

Heat Without Coal---Utilization of Wind Power.

MESSRS. EDITORS:—Looking forward to the exhaustion of the fossil fuel which nature affords us in the coal fields, economists have speculated on the possible discovery of some method of producing heat independent of coal, and the decomposition of water has been regarded as a probable expedient. With our present knowledge and appliances it appears not to be difficult to realize this proposition, even in competition with coal, at least in a small way. The agents are obvious, wind-power, a magneto-electric machine, oxygen and hydrogen gas holders, and the electrolysis of water. The products of combustion being only water, they could be burned for room warming without a chimney.

For use in the arts the oxy-hydrogen furnace would of course offer advantages far above any other known, and results could be reached impossible with the lower temperature of the coal fire, while the flame would be free from deleterious substances common to coal.

Owing to its gaseous form and the intensity of its heat this fuel would be manageable in many ways impracticable with coal. For instance seams could be hard-soldered with great rapidity with the jet of the compound blow-pipe, and it is probable that the joints of steam boilers could be heated for welding in a suitable oxy-hydrogen jet.

Newark, N. J. H. W. POND.

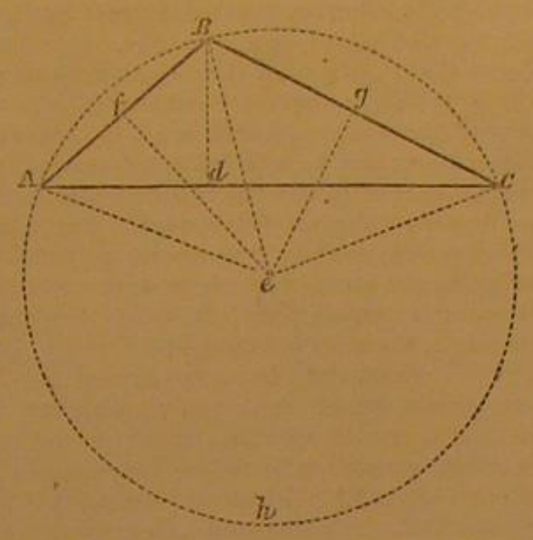
The Cold Cave at Decorah.

MESSRS. EDITORS:—There is at the village of Decorah, near the northern boundary of the State of Iowa, a cave where the operations of nature are reversed. In this cave it is cold in summer and warm in winter. The ice begins to form the fore part of June and disappears again the latter part of August, the coldest period being about the middle of July. On the fourth day of July icicles may be found from six to eight inches in diameter and from four to eight feet long, affording fine sport for the boys who take them into the market for sale. In this cave no ice is found nor sun from September to June, but June, July, and August it is extremely cold so that a man can only stay in it a few minutes. This cave has been known about twenty years and the above facts appear every year. Thousands of people have been into this cave to see icicles in summer. I wish some one would give an explanation of this strange phenomenon through your journal. O.

Hardin, Iowa.

Solution of Plane Triangles.

MESSRS. EDITORS:—Herewith I send you a geometrical problem illustrated by diagram, which has probably never before been in print. In beauty and utility I believe it stands next to the 47th problem of Euclid, which is, that the square of the hypothenuse is equal to the sum of the other two sides. Having this handed down as a text, it was supposed that the same solution might be applied to any triangle. This may be done by letting fall a line from the apex of the angle, opposite the longest side of any triangle, cutting said side or base at right angles, as seen in the figure; the close



line, A B C, represent the sides given, and the broken lines represent the lines required.

To find A *d* and C *d*:

$$\frac{AB^2+AC^2-BC^2}{2AC}=Ad \qquad \frac{BC^2+AC^2-AB^2}{2AC}=Cd$$

$$BC^2-Cd^2=Bd \qquad AB^2-Ad^2=Bd.$$

$$Af : Ae :: Bd : BC.$$

$$Bg : Be :: Bd : AB, \text{ etc.}$$

$2Ae \times 3{\cdot}14159+$ equal the circle cutting each angle of the triangle.

Let AC=10, AB=5, and BC=7. Then

$$\frac{10^2-5^2+7^2}{2\times10}=6{\cdot}2=Cd \qquad \frac{10^2-7^2+5^2}{2\times10}=\frac{3{\cdot}8}{10{\cdot}}=Ad=AC$$

I have sought for this solution for some fifteen or twenty years, and think that in all probability it will be, sooner or later, introduced into the common school arithmetic. It will be observed in the solution above given that it is necessary to assume the longest side of the triangle for the base. In short the beauty of the problem lies in the discovery of letting fall from the apex of any triangle upon its base a line at right angles with the base, when the base is the longest side of such triangle, and which unlocks all its intricacies to the simplest rules of arithmetic. JUSTUS F. HOYT.

New Canaan, Conn.

Removal of Obstructions in the Mississippi at Rock Island.

MESSRS. EDITORS:—I have seen a report of the wonderful performances of the "chisel boats" on the upper or Rock Island Rapids of the Mississippi, which is somewhat overdrawn. Perhaps you would like to hear the truth. The Rock Island Rapids have been a very serious obstruction to the navigation of the river in times of low water, being about fifteen miles in length and having a fall of about eighteen or twenty feet. Congress at least once before made an appropriation looking to the improvement of the channel, but the work done did not in the opinion of the pilots render the navigation less dangerous than before. The last Congress appropriated $300,000 for the same purpose, and the United States engineers decided to remove the rocks to the depth of four feet below the low water of 1864, the lowest ever seen by the white residents on the banks of the Upper Mississippi. There are seven reefs to be removed. The contract was awarded to C. G. Case & Co., of New York, who built two "chisel boats," three barges, and other craft, suitable for the work, besides buying a steamer and one of the largest and best dredges in the West.

The chisels are raised and allowed to fall like a spile driver, and are made to fall about six times in a minute from a hight of twelve feet. They are cold chisels, pointed, and weigh 6,000 pounds each. They sometimes penetrate the rock to the depth of six inches the first fall, and sometimes drop three or four times without effecting anything; but altogether they are successful. The rock has no stratification, and yields reluctantly to the hardest blows.

The company have also coffered a space of 450 by 250 feet, and are blasting out the contained rock to the depth mentioned before, which will require the removal of 7,000 cubic yards. I send you by express an oyster can full of the most characteristic specimens I could procure. The work is more than half done on this chain (Duck Creek), and the weather all that could be desired. There has been no day in four months that could prevent men from work, and if my memory is right not a drop of rain has fallen here in that time.

THOS. DOUGHTY.

[The samples sent are limestone containing crystals of metallic sulphurets. The rock is favorable to the success of the chiseling process.—EDS.

Momentum and Inertia.

MESSRS. EDITORS:—I venture to offer an answer to that supposed paradox presented under the above title, on page 310, Vol. XVII.

There is no substance in the world so hard as not to yield at the point of contact when two such bodies should meet, as supposed in the problem. Admitting this, it contains nothing impossible or unnatural. The small body comes gradually to a rest, and is then gradually set in motion in the opposite direction, while the larger body continues to move, and loses only a part of its velocity. Within the small interval of time that this occurs, the two bodies come nearer together, while their surfaces yield at the point of contact.

The question is to be decided upon some other point, viz.: What is elasticity, and what makes a body non-elastic?

For example, a piece of lead is non-elastic, why? Suppose it strikes against some hard obstacle, by which it is brought suddenly to a dead rest. While the lead was in motion it carried a certain momentum, or, in other words, a certain amount of native power, and which I call simply "force." This force cannot be lost or annihilated, it can only be consumed by producing mechanical work or effect, for which a reasonable account can be given. What has become of this force, or of the momentum of the lead? This force was consumed by the friction of the molecules of the lead, while it was flattened or split in fragments, or otherwise changed in its shape.

If we take a piece of hard steel, as for example a small hammer, and strike against a heavy anvil of equal hardness, the hammer will be thrown back, why? Because neither of these bodies suffered any lasting indentation, because no mechanical effect has been produced which would consume the force of the blow; consequently this force is returned, and throws the hammer back. This is elasticity.

Glass is elastic to a certain limit. When the force of the blow exceeds this limit, the excess of the force, which is not taken up by elasticity, will break the glass, in consequence of which the force will be consumed and not returned. A piece of pumice, burned clay, or charcoal, is non-elastic, because the force of the blow is consumed by breakage of some minute parts of such a porous and fragile substance.

This may suffice to show that elasticity is nothing else but the manifestation of one of the most important laws of mechanics, the preservation of force, and that if really any perfectly hard and non-elastic substance should exist, the slightest blow must cause some breakage, as may be inferred from the above example of glass. And from this it will be seen, more clearly, that the above problem supposes an impossibility in the premises, since the momentum or the force of the small body cannot be annihilated instantaneously, but can only be consumed by producing some mechanical effect, in consequence of which the surfaces of the two bodies must yield in some way at the point of contact, at least by breakage, if not otherwise. J. G. KONVALINKA.

Astoria, L. I.

Aluminum for Mathematical Instruments.---Folding Machine.

MESSRS. EDITORS;—On page 292, Vol. XVII., I notice an interesting article on "Aluminum, its properties and uses." I am a civil engineer and surveyor, and would like to suggest, through the columns of your highly valuable journal, the advantages of the use of aluminum for the construction of civil engineering and surveying instruments. Accuracy, strength, and lightness are the requisites of a good instrument, the last quality having to give way to the two first, in the construction from the material now used. To illustrate my idea, I will take for an example one of Gurley's solar telescope compasses, with adjusting socket, which weighs 12 lbs.; if constructed of aluminum, with the same sized parts, it would weigh about 3 lbs.; and if the metal is as strong and rigid as it is represented, the thickness could be reduced at least one-fourth, which would make the weight only 2 lbs. 4 oz. I have been informed that aluminum could be obtained in large quantities at from $6 to $8 per lb. (I do not know whether by troy or avoirdupois weight); but say that it is worth $1 per oz. avoirdupois, then the material for the instrument would cost only $36 (I make no allowance for filing and chips, as they could be saved the same as in working gold, and the weight of the glass would compensate for the unavoidable losses in working), from which take the cost of the metal now used, say $4, and it leaves only $32 as the extra cost of an aluminum instrument. Of course, if the metal can be obtained at 50 cts. per oz., the extra cost would only be $14. Now, gentleman, I do not think there is one engineer or surveyor in fifty, who would not pay even $50 extra, for an instrument that weighed only about 2½ lbs., instead of 12 or 14. I think that manufacturers of mathematical instruments would find it profitable to turn their attention to the subject; the first one who does, and lets me know through your columns, will get one order, sure, from the Rocky Mountains.

It would be very interesting to me, and, judging by myself, I think to the majority of your readers, if you could compile an account of the different processes now known and used for the reduction of the metal from its ores. The ores of aluminum are the most common of any known metal, not even excepting iron, and I beg leave to predict that as we now live in an iron age, so will those who live twenty, or perhaps many less years hence, live in an aluminum age. As soon as the right process for the reduction of the metal from its ores is discovered, then we will see an entire revolution in mechanics and civilization, which is now beyond the comprehension of ordinary mortals. Speeds in traveling will be attained which, if told of at present, would appear wild and chimerical; ship building and warfare will be revolutionized; pneumatic railways will be common; the problem of navigating

the air will be solved; velocipedes and steam carriages for common roads will be as common as horse conveyances are at present; grades can be established on railways that are now perfectly impractical, and other improvements made in mechanics and engineering that are not now imagined by the most far-seeing thinker. For in the metal aluminum we have combined the maximum of strength and durability with the maximum of weight. The day is not distant when some person will discover the right process. Many more wonderful, and seemingly more difficult processes, have been brought to light in the past few years. Now, in order to give the inventive public (who all take the SCIENTIFIC AMERICAN, or ought to) a cue to the future process, please give them all the information you can in reference to the subject, and let them go to work, and they will soon ferret out the simple process needed.

I believe you like to have hints thrown out to inventors, so while I am in that line of business allow me to suggest that some inventor get up a machine to fold quarto and octavo papers; for instance, the SCIENTIFIC AMERICAN comes to me sometimes terribly askew. I am always too anxious to read it to take time to refold it and straighten out the creases before cutting, and therefore spoil the paper for the binder, and sometimes even cut the reading matter. I think you will bear me out in my assertion that some sure and easy way of accurate folding is a desideratum to both the publishers and readers of newspapers of a "several-fold-up" form.

Please hurry up your prospectus. Our club was euchred out of six numbers of the SCIENTIFIC AMERICAN by being so far away that we were not in time, and we cannot afford it again; besides, the "Noble Red Man" was in quest of science, and overhauled the mails, depriving us of eight or ten more copies. The SCIENTIFIC AMERICAN is just as welcome a visitor out here in the Rocky Mountains as it was back in "America." Our prayers are for our weekly SCIENTIFIC AMERIFAN," as well as for our "daily grub." "ALUMINIST."

Helena, Montana.

[Aluminum is prepared from cryolite, a compound of sodium, fluorine, and aluminum, procured mainly in Greenland. It is mixed with common salt and sodium, in the proportion of about 270 parts by weight of cryolite, 150 of salt, and 72 of sodium, and melted in a crucible. No feasible and cheap method of reducing the metal from ordinary clay has yet been discovered.

Folding machines for newspapers are in common use, but as a general thing they do not equal, in exactness of work, hand labor.—EDS.]

Extermination of Cockroaches.

MESSRS. EDITORS:—We have been greatly troubled for two or three years by roaches, the real, big, black fellows. By continued exertion we confined them to the vicinity of the furnace and range, but to exterminate them all sorts of traps and exterminators proved ineffectual. Somebody told us of Paris green, and it has done the work. We feel so rejoiced that we desire to give the knowledge to the public. Paris green can be procured at any apothecary store. Just sprinkle it round where "they most do congregate."

B. F. BURGESS, JR.

Boston, Mass.

NAPHTHALIN AND ITS USE.

Naphthalin was discovered in 1820, by Garden, among the products of distillation of coal, and has since been the subject of thorough investigations of Faraday, Liebig, Woehler and many other chemists. Laurent occupied himself especially with its derivates, and founded thereupon his new theory of organic compounds. Up to the present time naphthalin only was of scientific interest, and of a very limited practical use, when in 1860 Roussin, a French chemist, by his repeated experiments at once drew the attention of the scientific world to this hitherto so-considered worthless substance. He succeeded, namely, in producing a dye-stuff from it which he considered the *alizarine* of the madder, but which, though identical in its chemical composition with the natural *alizarine*, has subsequently been found to be very dissimilar to it. It therefore became suddenly lowered in the estimation of those whose interest was connected with it, and was subsequently looked upon as being as worthless as before, the more as other coloring matters which had been prepared from the same substance met with the same fate. Quite recently, however, European investigators have succeeded in producing benzoic acid from this hydrocarbon, a substance largely used in the preparation of tobacco sauces, in calico printing, in the manufacture of aniline blue and benzol, respectively nitrobenzol and aniline; and it is therefore that I call attention to this subject. I first will describe the

PREPARATION OF NAPHTHALIN.

Although this hydrocarbon (its formula is C_{20}, H_8) is a product of the distillation of coal, it does not pre-exist in them, as is the case with paraffin. [I have, in the laboratory of Prof. Bolley, in Züric, extracted small quantities of paraffin from boghead coal. The coal was previously pulverized very finely, and the extraction was performed by cold ether.] It is only generated at a high heat, such as that of the retorts in gas works when in full operation. In the manufacture of gas comparatively large quantities of tar are obtained, the conversion of which into permanent gas has puzzled the ingenuity of inventors since the first introduction of gas illumination on a large scale, and still remains an unsolved if not an insoluble problem. In distilling this tar, and in only gathering those portions which run over between 400° and 500° F., we get the so called "pitch or dead oil," which is employed for the extraction of napthalin. The residue remaining in the still is the substance into which the blocks of Nicholson's pavement are dipped, previous to their being inserted in the street.

According to a paper recently published by Dr. Vohl, the pitch oil should be put in vats and left in a cool cellar from six to eight days, after which time most of the napthalin will have crystallized out. The latter is then filtered from the liquid portions and transferred into a centrifuge, for the purpose of separating it from the adhering oil, but as this cannot be arrived at at once, the crude naphthalin is then subjected to hydrostatic pressure, commencing with a light pressure and increasing gradually until completed.

The pressed mass is then put into an iron vessel, which is heated by steam; in order to take up the creosote, the phenylic acid and other impurities, it is first melted with a small percentage of caustic lye, and stirred well; after a while the lye is drawn off, the same process being then repeated. After this the napthalin is washed with boiling water, then it is treated with oil of vitriol of 45° Baumé, and finally mingled again with lye and left at 212° F. for three hours.

The naphthalin being thus treated is poured into a cast iron still, which can be heated on an open fire. It commences to flow over at 410° F., in a thick stream, and in twenty minutes generally 20 to 25 per cent of napthalin may be obtained. The water of the condensing tank must be kept at 170° F., the receiver being also kept in water of this temperature. When the latter reaches 450° the distillation is fractioned, as then an oily yellow product is obtained. Finally the liquid and purified distillate is run into conical cylinders of glass, metal or moistened wood, in which it solidifies rapidly, and in contracting separates from the sides. It is thereby obtained in sticks, like solid brimstone.

PROPERTIES OF NAPHTHALIN.

The naphthalin thus obtained is of great beauty. It forms brilliant, white, crystalline sticks, in which the interstices and crystalline vegetations have the appearance of spirals. Its specific weight is 1.151 73, its melting point 174°, and its boiling point 452°. The following new properties are added to the already known ones by Dr. Vohl, in Cologne. When a naphthalin stick is rubbed with a silk cloth it gets strongly negative electric. Melted naphthalin absorbs a great amount of atmospheric air, which it gives off in cooling. When put in quantities of from one to two pounds the expulsion of the air is so turbulent at this stage that the liquid appears to be boiling. The air absorbed by melted naphthalin is abounding in oxygen; perhaps it is pure oxygen. This phenomenon has therefore a great similarity with the peculiar movement taking place in the cooling of silver, and called "spratzen," in German. Melted naphthalin dissolves indigo with great ease, forming a dark-blue violet liquid, from which, in cooling, the indigo separates again, in brilliant copper-like needles. The sulphurets of arsenic, tin and antimony are taken up abundantly in their amorphous state, in cooling they separate in crystals. Phosphorus and sulphur are also solved rapidly by liquid napthalin.

TEST FOR NAPHTHALIN.

To detect this hydrocarbon in a product of distillation, the latter is, according to the writer of this, treated with fuming nitric acid, in order to transform the napthalin into its nitro-compound; this being insoluble in and lighter than water, it will rise to the top. It is then gathered and converted into naphthylamin, by any known method. The best is that of Béchamp, who uses iron filings and acetic acid. In adding chloride of iron to an alcoholic solution of the naphthylamin a deep blue color will be produced.

ITS TRANSFORMATION INTO BENZOIC ACID.

The first step in the two or three processes known, is the production of naphthalic acid, a body of the chemical formula C_{16}, H_4, O_6. While, however, the brothers Depouilly, in Paris, directly convert the latter into benzoate of lime, separating therefrom the benzoic acid, Laurent and Casthelay change the naphthalic acid successively into phtalamid, benzonitoil and benzoate of soda, a process lately fully described by me in one of the meetings of the New York Polytechnic Association. The method recommended now by high scientific authorities is a combination of a French and German one, namely, of

a. The process of Dr. Vohl for the preparation of naphthalic acid, and

b. That of the brothers Depouilly, as indicated.

Naphthalic Acid.—While hitherto naphthalic acid was obtained by a very tedious way of preparation, which was not only injurious by the highly irritating gases escaping, but also yielded a small percentage, it may now conveniently and cheaply be produced by the process invented by Dr. Vohl. According to the same, 12 parts of naphthalin are dissolved in 109 parts of concentrated oil of vitriol, and to this 89 parts of finely pulverized bichromate of potassa are gradually added. The reaction ensuing being over, the product is solved in boiling water, and the liquor thus obtained is oversaturated with carbonate of soda; it is then left to settle for a quarter of an hour. By filtration, a rich orange-colored liquid is obtained, which, in evaporating on the water bath, yields the naphthalic acid.

Benzoic Acid from Naphthalic Acid.—This process is based upon the fact that naphthalic acid in presence of a surplus of an alkaline base (lime), and at a temperature of 625° to 660° F., is changed into benzoic acid. The process, however, has to be performed in vacuum.

The brothers Depouilly indicate the reaction taking place as follows:

Naphthalate of lime=C_{16}, H_4, O_6+2 Ca, O, and hydrate of lime=Ca, O, H, O, yield in heating to the above temperature.

Benzoate of lime=C_{14}, H_5, O_3+Ca, O, and carbonate of lime=2 (Ca O, C O_2).

As seen from this equation, decomposition of water and formation of carbonic acid is taking place. As the success of this operation, however, is often depending upon mere chance, it requires great skill and practice. From the benzoate of lime, the benzoic acid is separated by hydrochloric acid. In distilling the naphthalate of lime in presence of lime, *benzol* is formed, an operation which is nearly always of success.

NAPHTHYLCARMIN.

If the orange-colored liquor, containing the naphthalic acid—vide above—is oversaturated either by hydrochloric or sulphuric acid a precipitate in floes of a most beautiful carmoisin red is obtained. The same is undoubtedly identical with the *carminnaphte* of Laurent, which this investigator obtained once in heating naphthalin with bichromate of potassa and sulphuric acid, but could not produce again at any subsequent trial. This substance combines readily with alkalies, yielding yellowish-red lacs, and dyes silk and woolen without mordants, either orange or violet red. It is soluble in acetic acid and alcohol, and is precipitated again from its compounds by mineral acids.

On the Formation of the Diamond.

Researches on this subject have lately been made by Messrs. Goeppert and D. Brewster. The black diamond of Bahia is, according to Mr. Goeppert, a mixture of amorphous carbon and diamond. M. Liebig's experiments on its combustion also agree with this statement. It often happens that the diamond incloses other crystals; iron pyrites, particularly, have been noticed in it by Mr. Hartwig. Sir David Brewster calls attention to the microscopic cavities existing in this as well as in other gems, as in the topaz and emerald. These cavities are found to be often very numerous in certain dark diamonds, they thus dispersing the rays of the light, are therefore of no value in jewelry. Mr. Goeppert remarks that the diamond must originally have possessed a certain plasticity; we notice, in fact, in a diamond belonging to the emperor of Brazil, the impression yet of a sand grain. The black as well as the crystallized white ones bear also the signs of analogous impressions produced by foreign bodies. Some investigators believe to have recognized the cellular tissue of plants in the ashes resulting from the combustion of this gem. Mr. Goeppert, however, has not yet detected with certainty any traces of organization, neither in the diamond nor in its amorphous form, the plumbago. As to the question so often discussed, whether the diamond be formed by platonic or neptunic action, the latter naturalist is of the opinion that the first hypothesis is scarcely admissable, the experiments of Depietz having shown that the diamond is changed into a kind of coke, whenever exposed to the intense heat of a galvanic battery. The second hypothesis, attributing its formation to neptunic action, is sustained by the authorities of Newton, Brewster, and Liebig, being also that which is best in accordance with all that is known about the gneiss, itacolumite, and the metamorphic rock in which it is found. The character of these rocks, however, do not allow us to attribute to them a plutonic origin.—*Cosmos.*

A Daring Explorer.

At the last meeting of the California Academy of Science, a letter was read from William H. Dall, Chief of the Scientific Corps of the Western Union Telegraph Company, dated at St. Michaels, Alaska Territory, and acknowledging his election as corresponding member of the Academy. When the telegraphic party returned from the wilds of those northern regions, as we noticed in a late issue, this gentleman remained behind to prosecute scientific researches and gather information respecting this country. That the work he has undertaken to perform is no easy one, an extract from his letter will show. He says:

"I have traveled on snow shoes about 400 miles, camping in the open air, with the thermometer from 8° to 40° below zero. I have seen the thermometer down to 68° below zero. In the spring I started from Nulato, on the Yonkon River, where poor Kennicutt died, and paddled up stream 650 miles in an open canoe to Fort Yonkon, being the first American to make the trip, and one of the only four men out of the whole expedition who have been there. We met two adventurers returning from a trip of 600 miles further, and all hands came down together to the sea and round to St. Michael—a nice little trip in an open canoe of 1,300 miles. We had plenty of rain the last part of the journey, and made the trip in 16 days. This is the first trip ever made to the sea from Fort Yonkon direct. I have acquired sufficient knowledge of Russian and one or two Indian dialects to get along very well. I do not like the country. It is full of mosquitoes in spring; the summer is constant rain and fog, and the only pleasant time is the winter, when it is very cold. But in consideration of the work, I can stand it another year."

NEW GALVANIC BATTERY.—We have had in use in our laboratory a most singular looking piece of apparatus, devised by Moses G. Farmer, Esq., the well known electrician of this city. It is a new form of instrument for converting heat into electricity, and most satisfactorily does it perform its work. All that is necessary to put it into active operation is to light a gas jet, and in a few moments the electrical impulses are manifested, and the battery is ready to be set to work. It deposits metals with great facility, and the development of the agent is constant and uniform so long as the heat is supplied. It resembles a "fretted porcupine" as much as anything we can compare it with. The metals employed in its construction are antimony and copper. The strips or arms of copper protrude outward from the bars of antimony, so as to secure the cooling influence of an air current, while the gas is heating the other extremity. A portion of the heat of the flame is transformed over into electricity, thus showing the easy convertibility of one imponderable into another, and the correlation of the forces.—*Boston Journal of Chemistry*

Skating Rink.

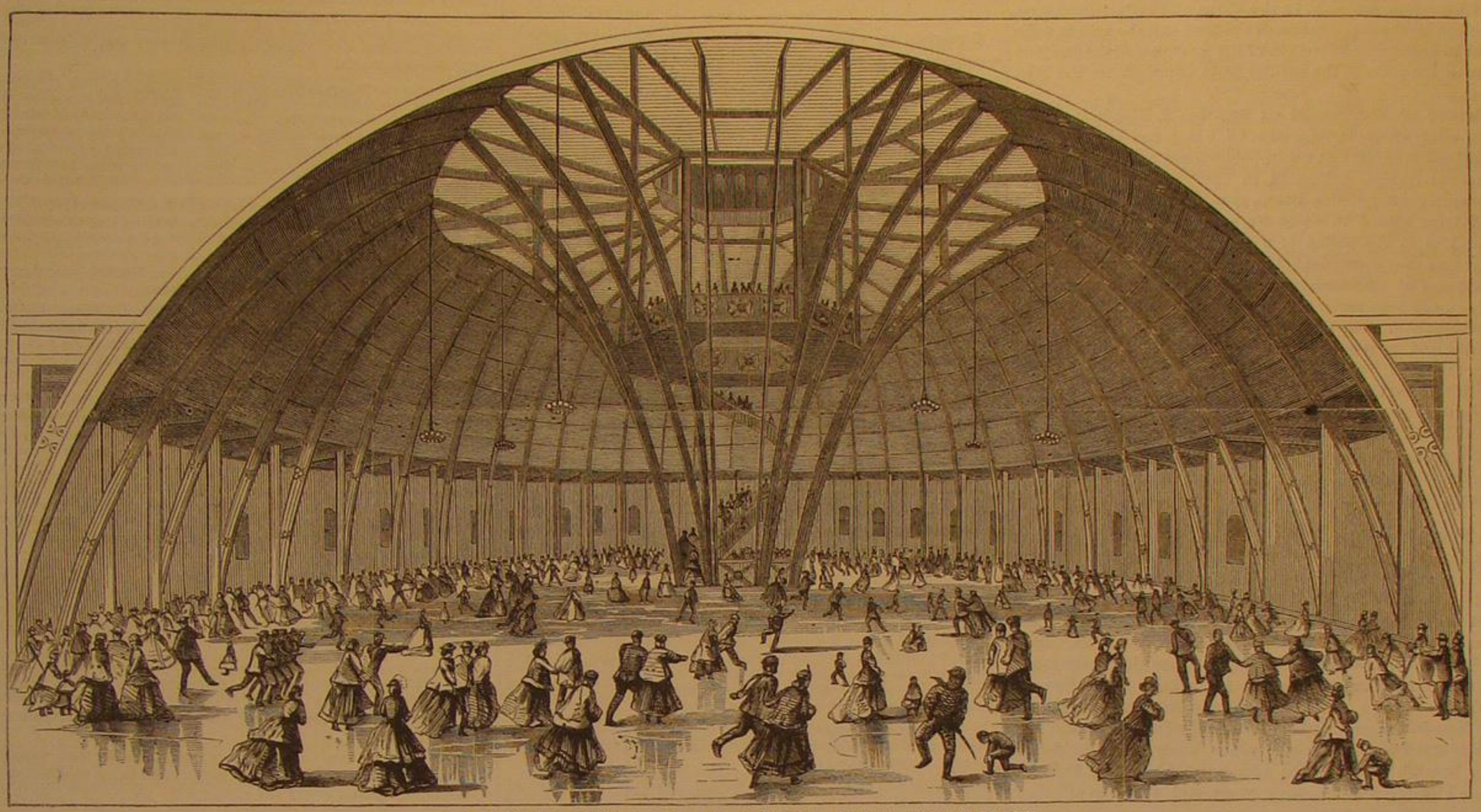
In the vicinity of the Central Park, New York City, several enterprising persons have caused whole blocks of ground to be flooded, and on the margin of the pond have erected temporary buildings, for the use and comfort of skaters, and the bands of musicians who play enlivening airs during the afternoons and evenings of the skating season. The proprietors call their respective places skating rinks; but in true terms they are simply skating ponds, unprotected from the weather. But young and old, in large numbers, patronize these ponds when the ice is good, and the scene is very enlivening to the beholder, and exhilarating and improving to the skater, the "poetry of motion," as in dancing, being kept in harmony with the music.

But our British neighbors are far in advance of us in providing comfortable and artistic places for the enjoyment of skaters; and we hope, by presenting a view of the best skating rink we know of, to stimulate the exertions of our people to making similar erections in our own cities. Our climate is not so favorable as our neighbors' for enterprises of this kind, but the receipts for even a short season would be very good in a city of the size of New York, and we think it would pay.

From *Harpers' Weekly* we extract the following description of the rink at St. Johns, N. B.:—

"In the British Provinces, where the rink exists in its full and sublime perfection, we find structures as spacious and graceful as a World's Fair palace, whose crystal floors are nightly renewed and polished to gleaming by the biting frost. Each night the icy arena is planed by a machine and flooded to the depth of an inch; and then, through every opened door and window, the keen air is admitted to harden and glaze the surface for the next day's sport. From December until March, throughout the long and dreary winter, the rink affords the chief and constant center of attraction; before it all other festivities pale their fires.

"All the chief cities of Canada boast their skating rinks. Montreal has a model one; but for extent, adaptation to the purposes for which it is designed, and beauty of detail, that at St. Johns, N. B., unquestionably bears off the palm. This rink is owned by an incorporated stock company. The main structure is of circular form, 160 feet in diameter, and covers an area of 20,000 superficial feet. It is an immense dome, resting upon perpendicular walls 20 feet high and pierced with 39 windows, and is surmounted by a graceful cupola, or lantern, the apex of which is 80 feet from the ground. This lantern contains 24 windows, throwing light directly into the interior of the structure. Within, and girting the extreme circumference, is a platform, or promenade, 10 feet wide, for the accommodation of spectators. In the center is a circular framework containing a spacious stand for the band, from which a spiral iron staircase ascends to two circular galleries, one above the other, the highest 50 feet from the ground, whence a bird's-eye view of all that is passing below can be had at a glance. From this focal point also spring the supporting rafters that form the huge dome which constitutes the chief feature of the design, producing an effect airy and graceful in the extreme: it cannot be better described in terms unarchitectural than to liken it to a fountain whose waters, springing from the center, fall in majestically-sweeping curves to the outer perimeter. All the area between the hand-stand and the circular promenade is covered with ice, which is flooded daily from the City Water-works. The outside front is two stories high, with decorated entablature, and contains waiting and refreshment rooms, dressing-rooms, and the residence of the janitor. The whole edifice cost about $12,000, and is in every respect creditable to the projectors and an ornament to the city.



SKATING RINK AT ST. JOHNS, NEW BRUNSWICK.

The Dignity of Labor.

"Spice," of the Boston *Commercial Bulletin*, relates the following: "We were never more impressed with the dignity of labor than while witnessing, a few days since, a group of 'down-trodden workingmen' engaged in setting up some machinery. There were five of them, or rather four men and a boy, and when they came under our notice, 5:30 P. M., one was engaged in slowly turning over the contents of a box, in search of a screw; two were looking with much interest for the result of the labors of No. 1; the fourth was slowly scratching a piece of iron with a file, and the boy was scratching his head. No. 1 finally found a screw to suit him, but during the search his pipe had gone out. Laying down the screw, he began to investigate his pocket for a match. Nos. 2 and 3 searched theirs in sympathy, while the filer paused to see the result. Finally No. 2 found a match, ignited it, and handed it to No. 1, who, having accomplished a light, smoked for a few minutes to assure himself of the fact, while the boy went to the other end of the room to look at the clock. No. 1 then looked at his watch, and compared time with No. 3. Time, 5:40. No. 1 then leisurely put the screw into position to fasten a bar. No. 2 held the bar; No. 3 squinted at it from the other side of the machine; No. 4 inspected the whole operation reflectively, as he slowly resumed the filing, and the boy wiped the oil from his fingers. Time, 5:45. The entire labor was now suspended, while the boy was sent across the room for a necessary tool. Just then it occurred to No. 2 that a chew of tobacoo was necessary to his comfort, and, as his supply was out, he applied to No. 3 for the weed, and to No. 2 for a knife to cut it with. No. 1 consulted his watch again. Time, 5:50. And labor was resumed, the screw was turned home; No. 1 tried the bar; Nos. 2 and 3 engaged in a playful scuffle, and the boy looked on with a grin of admiration. The filer laid down his work and looked at his watch, and announced it six o'clock. Tools were instantly dropped, and the five, having accomplished the work of two ordinary men, went cheerfully home."

Editorial Summary.

AMPUTATION NOT ALWAYS NECESSARY.—The *British Medical Journal* calls attention to the fact that several of the men who were wounded in the New Zealand campaign, have brought home arms and legs, which, according to the standard rule of military surgery, they ought to have left behind. Out of six cases of gunshot fracture of the femur, five recovered without amputation, four of them with very useful legs. Of ten cases of gunshot fracture of the humures, eight reunited solidly, and in only one case was amputation resorted to, and that was primary. Guided by the experience of these cases, the surgeon-general says, it would be fair to expect, that, when eighty per cent of gunshot fractures of the humerus recover without difficulty, that amputation in such cases might be delayed for a second operation, if after all found necessary.

UTILIZING SEWAGE.—At Sandon, Isle of Wight, the sewage is conveyed in pipes clear of the town into cesspits, where it is filtered and deodorized by a chemical process. The clear portion finds its way into the sea miles away from the town, and the solid residue is mixed with ashes and road sweepings, and forms good manure.

ARTIFICIAL TEETH.—They should never, under any circumstances, be worn at night, and for this reason: it is a physiological fact that bone, in a normal condition, is constantly undergoing a process of removal and replacement of particles, and that continuous pressure pervents the complete restoration of the parts, causing what is commonly called absorption. The osseous structure of the mouth is protected only by a thin covering of muscular tissue and mucus membrane, on the firmness and elasticity of which it depends for protection against the pressure of the plate; but when constantly excluded from the atmosphere, especially by hard rubber, which being a poor conductor of heat, keeps the part covered at nearly an equable temperature, these tissues lose their elasticity and become spongy and fungoid. Two very undesirable results are thus arrived at. The mouth is reduced to an abnormal condition, and the plate no longer fits well, which is just what the patient has been trying to avoid by wearing his plate at night.—*Dental Cosmos.*

A CANAL ON FIRE.—In an investigation as to the condition of the rivers Ayre and Calder, which water the great towns of Yorkshire, it was found that the fluid of Bradford Beck, the source of supply to the Bradford canal, was so corrupt from sewerage, that in summer large volumes of inflammable gases were given off; and although it has usually been considered an impossible feat to "set the river Thames on fire," the boys found it practicable to set the canal on fire, the flames rising six feet high, and running along the surface of the water for many yards, enveloping the canal boats, to the great terror of their passengers. That this state of things is not limited to one district was abundantly proved by inquiries at other towns.

THE SUEZ CANAL.—It has been announced that this great undertaking was in such an advanced stage of completion, that already an English vessel had passed through to the Red Sea. It now appears that the vessel was a Government tug-boat, which was to assist in the embarkation of the Indian troops at Suez, and, that after being lightened as much as possible, even to the removal of the paddle wheels, a number of empty casks were placed under her, and in this manner she reached Suez.

SHEET IRON RAILROAD SLEEPERS.—A curious plan for a temporary railway, to be laid for the benefit of the English forces in their excursion to Abyssinia, has been proposed by a Mr. Hadden. The peculiarity consists in making the sleepers of flattened cylinders of sheet iron, closed at one end, and which are to be filled with sand or gravel well packed. The sleepers are then to be laid on the ground with little or no ballast, and the rails secured to them by clip pieces, so as to be easily removed when desired.

THE thin metallic tubes used for holding artists' colors, are made by placing a disk of block tin in a die or cylinder into which a punch is slowly forced by hydraulic or other pressure. The punch fits the cylinder almost exactly, and the tin rises into the intervening annulus, as if it were a liquid, its constituent particles being made to move over each other as they would do if the tin were melted by heat.

AN OLD PIECE OF ORDNANCE.—The Turkish Sultan has given to the British government, in exchange for two large Armstrong guns, a monster gun, twelve feet long, thirty to thirty-six inches in exterior diameter, and weighing from twelve to fifteen tuns. Its chief value is its historical one, being one of the pieces of ordnance used in the memorable siege of Constantinople, by Mahomet II, in the year 1453.

WALKING STONES.—We have noticed in this column the "walking leaves" of Australia, and now give our readers the benefit of a statement that has fallen under our notice, of some "traveling" pebbles found in Nevada. They are described as almost perfectly round, the size of a walnut, and extremely hard. When distributed about upon a flat surface, when even separated two or three feet, they immediately gravitate toward a common center. At a distance of five or more feet, the attraction ceases. These stones are found in a very rocky region, which abounds in little basins hollowed out of the rock, from a few feet to a rod in diameter, and in the bottom of these the stones are congregated. We would suggest that perhaps the common phenomenon of the "eye stones"—calcareous concretions—which, when placed in a nearly flat porcelain dish with an acid, as vinegar, will tend gradually toward a common center, receives an illustration, probably, in the above. The effervescence occasioned by the combination of the lime and the acid is sufficient to overcome the weight of the pebbles and the inclined sides of the plate or the natural basin accomplishes the rest.

EFFECT OF ELECTRICITY ON SEEDS.—M. Blondeau asserts that, after many experiments, he has found the action of an induction current on seeds, before planting, produces very beneficial results, noticeable in their subsequent growth. In experimenting with beans, peas, and cereal grains, the seeds were soaked in water for some time, and were then submitted to the action of a current for several minutes. After this they were planted in pots filled with good garden earth, and at the same time other unelectrified seeds were planted and kept under the same conditions for the purpose of comparison. The former always came up first, grew more rapidly, and gave much more vigorous and fruitful plants than the latter. "But," says M. Blondeau, "one very singular fact is that many of the electrified seeds obstinately persisted in growing with the true root pointing up in the air, while the plumule was directed downward;" which gives a little shade of incredulity to the whole statement, but the experiment is an easy one for any interested person to try for his own satisfaction.

A NOVEL HITCHING POST.—The party comprising the Russian American Telegraph Expedition, on their return from the northern region, have brought home many interesting relics. An ivory tusk twelve feet long and measuring seventeen inches in circumference, was purchased for twelve leaden bullets from Indians living in the new territory of Alaska. Near the junction of the Anadyr and Myan rivers the party found a tusk of enormous size sticking some six or eight feet out of the ground and endeavored without success to dig it up. The frost in the ground held it so firmly that they were not able to ascertain whether the other bones of the mastodon were beneath or not. The Indians said that they had used it as a hitching post for many years, and that was all they knew or cared about it.

CHINESE TEA GROWN AT HOME.—In our number for Sept. 28, 1867, we gave a description of Dr Alfred L. Acee's plantation of tea, at Rose Bower, near Bellevue, Talbot County, Ga. We have now the pleasure of acknowledging the receipt, by express, from Dr. Acee, of a few living tea plants grown by him, together with some of the nuts. We have placed the plants in our green house, and intend to raise some tea from the seed. Dr. A. is entitled to much credit for his perseverance in demonstrating the feasibility of raising tea on this continent. The plant forms an ornamental evergreen shrub, and may be readily cultivated in many parts of the country. Dr. A. states that it blossoms in the fall, that it bears exposure even to freezing sleet, and may be cultivated anywhere in the open fields without manure.

CRYSTALLIZED EGG.—Numerous and of very varying values are the recipes for preserving eggs, which have been given to the world, but a company of this city believe that they have at last attained perfection in this line, though attaining their end in a novel way. Their process is as follows: The fresh eggs are emptied from the shell into a long trough, and into this trough descends a shaft armed with a series of metallic disks, which, rapidly revolving, beat the eggs into homogeneousness, and are themselves covered with a thin covering of egg. This thin pellicle, when dried, is scraped from the disks in the form of thin granules, apparently crystallized, and retains indefinitely all the peculiar properties and flavor of the fresh egg.

FERTILIZING PLANTS.—The old idea of botanists that hermaphrodite flowers shed their own pollen upon their own stigmas is now generally discarded, as observation has shown the almost infinite variety of contrivances which Dame Nature furnishes to prevent this. It has been recently noted that the insect world plays a very important part in the fertilization of certain plants in conveying the pollen from one flower to another. Another remarkable fact in this connection is that almost all flowers which are thus fertilized are gaily colored so as to be attractive to insects, and Mr. Darwin observes that he knows of no flower fertilized exclusively by pollen blown on the wind, that has not a dull unattractive appearance.

COFFEE-TEA.—We have made frequent mention of the experiment which, if reports are true, has been highly successful, of raising the true Chinese tea-shrub in our Southern States. An exchange calls attention to a new branch of industry in this line, which is capable of still more extended cultivation. It is customary in Sumatra to use the roasted leaves of the coffee plant for the production of a drink having all the properties of the best of tea, and containing nearly 1.25 per cent. of its peculiar principle. The preparation of the leaves is much simpler than that required for the true Chinese tea, and the cultivation of the plant can be carried on in more northerly countries, where the coffee berry itself would never fully ripen.

A NOVEL MODE OF PASTURING SHEEP.—A grazier in the Pas de Calais, named Pentefort, has introduced the following singular method of economizing his green crops: Over the whole field is placed a rack or fence, so made that the sheep cannot jump over it, but must feed between the bars; and when all the herbage within their reach is consumed, the rack is moved forward, so as to give them a fresh supply of forage. Regularity in cropping and great economy result from the employment of this singular system.

CARBONIC ACID BATHS.—At Pièrmont, in Germany, there is a natural spring of carbonic acid gas, the sides of which have been walled up, and steps laid for entering it. The well is shallow, and the gas fills it to a depth of about four feet, so that the gas rises about to the middle of a person standing in the well. The effect of the gas in contact with the skin is said to be a peculiar pricking sensation, but not so unpleasant but that such baths have come to be very much in vogue.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

Samples of ore from the Industry silver mine, in Maine, have been assayed by the Massachusetts States assayer and found to average 8 ounces, 60 grains of silver per ton. An interesting fact regarding this mine is the discovery of silver in magnesia, and white or gray pyrites.

From a list of railroads in California, prepared by the Secretary of the Interior, it appears that up to July 1st, 1867, there were a fraction less than 300 miles of railroad track completed and in running order in that State, with an additional length of 1,142 miles, now being constructed.

Machine belting is manufactured of paper by Messrs. Crane, at Dalton, Mass., and is in use in several New England mills. One of these paper belts measures seventy-five feet long and eight inches wide. Patents have been secured in foreign countries for this invention, through this office, and the article promises to become the subject of much importance.

Notice has been served on the workmen in the iron trade in Middlesbro' and the Tees District, Darlington, Witton Park, and other parts of the north-east of England, that the masters intend to reduce their wages on the 7th of December. The notice has been issued in consequence of a meeting of the Ironmaster's Association, at Newcastle-on-Tyne, and it is thought that the reduction will average about ten per cent. The men at the Albert Works, Darlington, have accepted a reduction.

The survey of another trans-continental railway route, which shall follow mainly the thirty-fifth parallel of latitude, is nearly completed. Its projectors claim this as the most feasible one across the continent, and even if the Northern and Southern roads are constructed, this would still be the favorite popular thoroughfare, and the easiest and cheapest built.

From lack of economy, in production of ores, it is estimated that the aggregate loss on the production of bullion of this country for the present year, will reach the round sum of $25,000,000.

Many of the very best locomotive builders in France and Belgium still adhere to the plan of packing their cylinder heads with wire gauze and red lead paint, an antiquated practice long since discarded in both this country and England.

In Brazil, Clay county, Indiana, there is found a species of coal which in appearance and gravity resembles charcoal, having even the woody fibre of the latter. So valuable is it for smelting purposes that one furnace in St. Louis is using five car loads a day, and its existence needs only to be known to increase the demand from other establishments indefinitely. In the same neighborhood is also found an abundance of native iron ore of a superior quality, and a number of iron men from Ohio and Pennsylvania have lately been investing heavily in real estate, and the erection of mills and furnaces in this section.

During last year there were 181,099 tuns of new, and 236,834 tuns of re-rolled rails made in the United States. During the same period we imported about 100,000 tuns, making the total consumption of rails in 1866, 517,933 tuns of 2000 lbs.

It has been calculated by Prof. Breithaupt that during the six hundred and forty years, dating down to 1825, which the mines of Freiburg have been worked, not less than eighty-two thousand hundred-weight of silver have been raised, and that the amount yielded in 1859 alone was not less than eight hundred thousand thalers.

There remains to be built to complete all railroad communication across the continent, 1,070 miles of road. As about 700 miles have been built within little more than two years, it is not unreasonable to expect that the remainder will be completed in the time anticipated—say in 1870.

Our Canadian neighbors are now very much exercised over the selection of a route for the new Intercolonial railroad, which is to bind the various members of the new Dominion more closely together. The road is to run from Quebec to Halifax, through the lower part of what was Lower Canada, but now called the Province of Quebec; New Brunswick and Nova Scotia. Three routes have been proposed, and consequently the war of local interests runs high. Of these, the frontier line runs through the most thickly settled regions, but in case of war with us, the Canadians fear the road would be too easily destroyed. The same reason holds good against the second or central route, the northern route being preferred by the Government officials. Toward the construction of the road, the English Parliament is to guarantee a loan of $15,000,000, which will probably cover the cost of construction.

Recent American and Foreign Patents.

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

MANUFACTURE OF STEEL.—James R. Bradley and Moses W. Brown, Chicago, Ill.—This invention relates to an improved process for manufacturing steel of various kinds and grades, and consists in improvements in the composition of mixtures for treating malleable iron.

HOISTING JACK.—S. B. Rittenhouse, Plymouth, Ind.—The object of this invention is to provide a small and portable machine through which a very great power may be obtained for the purpose of hoisting heavy weights, or propelling heavy bodies, or exerting a great force in any direction, as propelling a ditching machine, or a plow for laying drain tile.

INHALING TUBE.—Samuel W. Sine, Easton, Pa.—This invention relates to an instrument which is used for inhaling gas, or anæsthetic agents for producing insensibility in surgical, dental, and other operations, or for other purposes.

BOOT-TREE.—F. S. Wilt, Allentown, Pa.—This invention relates to a method of constructing boot-trees, and the invention consists in an arrangement whereby the leg and foot of the boot are treed or expanded simultaneously, by operating a single lever nut on the upper end of the tree.

IMPROVED AUTOMATIC RAIN CONDUCTOR.—James B. Hudson, Fayetteville, N. C.—This invention relates to an apparatus for conducting water into cisterns or tanks, and has a conducting disk to oscillate on pivots, and connected with a float, whereby the said disk is made to reverse its angle of inclination and deliver the water into a waste pipe, when the water in the cistern reaches a certain point.

ASH HOUSE.—Moses Hall, Osborn, Ohio.—This invention consists of a hopper and screen upon a fire-proof ash box, and the whole placed upon a leach tub; said leach tub being provided with a screen or perforated plate through which the lye passes off.

CASE OR BOX FOR PRESERVING CORPSES.—P. Wendhiser, Rockville, Conn.—This invention relates to a case or box for the preservation of corpses, which box or case is constructed in a novel and peculiar manner, whereby it is rendered extremely efficient and desirable, as well as serviceable, for the purpose intended.

GENERATING AND SUPERHEATING STEAM.—George Miller, Melbourne, Victoria.—This invention relates to the manner in which steam is generated and superheated, and to the means by which the pressure of the steam is regulated, and also to the manner in which the temperature is concentrated, and consists in providing, in connection with a furnace or fire box, generating pipes or tubes wherein the water enters and is converted into steam, and also superheated.

PLOWS.—S. J. Leach, Tuscaloosa, Ala.—This invention has for its object to furnish an improved plow provided with a detachable facing formed of wood or other material, to which adhesive soils will not adhere and clog the plow, which shall be cheap, more durable, and more effective than the plows ordinarily used in such soils.

LAND CONVEYANCE.—G. F. Krollpfeiffer, New York city.—This invention relates to an attachment for sleds, sleighs, and other classes of land conveyance, whereby sleds or sleighs can be propelled over the ground or other surface, by means of the direct action upon the ground of a lever or levers, so hung to the body of the sled or other vehicle as to be suitably operated by a person or persons within the same, or by other power, either hand or mechanical.

BOAT LOWERING APPARATUS.—A. F. Crosman, Lieut. Commander, U. S. N. This invention relates to a new and improved means for detaching boats from davits, and it consists in a novel manner of applying the davits to the vessel, whereby the former may be made to project out from the vessel, more or less as required, in order to prevent the boat, while being lowered, being thrown against the side of the ship by the action of the waves.

LANTERN FOR STREET RAILROAD CARS.—L. V. Badger, Chicago, Ill.—The invention is to obtain a signal lantern for street railroad cars, which may be applied to any car without difficulty, be readily changed from one car to another, and have the advantage of being capable of adjustment in a more conspicuous place than those now used.

STOVEPIPE DAMPER.—D. Manuel, Boston, Mass.—This invention relates to an improvement in the construction of dampers for stovepipes, and consists in two cast iron disks, which have flat central surfaces and are interlocked so that they lie close together when united by the pivot suspension rod of the damper; they have fluted or corrugated edges, which overlap the opposite corrugations on the opposite disks, and form concave radiators above and below, so related to each other that the smoke and heated gases can enter therein from below and receive a reverse movement which deflects them against the stovepipe, thus imparting more heat to the air in a room before finally escaping.

DRESSING MILL STONES.—Notley W. Wortham, Union Point, Ga.—This invention relates to an improved mode of dressing mill stones for grinding indian corn and other grain, whereby there is a large gain in the grinding capacity of the stones over the ordinary methods of dressing the stones and a superior quality of meal is produced.

RAILROAD WEED CUTTER.—J. S. Boicourt, Boonsboro', Iowa.—This invention relates to an improvement in a device for cutting weeds on a railroad track and consists in attaching cutters either circular or straight to the truck of a car, which are worked by gear deriving its motion from the wheels of the car.

HEDGE TRIMMER AND CORN STALK CUTTER.—John W. Hull, Connersville, Ind.—This invention relates to an improvement in the construction of a machine for trimming hedges and cutting down the stalks of corn in the field, and consists in a frame mounted on wheels and drawn by a team, an adjustable rotary cutter being connected with gearing moved by one of the wheels for trimming the top and sides of a hedge and a detachable cutter being placed on the frame when required for cutting corn stalks as the machine travels.

LAMP CHIMNEY CLEANER.—George Lea, Shirleysburg, Pa.—This invention relates to the construction of an improvement for cleaning lamp chimneys, and consists in a curved metal rod having a serrated conical disk or cap on one end by which a bit of paper, cloth, or fibrous substance of any suitable kind for wiping, cleaning, and polishing a lamp chimney may be introduced.

TURNING SPOOLS, BOBBINS, ETC.—David Dick, Corning, N. Y.—This invention relates to a machine for turning spools, bobbins, and other wooden articles of a similar character, and has for its object rapidity of execution and an automatic operation of the several parts throughout.

COMBINED SHOVEL AND SIFTER.—D. Boynton, St. Johnsbury, Vt.—This invention relates to a combination of a fire shovel and sifter, and it consists in providing a shovel with a supplemental bottom in which a screen is inserted, the bottom being so arranged or disposed within the shovel as to admit of a separate discharge for the ashes, and the shovel provided with a lid or cover, all being arranged in such a manner that the ashes may be shoveled up and the cinders separated from it and the ashes discharged from the shovel so as to leave the cinders clean and in good condition to be placed upon the fire whenever required.

SPRING BED BOTTOM.—George Widdicomb, Grand Rapids, Mich.—This invention has for its object to furnish an improved bed bottom, simple in construction, very elastic and wholly without noise when in use.

PRESERVING EGGS, MEATS, ETC.—Charles Boize, New York city.—This invention consists in the use of argillite or argillaceous schist or slate finely powdered as a medium or means of packing or surrounding the eggs or other articles, whereby they are enabled to be preserved and maintained fresh and suitable for being transported from place to place without becoming deteriorated or rendered useless. The slate employed is susceptible of use over and over again and not in the least becoming deteriorated.

BELT-FASTENER AND TIGHTENER.—Charles O. Pike, North Leverett, Mass.—This invention relates to a device for fastening the ends of a belt, and for tightening it, and the improvement consists in a clamp for holding the ends of the belt together, and a lever arrangement fitted to the clamp for tightening the belt.

SEED-PLANTER.—William R. Mozier, Higginsville, Ill.—This invention has for its object the furnishing of an improved seed planter, so constructed as to furrow the ground and drop and cover the seed; and which, by removing the sub-dropping device, may be used to cultivate the crop.

INSIDE WINDOW-BLINDS.—S. W. Shorey, Galesburg, Ill.—This invention relates to a method of constructing and operating inside blinds for the windows of dwelling-houses and public buildings, and it consists in the peculiar manner in which the slats forming the blind are connected together, and the manner in which they are closed and secured in a closed position.

EXCAVATOR.—B. T. Stowell, Quincy, Ill.—This invention relates to a new method of constructing excavators and ditching machines.

SAIL SAFE.—F. G. Ochme, Plymouth, Mass.—This invention has for its object to prevent the capsizing of sail-boats, by securing the sail with an apparatus which may be set so as to release the sail when the pressure has reached the amount that the sail and boat can bear.

CULTIVATOR.—Henry Howe, Oneonta, N. Y.—This invention has for its object to improve the construction of cultivators so as to make them more convenient in operation.

EQUILIBRIUM BALANCE FOR SAFETY-VALVES.—Virgil D. Green, Watertown, Wis.—The object of this invention is to overcome the rigidity of the spring in the spring balances in common use.

WASHING-MACHINE.—Thomas Q. Frost, Indian River, N. Y.—This invention relates to a machine for cleansing or purifying linen and other clothes or

articles of a similar nature. The invention consists in operating stampers or dashers within the washing-tub, and also in attaching to the tub rollers which are made to act as a wringer for the clothes, and which form a part of the tub.

TUG OR TRACE-FASTENER.—Ira McAllaster, Milo, Mich.—This fastener or buckle consists of a frame having side-guards, which frame is fastened in any suitable manner to the outer end of the hame-strap, along its length, so that the tug or trace-strap can be drawn through it from end to end, and there secured by inserting a tongue into the proper aperture; that is at one end of a lever arranged to slide upon a cross-pin between the side-guards and in the direction of the length of the frame, wherein such tongue is fastened by running the opposite end of the lever up over the end of the frame, where the tug or trace enters.

HAND RINDING HARVESTER.—G. H. Spaulding, Rockford, Ill.—This invention consists of a box or grain receptacle, placed on the platform into which the grain enters through the bottom, being carried therein by the action of the rolling apron, forming part of the platform. The peculiar construction of the apron conduces to the perfect working of the device.

PLOW.—Andrew Gilmore, Phœnixville, Pa.—The invention is limited to a new and improved device for preventing the colter from clogging, and in connection with this, an adjustable handle.

TABLE CUTLERY.—N. W. Caughy, Baltimore, Md.—In this invention the knife or fork is made adjustable, and extensible in the handle, so as to serve for use at both the dinner and tea table.

WATER WHEEL.—Henry W. Shipley, Portland, Oregon.—The object of this invention is to obtain a wheel which will utilize the power of small streams of water to a degree not hitherto attained.

COFFEE POT.—John Zimmerman, Royalton Centre, N. Y.—In my improved coffee pot the coffee is subjected first to the action of the stream as it rises from the water in the pot to the condenser, and afterwards to the action of the condensed water flowing back to the pot from the condenser.

POTATO DIGGER.—Thomas W. Shepard, Hennepin, Ill.—In this invention a new form of mold or plow is used, and a new arrangement for regulating it, by which greater results are obtained with less power than in any other machine for the purpose.

STEAM COOKING APPARATUS.—John Zimmerman, Royalton Centre, N. Y.—In this invention a large number of cooking vessels are so constructed that they can be arranged one above another in a vertical cylinder, and a variety of materials, vegetables, meats, pastry, cakes, etc., can be cooked at the same time in the cylinder without interfering with each other, and with a single application of the steam.

REGISTERING YARD STICK.—W. P. Lupton and C. M. Talbot, Cadiz, O.—In this invention the operator registers the number of yards measured by pressing a knob projecting from the side of the stick under his finger as he measures each yard. The number of the tally is indicated by figures appearing through a small aperture in the back of the yard stick.

AUTOMATIC STEAM VALVE FOR INJECTORS OR FEEDERS FOR STEAM BOILERS.—Richard Gornall, Baltimore, Md.—This invention is a new device designed to be applied to a steam boiler, whether connected with an engine or not, and automatically to regulate the flow of steam from the boiler to a pump or injector, the steam thus escaping being used to work the pump or injector, and feed the boiler, entirely independent of the action of an engine.

SCHOOL DESK AND SEAT.—C. Thurston Chase, Albany, N. Y.—In this invention the seats and desks are so supported that each one is connected with all before and all behind it in the row. The same construction which affects this object renders the seat much easier to enter and leave. The seats are also provided with hinged bottoms, opening upward and inward.

TIDAL OR SELF-ACTING ELEVATOR.—Philip Weck, Brooklyn, N. Y.—This invention relates to a device for elevating water and other articles by the rising and falling of the tides, and is designed to be perfectly self-acting, and to effect a great saving in labor and expense in elevating articles in places where the tides ebb and flow in any material degree.

WASHING MACHINE.—G. Reneky and J. Keiss, Cedar Falls, Iowa.—This invention has for its object to furnish an improved washing machine, simple in construction, easily operated, and doing its work quickly and thoroughly.

CULTIVATOR.—C. G. Petengill, Hebron, Me.—This invention has for its object to improve the construction of cultivators so as to make them more easily adjustable, and more effective in operation.

CLEANING BOILER FLUES, ETC.—Joel M. Wheeler, Oxford, Conn.—This invention has for its object to furnish an improved means for cleaning the tubes, flues, tube boxes, etc., of steam boilers easily, conveniently, and thoroughly, which may be applied without hauling the fires, or while the ship is under way., and which cannot injure the flues, or cause them to leak.

WASHING MACHINE.—John Mitchell, Newark, Ohio.—This invention relates to an improved washing machine, and consists in the insertion of ribs in the end of the machine, between which and a vibrating weighted dasher provided with pounders alternating with said ribs, the clothes are squeezed, and effectually washed and cleansed.

CAR COUPLING.—A. Hillman, Stratford, C. W.—This invention has for its object to furnish an improved car coupling, simple, strong, and reliable in construction, not liable to get out of order, which shall be self-coupling, and which may be readily attached to an ordinary draw bar and bumper head.

HARROW.—John Aiken, Warner, N. H.—This invention has for its object to furnish an improved harrow, so constructed and arranged that it will adjust itself to pass over roots, stones, or other obstructions, without having to be raised from the ground; that it will relieve itself of rubbish, and that it may be made light, while at the same time it will do its work better than the ordinary heavy harrows.

HAY FORK.—J. S. Gochnauer, York, Pa.—This invention relates to an improvement in hay forks, in which two tines are made in one piece, two lifting toes being employed which are simultaneously operated by means of an oscillating bracing roller and a spring lever.

SORGHUM EVAPORATOR.—Noah Clouse, Buffalo Village, Pa.—This invention relates to a new sorghum evaporator, which is so arranged that the sorghum goes through the whole process in separate vessels, so that each vessel can be cleaned after it has been emptied, and can be made ready for further operation without stopping or retarding the process in the other vessels.

STEAM ENGINE GOVERNOR.—Oliver A. Kelly, Slatersville, R. I.—The object of this invention is to obviate the violent changes and consequent fluctuations in the quantity of steam admitted to the piston, and is especially designed for engines that are regulated by the main valves.

IRON SAFE.—William Gardner, New York city.—This invention consists in a novel construction of the door of a safe, which is so made as to more effectually resist the action of fire and burglars, and also in the employment of a false bottom for the purpose of conveniently and securely fixing the safe to the floor of the chamber in which it is placed, without affecting its fire and burglar proof qualities; also in an arrangement for more securely locking the door to the case or frame of the safe.

LOCK.—Jacob Wertsbaugher, La Grange, Ind.—This invention has for its object to furnish an improved lock, strong, durable, and simple in construction, which cannot be picked, and of which no impression can be taken to enable a false key to be made.

TRUNK.—Thomas Smith, Brooklyn, N. Y.—This invention relates to a new extension trunk, which is provided with a tray or trays having hinged bottoms, which tray can be secured in an inverted position upon the cover of the trunk, extending the same and forming a new compartment for packing goods. The bottom of the tray becomes in this position the cover of the trunk extension.

SEAT RISERS FOR VEHICLES.—John R. D. V. Linton, New Bedford, Mass.—This invention relates to a new kind of seat risers or seat legs now used on wagons, carriages, sleighs, and vehicles of any description. The invention consists in the use of cast metal risers in place of the ordinary wooden risers or supports, such risers, when made of cast metal, possess great and important advantages over wooden ones, in beauty, convenience, and cheapness.

SEED PLANTER.—John Stark, Thomasville, Ga.—This invention relates to a new machine for planting all kinds of seed, from the largest to the finest sorts, and for spreading pulverized manure, as well as for preparing the ground for the reception of the manure and seed and for covering the furrows made and for rolling the land.

BURIAL CASE.—Robert F. Hill, Philadelphia, Pa.—This invention relates to a new manner of constructing burial cases so that they will be strong and commodious. The invention consists in making the cover hollow, and not flat, as usual, thereby permitting the body of the case to be shallower, and the consequent better display of the face and head of a deceased person. The head can then be laid upon a pillow, so as to project above the case, and will still not come in contact with the lid when the same is closed.

CHECK REIN ATTACHMENT.—M. A. Gates, Troy, Pa.—This invention has for its object to furnish an improved check rein attachment for harness, so constructed and arranged that the horse can be unchecked or allowed to drink without its being necessary for the driver to get out of the carriage. The invention consists in a strap running along the back strap of the harness guide rings attached to the back strap. To the forward end of the said strap is attached the check-rein hook, and to its rear end is attached a ring which, when the horse is checked up, is dropped over a hook attached to the rear part of the back strap or to the crupper strap. The ring of this strap is removed from the hook to allow the horse to drink and attached to it to check him up by means of a small hook attached to the but end of the whip.

LOCOMOTIVE LINK.—Thomas J. Rowley and Wm. Poland, Chillicothe, Ohio—This invention relates to an improvement in the construction of links for locomotive and other engines, and consists in a link formed of a single bar on which the box slides, which bar is stiffened by a side bar connected with the tumbling shaft.

HANGING WINDOW, SASH, DOOR, OR VENTILATING FRAMES TO CARS, ETC.—Wm. B. Dunning, Genesee, N. Y.—This invention consists in so hanging a window, door, or ventilating frame within the body of a car or other land conveyance, that it can be swung in either direction, that is either on the right or left, according to the direction in which the car, etc., is moving or as may be desired, to allow ventilaton and at the same time prevent the entrance of dust to the inside of the car.

NUTMEG GRATER.—W. W. Owen and D. C. Kelly, Muskegon, Mich.—This invention relates to a grater for grating nutmegs and similar substances, and consists of an L or T shaped pipe of tin or other metal with a spiral spring soldered at one end to a perforated grater plate which fits into the pipe; a small thumb rod is fastened to this grater and passes through the cross piece of the pipe. A grater wheel moves round on a wire axis secured to a plate borne on the pipe.

NEW PUBLICATIONS.

TODD'S YOUNG FARMER'S MANUAL, Vol. 2. How to Make Farming Pay. By S. Edwards Todd.

With full practical details of farm management, character of soils, plowing, management of grass lands, manures, farm implements, stock, drainage planting, harvesting, etc. One handsome post octavo volume, beveled boards, finely illustrated, and contains upwards of 400 pages. Post paid, $2.50

Also a new edition of TODD'S YOUNG FARMER'S MANUAL, Vol. I.: The Farm and the Workshop, with practical directions for laying out a farm, erecting buildings, fences, farm gates, selecting good farm and shop tools, and performing farm operations. Fully illustrated. One handsome post octavo volume, beveled boards, 460 pages. Post paid, $2.50.

Each volume distinct by itself, and sold separately. The experienced practical farmer will find the above works useful to him, although the author intends them more especially for the young farmer, as their titles indicate. The works are both copiously illustrated, showing improved farm tools, implements for cultivating the soil, fences, etc. The above works are both published by F. W. Woodward, at the office of the *Horticulturist*, 37 Park Row, New York.

PHOTOGRAPHIC MOSAICS. For 1868. Philadelphia: Benerman & Wilson.

This excellent little annual, by M. Cary Lea and Edward L. Wilson, is brimfull of choice extracts relating to improvements and best suggestions in photography.

THE SCHOOL DAY VISITOR.

A monthly magazine for the young, has been enlarged and improved $1.25 a year. Published in Philadelphia, Pa.

ATLANTIC MONTHLY. Boston: Ticknor & Fields.

The December number is just out. For sale by all the news venders Subscription price $4 per annum.

THE BOSTON WEEKLY ADVERTISER.

This excellent journal has entered upon a new volume—its fifty-eighth—and comes to us enlarged and improved, in quarto form, headed *The Thursday Spectator and Boston Weekly Advertiser*. We are glad to observe that prosperity and progress still attend the efforts of its proprietors.

LEAF PRINTS. By C. F. Hines. Philadelphia: Benerman & Wilson.

This is a neat little volume illustrating a very simple method of copying the forms of all kinds of leaves. The process consists substantially in making a photographic print of the leaf upon paper so prepared as to be sensitive to light. The method of preparation and printing are exceedingly simple and may be practiced by ladies. The results are very beautiful.

HISTORY OF THE MICROSCOPE.

Probably no person has contributed more towards the popularization of the microscope than Dr. Hogg, whose book bearing the above title has been ten years or more before the public. The present is a new and enlarged edition, rewritten and greatly improved. It is illustrated with some five hundred engravings explanatory of the construction of the microscope, views of the different styles manufactured, illustrations of their use, of the methods of preparing specimens, dissection, mounting, collecting, etc. Nothing could be more complete for the student or observer than the instructions of this valuable work. The wonders revealed by the microscope are both astonishing and endless. The study is most fascinating, while as an amusement for the leisure hour it is not only delightful but beneficial. If our young men and women could be induced to devote but a small portion of the time now wasted in gossip, idle conversation, or dissipation, to instructions such as may be easily realized from the microscope, they would make rapid advances in social and mental improvement. Dr. Hogg's book is probably the most popular of any upon the subject. Fifty thousand copies have been sold. The new edition is published by Routledge & Sons, 416 Broome street, N. Y.

A HISTORY OF WONDERFUL INVENTIONS. By John Timbs.

This will be found a most readable and valuable book. Every person who aspires to be well informed ought to be posted concerning the great inventions of modern times, their nature, names of the inventors, date, their progress and value. The accounts here presented concerning the early history of the mariners' compass, the barometer, the art of printing, the telescope, warfare, illuminating gas, steam engine, machine weaving, electric telegraph, and other inventions, each seem to form a separate romance of rarest interest. We wish that the facts concerning these things, their authors and projectors, could be generally fixed in the minds of young men. They could draw from them many lessons of encouragement and cheer, as showing how the men of toil in former days worked out the greatest problems of science and achieved the most extraordinary success. Beautifully illustrated. Published by Routledge & Sons, 416 Broome street, N. Y.

THE FAMILY SAVE-ALL.

This is the title of a new book relating to the economy of the kitchen, the larder, and the household generally. It contains the best recipes for cooking, from the smallest dishes up to the most difficult, with directions for the saving and reuse of very many substances that are commonly wasted. It is proverbial that people waste more than they consume. If the directions for family economy here presented were generally observed in this country, the resultant saving would be sufficient to pay off the national debt in less than five years. Price $2. Published by Peterson, Philadelphia. Sold by the New York News Company.

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."

☞ *All reference to back numbers should be by volume and page.*

J. B., of La., says: "I observe in your issue of Nov. 30th a notice of the presentation of a glacial theory by J. W. Reid, in which he advances the idea that the temperature of the northern hemisphere has been decreasing for 500 years. Is this correct? I thought the contrary was the case and that our winters were milder than those known to our forefathers." It is very common to hear accounts from the oldest inhabitants of the severity of winters in days gone by, but the average yearly temperature for a century past would, we doubt not, show a slight gradual decrease, and the remains of animals and plants which now flourish in tropical regions prove without doubt that the temperature of the northern hemisphere was once warmer than at present. This is not at all inconsistent with the supposition that it was also, at some time, colder than at present, for in looking into this subject we must deal with ages and not years.

J. H. B., of Pa., asks: "How many gallons of water will be required per minute to run machinery demanding 60 H. P., with an overshot wheel of 16 feet diameter? How many gallons of water will a water wheel of 60 H. P. raise per minte 40 feet high with the best pump now in use?" 75 gallons per second falling through one foot is a horse-power: that is 75x60 4,500 gallons per minute must fall through one foot for a horse-power, and this quantity falling through 16 feet will give 16 H. P. Hence for 60 H. P. 4,500x60-16ths=16,875 gallons are necessary; add to this about 55 per cent for friction, waste, etc., and you will have the required amount. As a horse-power is 33,000 lbs. raised one foot high in one minute the second query can be answered by simple calculation. Deduct from the result about 12 per cent for friction of pump, loss, etc., and the amount of water 60 H. P. will raise 40 feet high will be given.

G. W. G., of Pa., asks for a cement to secure the brass tops to carbon oil lamps. We have never found any difficulty with a cement of plaster of paris. The tops of all kerosene lamps are thus secured.

R. H., of Ohio, says, in relation to preventing scale in boilers—without injury or foaming—that the Anti-Incrustator Powder of H. N. Winans, 11 Wall street, New York city, is the most reliable article he has ever heard of and the cheapest.

Business and Personal.

The charge for insertion under this head is one dollar a line.

Parties in want of Fine Tools or Machinists' Supplies send for price list to Goodnow & Wightman, 23 Cornhill, Boston, Mass.

Pattern Letters and Figures for inventors, etc., to put on patterns for castings, are made by Knight Brothers, Seneca Falls, N. Y.

Allen & Needles, 41 South Water street, Philadelphia, Manufacturers of Allen's Patent Anti-Lamina, for removing and preventing Scale in steam boilers.

Will the Patentee or Manufacturers of Collins's Sunburner Lamp send a circular and price list of their lamps and chimneys to fit them to W. B. Beckwith, Franklin, Venango county, Pa.

Parties desirous of saving fuel, expense of cleaning, and corrosion of boilers, will find the remedy in H. N. Winans's anti-incrustation powder, 11 Wall st., N. Y.; twenty thousand references prove it reliable and uninjurious.

Manufacturers of Portable Steam Engines and Threshing Machines will will send circulars to Walker Reynolds Alpine, Talladega county, Ala.

The Safety Lamp Attachment can be applied to any Lamp. Inflammable gases banished. Lamps filled without removing the chimney. Price 25c. By mail 30c. Address Novelty Machine Co., Box 258 Troy, N. Y

Important to Capitalists.—Thos. Cooper offers for sale at a great bargain a patent mill for making railroad-car axles, which will also roll cold iron, and straighten and polish any kind of shafting. Circulars with full particulars, sent on application to Thos. Cooper, Box 2377, Cincinnati, Ohio.

Wanted—Two new or second-hand steam excavators. Address, with full particulars, S. M. Barrett, Sup't S. & F. R. R., Sheboygan Wis.

Manufacturers of Fancy Glass Goods will please send their address to J. Martin, Box 316 Cairo, Ill.

J. Hexter, Vancouver, W. T., wishes to obtain a first-class turbine.

Wm. Hanser, M.D., Bartow, Jefferson county, Ga., wishes to obtain a good stump puller and a buggy plow.

EXTENSION NOTICES.

Chauncey D. Woodruff, of Toledo, Ohio, having petitioned for the extension of a patent granted to him the 7th day of March, 1854, for an improvement in suspending eaves troughs, for seven years from the expiration of said patent, which takes place on the 7th day of March, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 17th day of February next.

James H. Sweet, of Pittsburgh, Pa., having petitioned for the extension of a patent granted to him the 14th day of March, 1854, for an improvement in hanging of the grining jaw of spike machines, for seven years from the expiration of said patent, which takes place on the 14th day of March, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 24th day of February next.

Ellsworth D. S. Goodyear, of North Haven, Conn., having petitioned for the extension of a patent granted to him the 28th day of March, 1854, for an improvement in processes for treating India-rubber, for seven years from the expiration of said patent, which takes place on the 28th day of March, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 9th day of March next.

Henry B. Myer, of Cleveland, Ohio, having petitioned for the extension of a patent granted to him the 19th day of September, 1854, reissued the 3d day of May, 1859, and again reissued the 8th day of October, 1861, for an improvement in converting railroad car seats into beds or lounges, for seven years from the expiration of said patent, which takes place on the 19th day of September, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 23th day of May next.

Willis Hamilton, of Troy, N. Y., having petitioned for the extension of a patent granted to him the 4th day of April, 1854, and reissued the 6th day of March, 1860, for an improvement in candle mold apparatus, for seven years from the expiration of said patent, which takes place on the 4th day of April, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 16th day March next.

BOILER EXPLOSIONS---WHAT CAN BE DONE TO PREVENT THEM.

The occurrence of several disastrous boiler explosions since we last referred to this subject, demands that we should again direct attention to this constant cause of the destruction of life and property. We have before us a large pile of letters on boiler explosions, the accumulation of several months; in these letters there is scarcely a word said about bad workmanship, bad material, improper design or carelessness or management. But the gas, electrical, and explosive compound theories are presented in nearly every conceivable way to account for these boiler catastrophes continually occurring. All these vague and useless, nay, positively injurious speculations should be discouraged in every possible way. They simply tend to distract attention from causes of a purely mechanical nature which are entirely within our control; further than this, this "mysterious agency" business is not unfrequently used by the blunderers who have built bad boilers, and employers who have hired incompetent attendants and who have used boilers which were known to be out of repair, or who have used them for long periods of time without having had them properly examined by competent persons, to shield them from the punishment which is their just due. Just as soon as the public are persuaded into belief in the opinion which is persistently urged in some quarters that boiler explosions are produced by inscrutable causes or that they are to be accounted for by some incomprehensible theory, just so soon will the time be at hand when the coroner's inquest or the victims of an explosion will be even a greater farce than it is now. And we intend to exert our influence to prevent the existence of this state of affairs which threatens us in this matter. No sooner does a boiler explosion occur than a bevy of boiler explosion theorists crawl out of their holes and either deluge the press with long-drawn theories or cunningly manage to be called as witnesses by the coroner whom they deceive by their pedantry, and in many cases prevent a proper examination into causes which, of course, tends to shield the culprits from punishment or censure.

We have no objections to, but on the contrary encourage speculation in abstract science, the nature of force and matter are fair subjects for the speculative philosopher, but when practical matters are to be examined into, common sense and analytical investigation is what is demanded, not desultory speculation.

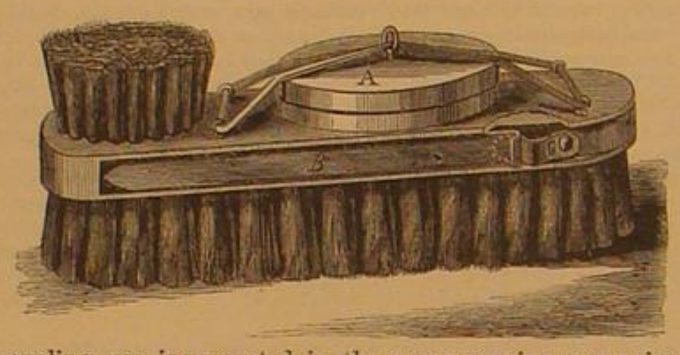
As the hydrogen gas theory is now in full blast, perhaps it may be well to devote a little attention to it and exhibit its fallacy. Hydrogen gas can only be generated in steam boilers by the decomposition of the steam or water, and it is easy to show that no such decomposition can possibly occur, to any extent worth mentioning, under any conditions arising in the use of steam boilers; and beside, if such decomposition did occur, the hydrogen so generated would have no oxygen to combine with, a condition absolutely indispensable in order that it may form an explosive compound. And still further, even if there was a sufficiency of oxygen at hand, the presence of the steam would preclude the temperature, necessary for ignition, from being reached. Let us see what the late Professor Faraday says on this point. An apparatus having been introduced to superheat steam, by passing it through iron tubes which were placed directly in the furnace, where they could, of course, be made red hot, it was thought by some that the steam would be decomposed, that an explosive compound would be formed, and that consequently the apparatus was unsafe, and should not be used. This eminent physicist says "that as respects the decomposition of the steam by the heated iron of the tube, and the separation of hydrogen, no new danger is incurred. Under extreme circumstances the hydrogen which could be evolved would be very small in quantity—would not exert a greater expansive force than the steam—would not with steam form an explosive mixture—would not be able to burn with explosion, and probably not at all if it, with the steam, escaped through an aperture into the air, or even into the fire place. Supposing the tubes were frequently heated over much, a slow oxidation of the iron might go on within; this would be accompanied by a more rapid oxidation of the entire iron surface, and the two causes would combine to the gradual injury of the tube."

These facts thus clearly set forth effectually dispose of this "mysterious" cause, and at the same time it points out that if any portion of a boiler not covered with water is exposed to a high temperature from the furnaces slow oxidation of the iron is likely to go on, and then the boiler in that part may gradually become deteriorated or decayed until it can no longer stand the pressure on that part, and away it will go. But this is certainly a cause which can be prevented by proper vigilance, the part repaired, and if necessary protected from the action of the fire. And this leads us to consider the fact that if a boiler is so planned that proper circulation of the water over the heating surfaces is prevented, those parts in direct contact with the hottest part of the fire, are liable to be exposed to its action, while, instead of being covered with water, they are simply enveloped in a layer of steam, which not only is a bad conductor of heat and consequently permits the metal to be overheated, but also allows it to be deteriorated by oxidation. This state of affairs can and has existed in boilers whose gage cocks showed an ample supply of water. Hence those boilers which do not allow for an unobstructed departure of the steam bubbles from the heating surfaces and for a circulation that will always keep those surfaces in contact with solid water are positively dangerous and should not be permitted to be used. We might mention several cases in our experience which bear on this point and conclusively show the great danger which may be incurred from this cause, but want of space warns us that we must proceed to the point it is our desire to impress upon our readers, and that is that boiler explosions with their appalling consequences are becoming so very frequent that practical measures are at once demanded, to at least diminish their frequency, if indeed they cannot be wholly prevented. We need scarcely remark that the first step which should be taken in this direction is to remove those causes, which it is known do produce the horrible disasters which makes one shudder to think of, and which are almost daily to be seen in the papers. These causes, we again repeat, to be bad workmanship, bad planning, incompetent attendance, deterioration, bad iron, and inoperative safety valves. We think that all of our readers will agree with us that these fruitful causes are almost wholly within our control. Legislative action we do not believe can wholly remove them, bad planning, bad workmanship and bad iron it certainly cannot, but we believe that much good may be effected by the passage of a law with respect to the competency of those who are to be allowed to have charge of steam boilers, and by providing for rigid periodical inspection prevent much of the danger from deterioration or corrosion, and we are sure that a law compelling the use of proper lock up safety valves on stationary boilers cannot fail to add to the security of the public.

But after all, let our legislation do their best, and pass the most perfect laws on this subject that can be enacted, yet we are confidently of the opinion that much more good is to be accomplished by Boiler Insurance Associations. In this, that important element, self interest, is made to act in a much more powerful manner than can be brought about by any system of legal inspection, no matter how rigid its provisions may be, or how carefully it is drawn up. The self interest of a corporation will be sure to discover flaws and causes of danger which will escape the less interested inspection of a paid official.

PARET'S IMPROVED BLACKING BRUSH.

A combination of brush, blacking, and mud scraper, forming a very compact and handy contrivance for household or

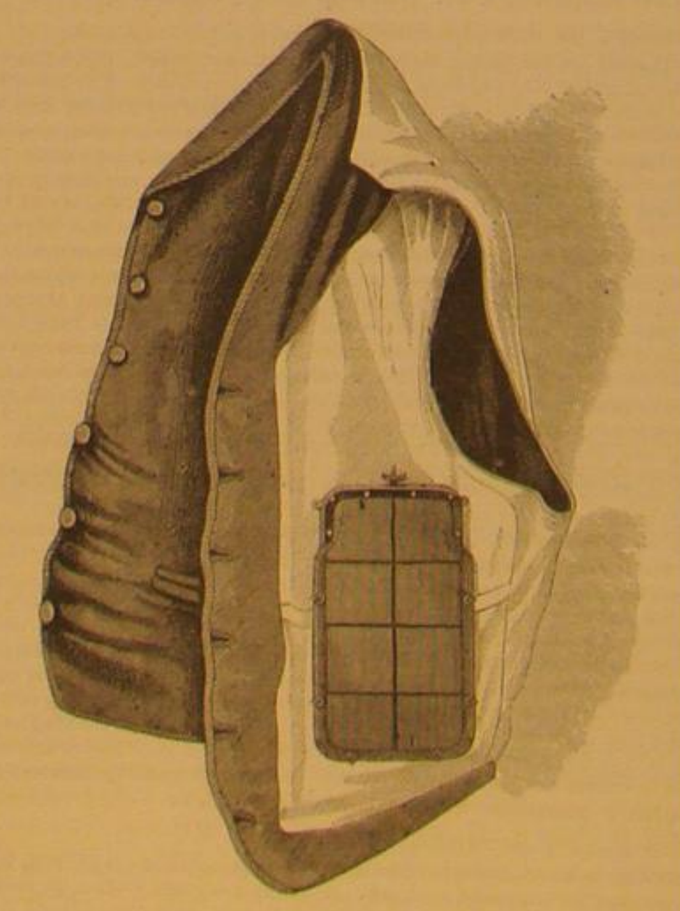


traveling use is presented in the accompanying engraving. A few words will explain its construction. The blacking box, A, is held in place, when not in use, by an endless elastic band, secured by hooks, which, being open at the shanks, permit the replacement of a new elastic for a worn out one. In a recess, in the side of the brush, slides a metal scraper, B, held in place by the spring, C. Thus we have combined, all the appliances for cleaning and polishing boots and shoes in a simple and compact form.

Patented through the Scientific American Patent Agency, Nov. 12, 1867, by Charles A. Paret, of 43 Union street, Nashville, Tenn. The patentee desires to dispose of the entire right, or to make arrangements for manufacturing on a royalty. Those interested will address as above.

YANKEE SAFETY POCKET.

The art of the pickpocket is successful not only because of the dexterity of its practitioners, but also because the preventives used are not usually effectual. A pocket, to be se



cure against the depredations of the light fingered, should not only be locked, but composed of such material as cannot be readily cut. Such are the characteristics of that shown in the accompanying engraving, which represents it as attached to the inside of a vest. The outside of the pocket is of leather, similarly lined, having between the two a network of steel, impenetrable by the knife of the operator. The top is a clasp resembling those used on porte monnaies, with the difference that the knob, by pressing which it is opened, is movable, the piston or stem being a screw on which the button turns; when down on the face of the jaws it cannot be depressed to operate the spring catch, while a few turns will raise it on the spindle or stem so that the pocket may be opened. A series of metallic eyelets around the edge of the pocket afford a ready means of attaching it to the garment, whether vest, coat, pants, or a lady's dress.

This device was patented Oct. 24, 1865, by T. S. Lamborn, who desires to dispose of territorial rights, and may be addressed at Marshallton, Pa. [See advertisement on another page.]

New Locomotive for Common Roads.

Mr. R. W. Thomson, C. E., Edinburgh, has invented and patented a new locomotive for common roads, which was lately tried in the neighborhood of Edinburgh.

The tires are made of bands of vulcanized india-rubber, about twelve inches wide and five inches thick. Incredible as it may appear, this soft and elastic substance not only carries the great weight of the road steamer without injury, but it passes over newly broken road metal, broken flints, and all kinds of sharp things without leaving even a mark on the india-rubber. The tires do not sink into the road in the least degree. They pass over stones lying on the surface without crushing them.

The india-rubber tires require scarcely any more power to propel them over soft bad roads or over loose gravel roads than on the best paved streets. The reason of this is quite obvious; they do not sink into roads, and do not grind down the stones in the least degree.

On Monday, the trials commenced by running the road steamer across a soft grass field, and it was afterward taken across a part of the field which had just been covered with loose earth to the depth of one or two feet, and run straight across, and then back through the deep soft soil. The weight of the road steamer is between four and five tuns; and yet the wheels, in passing over the loose earth, compressed it so little that a walking-stick could easily be pushed down in the track of the wheels without any exertion. After various evolutions, showing the ability of the road steamer to run about where there were no roads, it passed out into the street, and, taking a large omnibus full of passengers in tow, it proceeded up the Bonnington road to Messrs. Gibson and Walker's mills, where it took a large wagon, weighing, with its load of flour, about ten tuns, up a steep lane full of holes and ruts, and rising with a gradient of one in twenty. It was obvious that the road steamer was able to do a great deal more than it had to do in this trial. The bite on the road is something marvellous, and the easy way in which it floated along on its soft and elastic tires was very curious. When riding on the road steamer, the feeling is like what would be experienced in driving over a smooth soft grass lawn. There is, absolutely, no jarring at all. There was no appearance of wear on the india-rubber tires. The original surface which the rubber had when it left the manufactory is still visible. The engine is destined for Java, where it will be employed in drawing trains of wagons between two ports. The steamer, which was the subject of the experiments, had another specialty besides the wheels, it being fitted with one of Mr Thomson's patent vertical boilers.—*Engineering*.

Experiment on the Formation of Aniline Colors.

Pour into an ordinary test tube one fluid dram of pure concentrated sulphuric acid and add to the same one-tenth to three-tenths fluid dram of a diluted solution of sulphate of aniline. When, now, the solutions of different oxydizing agents, as those of chlorate or nitrate of potassa, hypochlorite of soda, chromic acid, bichromate of potassa, iodic acid, peroxide of hydrogen, or others, are allowed to flow upon the mixture of the tube, a characteristic coloration ensues at the place where the two fluids come in contact, in shaking the same is communicated to the whole liquid. Hypochloric acid or its respective salts produce a beautiful blue, nitric acid or its salts a rich carmoisin, chromic acid a bright violet. The nuances vary according to the strength of the liquids, and as there are but traces sufficient to produce a certain color, reactions may be founded upon them for the recognition of said oxydizing agents.

Preservation of Photographs.

H. Cooper, Jr., of England, gives the following formula for a preservative varnish which is stated to be an entire protection against fading:—

1 dram of gum dammar dissolved in one ounce of benzole.

1 dram of paraffin, dissolved in one ounce of benzole.

Mix four parts of the paraffin solution with one part of the dammar solution.

Prints covered with this varnish are impermeable to water. A solution of the paraffin only will do; but is better with the gum dammar.

THE ARAB JUGGLERS.—Mr. Frank Buckland gives in *Land and Water* the result of his observations of these performers. The snakes they handle are not poisonous, but belong to a harmless species common in France and England. The man who thrusts skewers through his tongue and the back of his neck, has permanent holes for their introduction, and does not suffer more pain than when a lady puts on her earrings after leaving them off for some time. Other features of the exhibition remain unexplained. Mr. Buckland concludes "Altogether, I do not recollect having seen an exhibition which combines so many horrible and truly sensational sights in so short a space of time."

Scientific American.

MUNN & COMPANY, Editors and Proprietors.

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VOL. XVIII., No. 1....[NEW SERIES.]....*Twenty-third Year.*

NEW YORK, SATURDAY, JANUARY 4, 1868.

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ENCOURAGING PROSPECTS.

In our last issue we stated that it was our desire to increase the circulation of the SCIENTIFIC AMERICAN from thirty-five thousand to fifty thousand on the new volume. We are encouraged from the prompt manner in which our old patrons are renewing their subscriptions, and the large clubs of new names our good friends are sending in, that our ambition to increase the weekly circulation to fifty thousand will be early accomplished.

STEREOTYPING WITH PAPER.

This is now in common use in all the principal daily newspaper establishments in New York. It is conducted substantially as follows: The stereotyper first dries the form of types upon an iron steam table. The form is then partially unlocked and a hand brush is rubbed over the surface of the types, cleansing them preparatory to placing over the entire form a sheet or sheets of thin bank note paper, of the finest quality, previously wetted to insure the required pliability. This paper being evenly laid over the types, the workman takes a long-handled brush made of short, stiff bristles, with which he beats the wet paper evenly, forcing it into all the depressions of the types, taking care not to break the paper. This work finished, a dampened sheet of thicker but more ordinary paper is placed over the first. This is also brush-hammered down upon the types, and followed by another sheet of paper, thinly coated with a preparation of whiting and starch. Again the brush is used to beat this home, after which a brown paper backing is put on, and then the form of types, covered by the before-mentioned sheets of paper, is trundled to another steam table, where it is slid under a powerful screw press, several blankets folded over it, and all firmly held down until the paper matrix is dry-hardened, or "cooked," as the workmen express it. The papering process occupies three or four minutes, the cooking about twice as many. The matrix is now peeled off from the form and prepared for casting, by sifting it with finely powdered borax, which with a soft brush is thoroughly rubbed into the sunken surface left by the types. The surplus borax having been removed, the matrix (which now resembles hard but pliable pasteboard) is ready for the casting box, which is made of iron, either straight or curved, to suit the press bed. Handle irons hold the matrix in its proper place, at the exact distance (about half an inch) necessary for the thickness of the stereotype plate, which is made by pouring a quantity of hot type metal into an open end of the casting box. This metal, dropping between one surface of the casting box and the sunken surface of the matrix, fills up the latter without burning it. A few moments are allowed for cooling, and then the matrix is stripped from the warm plate, which is subsequently prepared for the press, by trimming down all thick lines, or chiseling away any superfluous metal, paring off the edges, filing, and otherwise treating the stereotype after the usual manner. Circular saws driven by steam power, and hand cutting machinery of various kinds are used in finishing, the whole operation of stereotyping occupying from fifteen to twenty minutes. A second plate may be obtained from the original matrix, in about two minutes, and almost any number of castings can be taken by careful workmen. In some offices only one mold is taken, this being used for casting the number of plates required for several presses. The stereotype, being an exact reproduction, in solid plate form, of the million or more types originally put together by the compositors, is fastened upon the Hoe, Bullock, or any other printing press, and used in place of the types. The advantage of duplicating the plates is apparent. Two or ten presses, working similar plates, will print off in a couple of hours an edition of twenty or a hundred thousand copies, which formely occupied so much more time that when ten or twelve-cylinder "fast" presses became "slow," second and third editions were resorted to by editors desirous of giving the public the latest news. Previous to the use of stereotypes for newspaper purposes, duplicate forms were sometimes "set up" in type, an extra expense to the office adopting this course which was incurred only whenever a pressure of important news was likely to prevent the forms going to a single press in season for working off the edition. Compositors can now work until three and four o'clock in the morning, and half an hour later half a dozen "duplicates" of their work may be seen on as many different presses, striking off the printed sheets, units of an immense edition of perhaps seventy-five or eighty thousand copies of some newspaper, all of which are frequently counted and delivered to the carriers and newsmen before the editors, compositors, or stereotypers can reach their homes and retire to rest.

MINING EDUCATION---GOVERNMENTAL MINING SCHOOLS.

No department of industry in this country has received such an impetus, or been so largely developed within the past twenty years, as the mining of metals. Especially is this statement applicable to the production of the precious metals. Their mining and separation has become one of the most important departments of our national industry. From this source more than from any other, perhaps, is derived the bullion upon which the government relies to redeem its promises. Yet, with all the developments of new mines, the increase of the number of men engaged in the business, and the improvements made in reducing machinery and appliances, it is believed that the amount of the precious metals derived are wholly inadequate to the means, whether of labor, capital, or material, employed. Not only so, but the actual production is gradually declining. Surface workings, however rich, and however easily made profitable, are soon exhausted, and then the labor of human hands must be superseded by the power of machinery and the agency of chemical science.

And it is in these respects that the failure to increase the total yield of our gold and silver fields is most perceptible It is confidently asserted that our imperfect systems of reduction entail a loss of at least twenty-five per cent, probably more. On the Comstock lode, a return of sixty-five per cent of the silver contained in the ore is considered very fair. The yield of this lode for the past year is estimated at $17,000,000. A loss of thirty-five per cent amounts to more than $9,000,000.

We have received several communications on this subject, from practical men acquainted with the facts, all of whom attribute this waste entirely to a lack of scientific knowledge of the quality of the ores, the best methods and materials for their reduction, and to the want of proper machinery. To remedy this undesirable state of affairs, practical education is necessary, and the establishment of governmental schools for instruction in the treatment of ores is advocated. At present our skilled managers are mostly foreigners; those Americans who are engaged in mining, and possess a scientific knowledge of the business, having gained it in foreign schools. Mr. J. Ross Browne, in a pamphlet just received, proposes the establishment of a national school, for practical and scientific instruction in the reduction of ores, at some convenient locality in our gold and silver producing regions. That such a school, properly managed, is to be desired by every consideration of national advantage cannot be denied; but we cannot see the necessity of its being established or supported by the national government, any further than an appropriation of money or lands could be considered as an aid. Instruction in the science of the mining art is already adopted as a branch of study by several of our educational institutions. Yale, Harvard, Columbia, and other colleges have departments devoted to this branch, and others will undoubtedly follow their example. Neither do we see the necessity of locating such an institution as that proposed in a mining region. Assays of ores and their chemical treatment can as well be made and accomplished in New York city, or anywhere else, as in Colorado, California, Montana, or Arizona, and certainly the locations should be chosen with a view to the benefit of the greatest number. Governmental patronage and interference in our industrial pursuits seldom have produced satisfactory results. An endowment by government may be very well, but the institution should be managed by the associated effort of those directly interested.

A correspondent from Denver, Colorado, advocates similar schools, to be established and conducted by the legislatures of the states or territories. A bill for a school, he informs us, has been passed by the legislature of Colorado. This writer believes the institution will be self-sustaining from the income of donated property, tuition fees, the labor of students, assaying, ores presented for analysis, the proceeds of its own mines kept continually at work, and the preparation of plans, etc., for the construction of works. We confess we do not share in the sanguineness of our correspondent's belief. He expects the school to be in some respects an incorporated company, owning, controlling, and working its own mines. Such an institution, under the patronage and direction of a state legislature, would become, in all probability, a source of corruption, and its objects removed from the domain of science to the arena of politics. We see no more reason for establishing governmental schools for teaching mining than for teaching farming.

Doubtless, however, the facilities for procuring a thorough scientific and practical knowledge of the metals and their reduction from their ores should be increased, and that, we think, can be done without placing such institutions under the control of the government or locating them exclusively in mining regions. The remedy for the want of truly scientific knowledge on this subject is to be found in the exertions of individuals and companies directly interested in mining, rather than in appeals to the government either of a state or the nation.

Our Iron Deposits.

Iron ores of nearly every species and variety are distributed profusely over the whole country, and among them are species which belong to North America alone. Native iron—to commence with the simplest ore in which iron occurs—has only been met with in Canaan, Conn., in a vein or plate of two inches thickness, and is rather a mere curiosity. The ore, however, most generally distributed over the country is that of the mineralogical term limonite; it comprises a great number of varieties of all shades of color and the most varying forms, as the brown and yellow hematite, the pipe and bog ores. They are nearly all very well qualified for the manufacture of pig metal, and contain in their pure condition 59.15 lbs. of iron in 100 lbs. of ore. Vast beds of this ore are near Salisbury and Kent in Connecticut. Similar deposits are in the State of New York; it occurs in Massachusetts, Vermont, Maryland, and Ohio. The whole iron business of Hanging Rock depends upon it. Kentucky, Tennessee, and Alabama abound in inexhaustible beds of the best quality, but Pennsylvania is favored with the richest varieties of this mineral. It is there found in the anthracite region and in the valleys of the western coal formation. The kind of ore particularly adapted for the production of heavy wrought iron, yielding a most tenacious metal, is the red iron ore. If pure, it may contain about 70 per cent of iron, but when associated with clay, or silicious matter, it often does not yield more than 10 to 12 per cent of it. Specular iron and iron glance are varieties of this ore, the former being the kind from which the damask of Persia and the wootz of India are manufactured. In the United States it is, however, not yet found in any amount worth noticing, but other varieties are found throughout the Union. Heavy beds of the red variety occur in Wisconsin and Michigan; other but inferior varieties are largely met with in Missouri, New York, New Jersey, Pennsylvania and Arkansas.

MAGNETIC IRON ORE, LOADSTONE.—The richest kinds of this ore, as that occurring on the west side of Lake Champlain, contain 70 per cent of metallic iron; other varieties—conglomerates—do not yield more than 20 to 25 per cent. of the metal. Large and valuable beds of magnetic iron are found in Essex county, New Jersey, Pennsylvania, New York, and Ohio. The iron mountains of Missouri also appear to belong to this species. It forms the main body of iron ore in Sweden.

THE CARBONATE OF IRON.—This species comprises two varieties: the spathic, or sparry iron, and the compact carbonate, which has no relation externally with the sparry variety. The compact carbonate is largely distributed over the United States; its finest quality is found near Baltimore. We also find it in the Foostburg coal region, in Maryland, and in almost all the western coal deposits along the Alleghany and Ohio rivers. It generally does not contain more than 20 to 33 per cent of metallic ore, but is little used, on account of its being of rather difficult treatment in preparing it for smelting. The same is the case with the sparry or spathic variety, which almost in all instances, where it occurs, is adulterated with sulphur, and in some cases with copper. Large quantities of this ore are found in Vermont, Connecticut, and New York; smaller veins occur in all the New England States, in New Jersey, Pennsylvania, Virginia, North Carolina, and the States around the Lakes. In North Carolina it forms the bulk of a vein of gold ore, and it besides this associates with nearly all kinds of metallic ores, changing the character of a vein from one kind of an ore to another.

The Franklinite or dodecahedral iron ore is composed of 66.00 parts of peroxide of iron, 16.00 parts of oxide of manganese, and 17.00 parts of zinc, being a species which belongs to North America alone. It is, in association with the red zinc ore, found in large veins and masses near Franklin furnace, in Hamburg, N. J., and at Sterling, in the same vicinity, and is a most important ore, particularly for the manufacture of crushers and mills. The mixed ore of Franklinite and red zinc has been successfully worked for metallic zinc.

Illuminated Time Calendar for 1868.

Subscribers to the SCIENTIFIC AMERICAN who would like a copy of our handsomely Illuminated Calendar for 1868, can have copies mailed to them free on sending their address to this office.

PROPOSED OVERLAND ROUTE THROUGH BRITISH AMERICA.—Mr. Waddington, a person of note in British Columbia, has sailed for England to advocate a pet scheme of his which is the construction of a railroad through British America connecting the Atlantic and Pacific oceans. The journey across this part of the continent has been undertaken by only few adventurers, and to this day a package of merchandise or mail bag has never passed direct from Canada to British Columbia. From a pamphlet Mr. Waddington has published it appears that by making use of the lakes and rivers on the line 2,400 miles of steam navigation can be introduced. The railroads now in running order at the East are 1,285 miles more making necessary only the building of 648 miles of road more. When the line is completed the time to be occupied in traversing the entire 4,333 miles from ocean to ocean will not exceed twenty to twenty-three days.

ADVERTISERS are referred to the new rates for advertising as announced in the first column of advertising page.

OFFICIAL REPORT OF

PATENTS AND CLAIMS

Issued by the United States Patent Office,

FOR THE WEEK ENDING DECEMBER 17, 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.*

72,152.—BOLT MAKING MACHINE.—Abram Alexander, Pittsburg, Pa.

I claim the combination of the piece, D, guides, d d, and frame, A, with the pieces, H H, bolts, G G, and gripping dies, J J', guides, G' G' G' G', arranged and operating substantially in the manner and for the purpose set forth.

The compound cam, F, and block, F', in combination with the drop piece, D, to obtain a vertical upward motion of said piece, D, in the manner specified and for the purpose stated.

The hollow screw, 1, bolt, S, and nut, 18, in combination with the hammer 7, or its equivalent, and the gripping dies of a bolt making machine, substantially in the manner and for the purpose specified.

72,153.—MACHINE FOR MAKING BOLTS.—Abram Alexander, Pittsburg, Pa.

I claim the combination and arrangement of the cam, C, levers, G and M, bar, D, and pin, T, with the weight, W, or a spring, acting substantially in the same manner, when used and applied to operate the gripping dies closing machinery described in my improved bolt making machine, or any other substantially the same.

72,154.—CHURN DASHER.—Andrew E. Banks, Detroit, Mich.

I claim, 1st, The use of the dowel pins, B B B B, for the purpose described, when arranged substantially as set forth.

2d, The combination of the disks A A, etc., with holes through them, F F, etc., the upper disk or collar, G, with the hollow handle, C, provided with the valve, E, and the dowel pins, B B, etc., when arranged substantially as described and for the purpose designed.

72,155.—SAW MILL.—Ashbel P. Barlow, Claremont, N. H.

I claim, 1st, The ways or guides, b, constructed with the double inclines and parallel sides, substantially as shown and described.

2d, The cross head, cut away as shown at s, and provided with the lips having the convex faces, r r, constructed and operating substantially as and for the purpose set forth.

3d, The saw buckle perforated and slotted as described, in combination with the rib or key bolts, o, as set forth.

4th, The hollow pitman, slotted at m, and provided with adjusting keys for varying the distance of the saw pivot from the pitman fulcram, in the manner and for the purpose set forth.

72,156.—DEVICE FOR ACCUMULATING POWER.—George H. Becker (assignor to himself and John C. Lanier), Memphis, Tenn.

I claim the construction and combination of the levers, E G J M O R and X, with the pitmen, D H L P and U, the connecting arm, T, and the wheel, W, and weight, Y, when arranged as herein described and for the purpose set forth.

72,157.—DRYING AND SEASONING LUMBER.—E. C. Bender, York, and Wm. Steffe, Philadelphia, Pa.

We claim the within described process of seasoning lumber, consisting in subjecting the lumber to the action of a gradually increased temperature, in an air tight chamber, until all or nearly all the moisture has been extracted from it; in retaining all the heat and watery vapor about the lumber until a temperature of about 170° Fah. has been attained in said air-tight chamber; and, finally, in compelling the heated moistened air to escape slowly from said chamber, while the temperature is reduced therein substantially in the manner herein set forth.

72,158.—PRESERVING EGGS AND OTHER SUBSTANCES.—Chas. Boize, New York city, assignor to himself and Peter M. Devos.

I claim the use of argillite, substantially as and for the purpose described.

72,159.—PLUMB AND LEVEL.—S. A. Bostwick, Laconia, N. H.

I claim the semicircular spirit block, B, fitting and adjusting in the semicircular space in the stock, A, arranged and operating substantially as and for the purpose herein specified.

Also the grooves, g and i, and stops, h and l, combined and arranged substantially as and for the purpose set forth.

72,160.—SHOVEL AND SIFTER.—D. Boynton, St. Johnsbury, Vt., assignor to himself, H. G. O. Burrows, and Arthur E. Whitney.

I claim a fire shovel, A, provided with a supplemental bottom, e, containing a screen, f, and also provided with a cover or lid, B, all arranged in the manner substantially as and for the purpose set forth.

72,161.—MACHINE FOR SEPARATING ROOTS FROM PEAT.—Sewall Brackett, Jamaica Plain, Mass.

I claim the combination and arrangement of the carriage, B, the main and supplementary grates, D G, the series of pins, e, mechanism for raising the supplementary grate on the pins and mechanism for imparting to the main and supplementary grates reciprocating longitudinal movements as set forth, these mechanisms being the lever, I, the bar, H, and the uprights, f, and the crank shaft, E, and connecting rod, F.

I also claim the combination and arrangement of the whole and the peat receiver, A, as set forth, the said peat receiver and the carriage, B, being connected by means substantially as explained.

72,162.—MANUFACTURE OF STEEL.—James R. Bradley and Moses D. Brown, Chicago, Ill.

We claim the improved processes for making steel of different kinds herein described, by mixing the several ingredients in the proportions, and melting the same with malleable or scrap iron, as specified.

72,163.—HARVESTER RAKE.—Isaac P. Cadman (assignor to himself and James Aiken), Mendota, Ill.

I claim so combining a circular reciprocating rake with the cam wheel which gives it its rising and falling motion as that the rake shall move said wheel when it clears the platform, and without it when it returns for the next sweeping or clearing operation, substantially as described.

I also claim, in combination with the sweep rake, the pivoted holding arm, 4, acting in conjunction with it, as and for the purpose described.

72,164.—DEVICE FOR ATTACHING OVERSOLES TO BOOTS AND SHOES.—B. H. Camp, Washington, D. C., assignor to himself and Rufus Prentice.

I claim in combination with the oversole, a, the corrugated elastic clasp, b, when constructed, arranged and operating in the manner herein described.

72,165.—HYDRAULIC ELEVATOR.—Thomas Chambers, St. Louis, Mo.

I claim, 1st, The reservoir, A2, the car, B, the chamber, B1, the pump, D, and the pipes, D1 and D2, when combined and arranged as described and set forth.

2d, The indicator, c c1 c2 c3 c4, when arranged in relation to the dumb waiter as described.

3d, The brake attachment, L L', when constructed and arranged in relation to the elevator as described and set forth.

4th, The self-tipping and unloading shelf, b5, when combined with the elevating car, as described and set forth.

72,166.—PADLOCK.—Charles J. Clements, New York city.

I claim the guard plate, B, arranged and operating in combination with the tumblers, a a, substantially as and for the purpose herein specified.

72,167.—MECHANISM FOR CONNECTING A HORSE WITH A CARRIAGE.—Alvin Colburn, Lynn, and Elbridge G. Stanley, Fitchburg, assignors to Alvin Colburn and John Raddin, Lynn, Mass.

We claim the arrangement of the connecting bar-case, B, with its bar, C, and spring against the side instead of on the end of the shaft, the same remaining so regardless of the shaft movements, substantially as and for the purpose specified.

Also the combination and arrangement of the spring bolt with the socket piece and the bar, C, its case and spring, arranged with the shaft as set forth.

Also the combination of the double eye piece, F', having a tooth, as described, with its spring bolt, its case and socket piece, to be used with the slide bar, C, made and applied, or to be applied to a shaft substantially as described.

72,168.—LUBRICATING CUP.—J. B. Collin [assignor to himself and E. E. Ricker), Altoona, Pa.

I claim an oil cup having an adjustable tapering pin projecting through, but free from contact with the sides of an orifice communicating with and smaller than the discharge passage, x, so as to form a regulating drip or guide for conveying the oil from the cup to the said passage, all substantially as described.

72,169.—WATER WHEEL.—Gilbert M. Conner, Cohoes, N. Y.

I claim, 1st, The combination of the circular receiving chamber and the helical floor, or its equivalent, with the radial guide chutes, substantially as described.

2d, The combination of the central hub, and its inclined and twisted buckets, with the conical wheel case, all constructed and operating substantially as described.

3d, The combination of the deflecting floats with the controlling rim, for the purpose specified, arranged and operating substantially as described.

73,170.—BOAT LOWERING APPARATUS.—Robert Creuzbaur, New York city.

I claim, 1st, Davits which are hinged in such manner as to swing freely in vertical or nearly vertical planes toward and from the water, and to vibrate above and below a horizontal plane intersecting their axes of motion, substantially as described.

2d, The application of curved sections to the upper ends of davits which are hinged at their lower ends, so that said sections can be turned around independently of the standards or lower sections of the davits, substantially as described.

3d, The application of a ladder to a davit, operating substantially as described.

4th, The combination of a folding hand rail and ladder to a hinged davit, operating substantially as described.

5th, Boats' davits hinged substantially as described, when counterpoised by a force sufficient to raise them without the boat, but easily overcome by the weight of the boat.

72,171.—BOAT LOWERING APPARATUS.—Robert Creuzbaur, New York city.

I claim, 1st, The application of elastic cushions, t' t', between the hand-wheel hub, Q, and the ratchet wheel, U, for the purpose and in the manner substantially as described.

2d, The longitudinally traveling drums, K, applied to the shaft, L, substantially in the manner and for the purposes described.

3d, In combination with the pivoted ships' davits, the pivoted shield or guard, S, constructed so as to keep the ropes, R, in place upon their pulleys during the raising and lowering of a boat, substantially as described.

4th, The combination of elastic pressure roller, h1, with the roller or pulley h, for preventing the slack of rope, R, from extending back to its drum, K, substantially as described.

72,172.—BOAT DETACHING APPARATUS.—Robert Creuzbaur, New York city.

I claim, 1st, Spring bolts, d d, or their equivalents, constructed as described, and applied to sheaths, so as to catch and hold the suspension tongues, C C, when thrust into said sheath, substantially as described.

2d, The employment of eccentrics or cams, b b, in combination with the rods, c c, and spring bolts, d d, substantially as described.

3d, The feathered coupling tongues, C, in combination with grooved and flaring sheaths, substantially as described.

4th, The attachment of the coupling tongues to springs or spring boxes, substantially as described.

72,173.—CORN POPPER.—Daniel A. Denigon, Troy, Mich.

I claim the arrangement and combination of the wire cloth pan, A, with the pieces of strap iron, B B, and the tin pan or cover, D, all arranged substantially as described for the purpose designed.

72,174.—STICK FOR TRUNDLING HOOPS.—Agnes Doisy, Cincinnati, Ohio.

I claim the improved hoop stick, B, provided with an elastic strap, tape, or cord, D, fastened by one end to the stick B, and being susceptible of being hooked or fastened by the other end to the said stick, in the manner and for the purpose set forth.

72,175.—WASHING MACHINE.—H. C. Dorman, North Bridgewater, Mass.

I claim, 1st, The combination and arrangement of the wheels, W W', the tub, S, the knob, K, with the springs, H H', substantially as described and for the purpose set forth.

2d, The holding disk, T, when slotted at V V', in combination with the reciprocating tub, S, substantially as described and for the purpose set forth.

72,176.—FIRE-PROOF SAFE.—Ebenezer D. Draper, Hopedale, and Edward W. Glover, Medford, Mass.

We claim the concave cap, c, in combination with the case, A, and the fusible metal sealing or solder, d, of the kind described, such cap being arranged with the mouth of the case in the manner as set forth.

72,177.—DEVICE FOR SECURING AND FEEDING SOFT CRABS.—Constantin Drexler, Washington, D. C.

I claim a marine inclosure constructed and arranged as shown, and provided with the guards or fenders, f, and the movable floats, g g h h, or their equivalents, forming artificial hiding places, arranged as shown and for the purposes substantially as described.

72,178.—ROCKER FOR CHAIR OR CRADLE.—Chas. S. Dunback, Swampscot, Mass.

I claim the arrangement of the guard or cushion, B, against or about the end of the rocker, in manner and for the purpose specified, meaning also to claim as an improved manufacture, a rocker as made with an elastic cushion applied to its rear end, as set forth.

72,179.—STOVE BACK PLATE.—Giles F. Filley, St. Louis, Mo.

I claim the method of forming the draught flue projection in the back plate of stoves with a curvature, in the manner substantially as shown and specified.

72,180.—SEWING MACHINE.—William Fiske, Lowell, Mass.

I claim, 1st, The combination of a sewing machine with a movable table, by means of cord, H, and pulley, I, and shaft, F, worm and worm gears on shafts, E and F, and cord, J J, with shaft, C, substantially as herein set forth and described.

2d, The band, P, on pulleys, R and Q, with tightener, Q2, fig. 1, for transmitting power from shaft, E, to shaft, O, substantially as set forth and for the purpose described.

3d, Also the shipper, M, tightener, N, belt, D, shafts, E F, and cord, H, for the purpose herein set forth.

4th, Also the brake, S, on shipper, M2, in connection with detent, T, and balance wheel, U, as fully set forth and for the purposes described.

72,181.—MACHINE BELTING.—Vincent Fountain, Jr., Castleton, N. Y.

I claim forming machine belting by combining leather with metal riveted thereto, as herein described.

72,182.—ORE CONCENTRATOR AND AMALGAMATOR.—Stephen Fountain, Silver City, Nevada.

I claim the box, D, having the valve, b, stems, n, or an equivalent device, together with their operating levers, d, and the rods, g, the whole constructed and arranged substantially as and for the purposes herein described.

72,183.—DRIVEN WELLS.—Oscar C. Fox, Georgetown, D. C.

I claim a well tube constructed wholly of woven wire of different textures, as shown, combined and arranged with a drill point, having a drip through its body, all substantially as and for the purposes described.

72,184.—PORTABLE SWITCH.—B. C Galvin, New York city.

I claim, 1st, The single switch, constructed and arranged as described, with bar, D, plate, E, teeth, F, clip of the rail, A A, rail plate, G, wheel guide, C, and leveling lug and casting, L L, and vertical acting hinge, H, in bar, D, as and for the purpose set forth.

2d, The double portable switch, when constructed with vertically hinged arms, A A, attached to plate, O, with frog, F, and movable arm, S, working in notches, R, with movable and sliding side lugs, L L, and parts, B and W, all constructed and combined as and for the purpose set forth.

3d, Also, in the car replacer or switch above described, the three inclines, combined and constructed substantially as described, and for the purposes set forth.

72,185.—RAILWAY SWITCH.—B. C. Galvin, New York city.

I claim, 1st, In railroad switches, as shown in sheet No. 1, figure 1, the construction and arrangement of fixed and movable rails with curved extremities, the movable rails and extremities being hinged to the fixed rails, and the movable rails locking therein by the straight insertion self-connecting rail end joint shown in figs. 2, 3 and 4, and by the dovetail joint in the ends of such rails, fixed and movable, all substantially as described for the purpose set forth.

2d, In railroad switches as shown in sheet No. 2, fig. 5, the construction and arrangement of fixed rails connected by curved extremities, and straight track-crossers, made with hollow ends, all substantially as described, for the purpose set forth.

72,186.—TWINE HOLDER AND CUTTER.—Thomas Garrick, Providence, R. I.

I claim the combination of a cutting blade with a spiral convoluted shield, constructed substantially as and for the purpose specified.

Also, the spring clamp, in combination with the metallic shell for holding the ball of twine, substantially as specified.

72,187.—ARGAND BURNERS.—Elliott P. Gleason, N. Y. city.

I claim, 1st, In argand burners, the regulating screw, for the purposes fully described.

2d, In combination with the same, the lever, for the purposes fully indicated.

72,188.—BURNER FOR HEATING GAS, ETC.—Elliott P. Gleason, New York city.

I claim the use or employment of the tube, C, within the tube, A, in combination with the burner, B, when the same shall be combined, constructed and operated substantially as shown, for the purposes set forth.

72,189.—PRESSURE SAFETY VALVE.—Henry A. Goll, Chicago, Ill.

I claim, 1st, The combination of valves, O, N and H, with cylinder, G, and pipe, F, substantially as set forth.

2d, The valve, H arranged to operate in cylinder, G, and having a shoulder on the top of it corresponding with the diameter of the valve seat, T, in combination with said cylinder pipe, F, and valves, O N, substantially as herein described.

3d, The combination of cock, C, pipe, E, double valve, O N, and cylinder, B, as and for the purpose set forth.

4th, The valve, O, having the opening, d, in its stem, for the escape of steam above said valve, in combination with a lower valve, N, arranged to receive pressure directly from boiler, A, as set forth.

72,190.—LETTER BOX.—Charles P. Gorley, Boston, Mass.

I claim, 1st, The combination of the lid, B, and springs, D D', in the manner and for the purpose described.

2d, The combination of the lid, B, springs, D D', catch, e, and lever, E, in the manner and for the purpose specified.

72,191.—NAPHTHA BURNER.—L. A. Gouch, Yonkers, N. Y.

I claim the detachable conductor, in combination with a burner constructed and operating substantially as described.

72,192.—STEAM SAFETY VALVE.—Virgil D. Green (assignor to himself and E. M. Hall), Watertown, Wis.

I claim the cylinder, A, the drum, B, the spring, G, the ratchet and pawl, D p, in combination with the cam, m, and the chain, H, substantially as described.

72,193.—MEDICAL COMPOUND.—John Greenwald, Cincinnati, Ohio.

I claim the compound as specified, for the purposes set forth.

72,194.—REEL OVENS FOR BAKERS.—Emily S. Greffet, St. Louis, Mo., administratrix of the estate of Joseph A. Greffet, deceased.

I claim, 1st, The combination of a drum with the revolving pans of an oven, when constructed and arranged substantially as shown and specified.

2d, The arrangement of the regulating flues, p p' p'' p''' of an oven, with their respective dampers and operating rods, when constructed and arranged substantially as shown and specified.

73,195.—BAIL FOR KETTLES.—Wm. Hailes, Albany, N. Y.

I claim constructing the metal sections, B B, with sockets formed within the enlargements, b b, of said sections, such sockets having the ends of a wooden handle fitted into them, and such handle being held in said sockets by a rod, c, which passes through the handle and through the enlargements, b b, and is fastened to the latter, all substantially in the manner shown and described.

72,196.—LOCK FASTENER FOR LAMP.—John Harding, Warrington, Great Britain.

I claim the application, employment, and use of a soft metal or other rivet, or other compressible plug, as a fastening for safety lamps, instead of locks, screws, or other mechanical contrivances now employed.

72,197.—MACHINE FOR CUTTING OUT GLOVES.—Jesse H. Harlan and Thomas Pomeroy, Denver City, Col., assignors to themselves and Wm. H. Harlan.

We claim the adjustable knives of a glove cutter, when constructed and arranged substantially as shown and specified.

72,198.—HARVESTER RAKE.—H. A. M. Harris, Philadelphia, Pa.

1 claim, 1st, The combination as described of the rake arm with the guide, F', both rotating on a common axis.

2d, The combination, substantially as described, of the beater arms, revolving in a fixed relation to a common axis, with the rake having a rotating, a circumferential, and an axial movement around said axis.

3d, The combination, substantially as described, of a stationary collar, to support the raking mechanism, a tubular axle, revolving within said collar, and carrying rake and reel arms, and counterbalance rock shaft, turning axially within said axle, to regulate the movement of the rake.

72,199.—HARVESTER RAKE.—H. A. M. Harris, Philadelphia, Pa.

I claim, 1st, The combination, substantially as described, of a rake rotating on a tubular axis, with a crank shaft, link and counterbalance, to hold the rake down when raking off, to lift it quickly at the end of its backward movement, and to draw it inward when passing forward.

2d, The combination, substantially in the manner described, of a continuously revolving rake, with a counterbalance, and latching and unlatching device.

3d, The combination, substantially as described, of a continuously revolving rake—having a pivot movement in its support—with a cam and compound lever, for the purposes both of turning the rake axially and of holding it in a line radial with its axis while raking off, as set forth.

72,200.—CAR COUPLING.—A. Hillman, Devonshire, England, assignor to Thomas R. Fuller, Samuel Fuller, and James S. McMurray.

I claim, 1st, The coupling boxes, D, constructed as described, and secured to the draught bar or bars, C, by the flange d1, and braces, E, substantially as and for the purpose herein set forth.

2d, The coupling link, K, constructed as herein shown and described, and having two downward projecting pins, k', attached to its lower side in combination with the coupling box, having perforations for the reception of the pins, k', of the link, K, substantially as and for the purpose herein set forth.

3d, The combination of the slotted, wedge-shaped, adjusting block, L, with the coupling link, K, substantially as herein shown and described, and for the purpose set forth.

4th, The combination and arrangement of the coupling box, D, spring, J, pivoted coupling bar, G, uncoupling rod, H, and lever handles, I, with each other and with the draught bar, C, substantially as herein shown and described, and for the purpose set forth.

72,201.—FURNACE FOR SMELTING PRECIOUS METALS.—H. Gengembre Herbert, New York city.

I claim, 1st, The combination of the boxes, D D' D'' D''', etc., the pistons, E E' E'', etc., and screws, f' f' f', etc., or their equivalents, with a cupola, or blast furnace, A, the whole arranged and operating in the manner set forth.

2d, In blast and cupola furnaces, making the lining of a composition of ore and flux, and renewing said lining from the outside by means and with the arrangement herein described.

3d, The combination of the box, M or M', the piston, N or N', and press, P or P', with a reverberatory furnace, arranged and operating in the manner specified.

4th, Forming the hearth of a reverberatory furnace of a concrete of ore ore and flux, and renewing the same from the outside, without stopping the operation of the furnace, by means and with the use of the herein described arrangement.

72,202.—SPRING BED BOTTOM.—Frank A. Huntington, San Francisco, Cal.

I claim the standard, A, with caps or tops, a, and the elastic bands or springs, B, arranged and attached to frames or bars, substantially as and for the purposes herein described.

72,203.—RAILROAD CAR VENTILATOR.—Martin G. Imbach assignor to James L. Howard, Hartford, Conn.

I claim the combination of a reversible deflector, with a spring for moving the same, substantially as before set forth.

72,204.—STEAM ENGINE GOVERNOR.—Oliver A. Kelley, Slatersville, assignor to Lamb, Cook and Co., Forestville, R. I.

I claim, 1st, The valve, M, constructed as described, with the triangular recesses, b b, and downward projecting pin, h, arranged in relation with the pin, i, and screw valve rod, L, as herein described for the purpose specified.

2d, The arrangement of the valve, M, pins, h i, valve-rod, L, sliding rod, K, and pins, j k, as herein described for the purpose specified.

72,205.—APPARATUS FOR SAVING PRECIOUS METALS.—Wm. Chase Knight, Yankee Jim's, Cal.

I claim the V-shaped apparatus, with an adjustable partition, B, substantially as and for the purpose described.

72,206.—JEWEL CASE.—G. F. Kolb, Philadelphia, Pa.

I claim the within described jewel case, composed of the lower portion, A, and the upper portion, A', hinged together by a double hinge, the whole being constructed and operating substantially as and for the purpose herein set forth.

72,207.—SUMMER FURNACE.—Ezekiel C. Little and Jas. W. Bell, St. Louis, Mo.

We claim the construction of a charcoal furnace, having a hinged plate, d, at the back thereof, which, shutting off the draught from beneath, causes it to pass up through the basket.

72,208.—HARVESTER RAKE.—Rufus Little and Lewis Gibbs (assignors to themselves and John R. Bucher), Canton, Ohio.

We claim, 1st, The dropper, composed of two blades that are moved in contrary directions by the rocking of a shaft, and which alternately hold and deliver the grain that has fallen against them, substantially in the manner described.

2d, The rake in combination with the hinged runners or frame, and which moves back and forth on said hinged runners or frame, conforming to the undulations of the ground, to rake the grain upon the ground out of the way and into a gavel for binding, substantially as described.

72,209.—LAMP BURNER.—John C. Love (assignor to W. H. Love), Philadelphia, Pa., and W. H. Love to himself, R. H. Childs and W. H. Childs.

I claim the plate, d, with its flange, i, and opening, w, in combination with the casing, A, of a lamp burner, when the edges of the said opening, w, are parallel to the upper edge of the wick tube, for the purpose specified.

72,210.—REGISTERING YARD STICKS.—Wm. P. Lupton and C. M. Talbot, Cadiz, Ohio.

We claim, 1st, The sliding graduated plate, D, in combination with the yard stick, substantially as and for the purpose described.

2d, The combination of the sliding graduated plate, D, with the knob, k, rod, l, ratchet, r, and spring, g, substantially as and for the purpose specified.

3d, The combination of lever, I, ratchet, r, rod, l, pin, e, and pin, o, for the purpose of disconnecting the actuating rod and ratchet, and replacing the plate, D, substantially as described.

72,211.—ANIMAL TRAP.—C. C. Lyman, Edinboro, Pa.

I claim, 1st, The arrangement of the lever, M, spring check, J, in combination with the slide, C, and box, A, for the purpose and in the manner substantially as set forth.

2d, The lever, M, spring check, J, as arranged in combination with the slide, C, and operated in the manner as and for the purpose described.

3d, The arrangement of the block, S, strip, S', in combination with the spring check, J, in the manner and for the purpose set forth.

72,212.—STOVEPIPE DAMPER.—David Manuel (assignor to himself and Willard Mannel), Boston, Mass.

I claim a stovepipe damper formed of two flat cast iron disks, A A, united solidly in the middle, and interlocked by loops, b b, upon the suspension rod, a, with concave radiating edges, c c, arranged and operating as herein described.

72,213.—GATE.—John M. May, Janesville, Wis.

I claim, 1st, Pendulum lever, M, and bar, N, operated by suitable mechanism, and combined with a gate that is moved longitudinally in opening and closing substantially as described.

2d, A gate latch combined with rod, L, or its equivalent, when both are so constructed and connected together that the latch may be operated by hand or form a carriage, substantially as and for the purposes described.

3d, Pendant rods, S S, levers, R R, connecting bars, P P, arm, O, pendulum lever, M, and bar, N, when connected together and combined with a gate that is moved longitudinally in opening and closing, substantially as and for the purposes described.

72,214.—HAIR CUTTING MACHINE.—Robert Maynard, Whittlesford, Cambridge, and Jabez James Purkiss, London, Great Britain.

We claim, 1st, The employment of one or more revolving knives, I, in combination with a fixed knife, A, for the purpose specified.

2d, The employment in combination with the knives, A I, of the comb, M, for the purpose specified.

3d, The employment of the inner comb, M, in combination with the outer comb, H, the latch of which is made adjustable for the purpose specified.

4th, Adjusting the comb, H, by means of the rack, L, springs, N, and paw O, or equivalent devices.

72,215.—APPARATUS FOR TREATING FRACTURES AND DISPLACEMENTS.—James S. McClelland, Crawfordsville, Ind.

I claim the device of a fracture adjusting apparatus herein described, consisting of the use of rubber counter extension, C C', fig. 1, extension screw, E, board, H, with cross bar, A, the peculiar shape and design of thigh splint (fig. 2, A) A A', and (fig. 2 B) B B', substantially as herein set forth.

72,216.—STEAM GENERATOR.—Geo. Miller, Melbourne, Victoria, executor of the estate of James F. McKenzie, deceased.

I claim, 1st, The generating and superheating tube, B, constructed as described in sections, the points of connection of each section provided with an inner disk, having a central opening, as herein set forth.

2d, The tubes, B, constructed as described, in combination with the thermostat, one or more, and arranged in the furnace, as herein set forth and represented.

72,217.—DRY GAS METER.—Edmund Meredith (assignor to himself and J. S. Sellers), Philadelphia, Pa.

I claim the application of the inclined planes, c'', either to the carrier, C, or to the rotary disk, B, so as to operate substantially as and for the purpose described.

72,218.—SLOTTING MACHINE.—Joseph W. Moore, Cambridgeport, Mass.

I claim the combination of mechanism as described, for the purpose set forth, and for the object specified.

72,219.—LAMP.—George Neilson, Boston, Mass.

I claim, 1st, The combination in a burner, such as described, with the elevated dome-supporting disk, of a dome or deflector hinged to said disk, substantially as and for the purposes set forth.

2d, The combination with the dome or deflector and the arm projecting from its base, of the dome-supporting disk and slot formed in the same for receiving and holding said arm, substantially in the manner and for the purposes set forth.

3d. The combination with the dome-supporting disk, of a ring of leather or other suitable material which is a non-conductor of heat, secured upon the periphery of said disk, substantially as and for the purposes set forth.

4th. The base or chimney rest, constructed substantially as herein described, that is to say, provided with a series of radial corrugations, which, when the chimney is in place, allow the external air to pass into the burner between the base of the chimney and the said rest, substantially as set forth.

5th. The combination of the radially corrugated base or chimney-rest, with the dome-supporting disk and dome or deflector hinged to said disk, under the arrangement and for the operation as set forth.

72,220.—BRICK MACHINE.—John North, New York city.

I claim, 1st, A mold wheel or frame made of annular or ring shape, and suspended upon rollers, substantially as and for the purpose described.

2d. The combination of the mold wheel or frame, K, arranged to have an intermittent rotary motion, with the follower, Z, or its equivalent, within the feed hopper X, and box, Y, when such follower is arranged for operation with regard to the mold wheel, substantially as and for the purpose described.

3d, The combination with a mold wheel or frame, K, arranged to have an intermittent rotary motion, and the frame, B2, so disposed and arranged about such wheel as to exert a pressure upon the clay within its molds, substantially as and for the purpose specified.

4th, The mold-wheel or frame, K, arranged to have an intermittent rotary motion, the stems, M2, the presser frame, B3, and the molds, O O O O, so combined and arranged as to operate simultaneously, substantially as and for the purpose set forth.

5th, So arranging the endless belt or apron, in combination with the stationary clearer-board, W2, and brush, V2, rocker shaft arm, I, and pawl lever, V3, when operated on the gear, z, causing an intermittent rotary motion, substantially as and for the purposes described.

6th, The brushes, X2 and S3, in combination with a mold wheel, arranged to have an intermittent rotary motion, when such brushes are disposed for operation upon the said wheel and are only revolved or actuated when the is in motion, substantially as described, for the purposes specified.

72,221.—HAY PRESS.—Geo. Noyes, Pownal, Me., assignor to Andrew Leighton and M. L. Whitney.

I claim, 1st, The combination of the springs, 4, and levers, r, as and for the specified purposes.

2d, The combination of the ears, u, springs, 4, and levers, r, as and for the specified purposes.

3d, The adjustable doors, m, with trucks, o, as and for the purposes described.

4th, The combination of the clamps or cams, x z, levers, y and 2, and lever, 3, all as and for the purposes described.

72,222.—RAILROAD RAIL.—Clark Osgood, Cape Elizabeth, Me., assignor to himself and Frederick A. Prince.

I claim the rail composed of the support, A, and cap rail, C, when the two parts are placed together as shown by 1 2, and when the several cap rails are also united by the horizontal pintle, d, substantially as and for the purposes described.

72,223.—NUTMEG GRATER.—W. W. Owen and Daniel Kelly, Muskegon, Mich.

We claim the nutmeg grater, constructed as described, consisting of the T-shaped tube, A, whose short section is at right angles with the longer section, and has upon one end the flat circular box, G, placed parallel with the longer tube, and containing the revolving grater wheel, F, said short tube receiving the plate, B, spring and rod, D, all arranged and operating as herein shown and described.

72,224.—MANUFACTURE OF JEWELRY.—John S. Palmer, Providence, R. I.

I claim, 1st, Forming the raised metal shell merely of the general outline of the shape in which it is finally to be produced, substantially as and for the purpose specified.

2d, Forming the alloy filling of a shape to fit the interior of the said shell, in one piece or shape, substantially as and for the purpose specified.

3d, Reducing the said outline shell and the filling, after the same have been united into one piece, as described, to its perfect finished shape, and ornamenting the same by rolling or other suitable means, substantially in the manner described.

72,225.—MACHINE FOR FOLDING ENVELOPES.—Robert Parks (assignor to E. J. Spangler), Philadelphia, Pa.

I claim, 1st, The blade, F, the recessed or grooved block, J, rods, b, and receiver, D, the whole being combined and arranged for joint action, substantially as and for the purpose herein set forth.

The sliding bar, E, its blade, F, and plate, d, with curved slot, c'', in combination with the crank, M, the whole being arranged and operated substantially as and for the purpose described.

72,226.—STAKE HOLDER IN CARS.—O. R. Parmele, Aurora, Ill.

I claim the socket or stake holder, constructed with the right angular slots, I, and notches, L H, in combination with the pins, E F, in the lower end of the stake, substantially as and for the purpose described.

72,227.—CULTIVATOR.—C. B. Petengill, Hebron, assignor to Freeman C. Merrill, Paris, Me.

I claim, 1st, The circular draw beam, A, having the wheel straps, a1, draft bars, a2, socket, a3, and ears, a4, cast solid therewith, substantially as herein shown and described.

2d, The combination of the bent adjusting rod, F, with the front tooth, E, and with the central beam, C, of the cultivator frame, substantially as herein shown and described and for the purpose set forth.

3d, The combination of the ring bolt, I, curved adjusting bars, H, and beams, C and D, with each other, substantially as herein shown and described, and for the purpose set forth.

4th, The combination of the bent adjusting rods, F, circular draw beam, A, and teeth, E E I, of different lengths, with each other, and with the beams, C and D, of the cultivator frame, substantially as herein shown and described, and for the purpose set forth.

72,228.—SKIRT-IRONING TABLE.—Alfred S. Phillips, Boston, Mass.

I claim the skirt-ironing table, as composed of the top or board, the pair of legs hinged thereto, and the pair of separable legs, and the dovetailed connections, as described, for connecting the separable legs to the board or top, in manner as specified.

72,229.—HEATING FURNACE.—Chas. R. Rand, St. Louis, Mo.

I claim, 1st, The shaker grate, C provided with the points, a, and pivot, b, arranged to rest upon the grate, A, and operate substantially as described and for the purpose set forth.

2d, The smoke flues, l m n, and air flues, a', in connection with the hot and cold air chambers, and the dampers, i j and r, and pipes, p, when arranged to operate substantially as described.

3d, The water-vessel, W, in connection with the crane, S, when arranged to operate substantially as described.

4th, The ashpan, M, with its sliding bottom, N, in connection with the pipe, O, when arranged to operate as shown and described.

5th, The openings, R V t, for obtaining access to the chimney, and the opening, Z, in the hearth plate, in connection with the opening in the partition, J, with their movable covers, when arranged as described and for the purposes set forth.

6th, The half-conical form of the fireplace, with the globe top, having the divisions therein for the air flues, as shown, as well as the arrangement for dividing the smoke, with the shutter, E, provided with the door, g, and damper, h, when arranged as described and for the purposes set forth.

72,230.—MACHINE FOR MAKING NAILS.—Benjamin Robinson, Boston, Mass.

I claim, 1st, in combination with a feeding device, so arranged as to feed the forward edge of the nail sheet past the foremost edge of the upper die by the width of one nail at each stroke of the cutter head, and a pressure bar, Z, slotted as shown, the arrangement of the male dies, C, and female dies, K, placed in transvers series, heads to points, substantially as and for the purpose described.

2d, The arrangement of lever, W, spring, U, standard, V, and nut, X, in combination with the journal of roll, N, as and for the purpose described.

3d, The arrangement of female dies, K K, made in halves, in crossbars, J, as held by bolts, L, and adjusted by set screws, E and F, as and for the purposes described.

4th, The arrangement of levers, S S2, connecting rods, R R2, substantially as and for the purpose described.

72,231.—LOCOMOTIVE LINK FOR TRUCKS.—Thos. J. Rowley and William Poland, Chillicothe, Ohio.

I claim the link or radius bar, A, combined with the slide box, B, and the stiffening bar, , constructed as and for the purpose herein described.

72,232.—HORSE HAY FORK.—George W. Shade, Shippensburg, Pa.

I claim a hay fork, constructed in the manner substantially as described, with one or more pairs of prongs, in combination with bars, B B', toggle joints a, spring, C, handle, D, and trip catch, E, all operating in the manner as and for the purpose set forth.

72,233.—WHEEL FOR WAGONS AND CARRIAGES.—Fred. G. Simmons, Lansingburg, N. Y.

I claim, 1st, The employment of the socket cylinders, C and D, one cast on the hub, A, the other disconnected therefrom and working freely thereon, and in combination with the said hub, A, substantially as herein described and set forth.

2d, Also, in a wagon hub, the socket cylinders, C and D, the hub, A, and the nut or cap, B, constructed and arranged in the manner and for the purposes substantially as herein fully described and set forth.

72,234.—INHALING TUBE.—Samuel W. Sine, Easton, Pa.

I claim, 1st, The metallic valves, D and E, the diaphragm, c, stop, e, and the spring, d, in combination with an inhaling tube, substantially as and for the purposes described.

2d, A metallic valve, either with or without a stop or spring, in combination with an inhaling tube, substantially as described.

72,235.—LET-OFF MOTION FOR LOOMS.—George Smith, Cumberland, R. I.

I claim the combination of the mechanism for controlling the let-off warps as described, with a binder or break, for rigidly confining and holding the whip roller in its latest position at the moment that the lathe beats up the filling, substantially in the manner described.

72,236.—CORN HARVESTER.—H. L. Smith, Watkins, N. Y.

I claim, 1st, The combination of the hand lever, D, with the platform, A, and thills, C, without intermediate parts, so arranged that the platform is tilted by simply raising the lever, as herein set forth.

2d, The arrangement, with the tilting platform, of the parts constituting the gearing operating the knives, I, and reels, M, the same consisting of the gears, 1, 2, 3, 4, the shafts, H H', with the collars, g g', operated by levers, K K', and the pulleys and bands, k k1, the whole constructed and operating in the manner and for the purpose specified.

72,237.—TRUNK.—Thomas Smith, Brooklyn, N. Y.

I claim, 1st, The tray, B, of a trunk, when provided with a hinged bottom, b, substantially as and for the purpose herein shown and described.

2d, So arranging a trunk, A, and its tray, B, that the latter can be secured in an inverted position upon the cover of the trunk, by means of straps, or otherwise, substantially as herein shown and described, so as to form a separate compartment upon the trunk, as set forth.

72,238.—HARVESTER.—George H. Spalding, Rockford, Ill.

I claim, 1st, The receiving box, B, located between the driving wheel and the first guard finger, substantially as and for the purpose herein shown.

2d, The location of the footboards, f f', on each side of the receptacle, B, which permits the binder to face the receptacle, substantially as set forth.

3d, The raised footboard, f', which admits the grain beneath it, substantially as and for the object specified.

4th, The delivery of the grain into the receptacle at its bottom or base, substantially as and for the purpose set forth.

5th, The employment of metallic strips, S S S, and belts, b b, as apron or carrier, substantially as and for the purpose herein shown.

6th, The securing of the said metallic strips, S S S, at their forward edges, substantially as herein shown, so that in passing over the roller they will assume a vertical position and thrust the grain into the receptacle, all as set forth.

7th, The employment of a receptacle, B, for the grain, which admits of the binding of the bundles upon the loose grain in it without removing the bundle till completed, substantially as and for the purpose hereinbefore mentioned.

72,239.—MARINE ENGINE GOVERNOR.—Jas. Sullivan, South Boston, Mass.

I claim the arrangement of valve, B, lever, E, weight, I, and counter weight K, operating substantially as and for the purpose described.

72,240.—STEAM GENERATOR SAFETY VALVE.—Henry Taylor and Joseph M. Cole, Baltimore, Md.

We claim, 1st, The combination of the weight and valve, when connected by a flexible joint, substantially as and for the purpose described.

2d, Also, in combination with the closed self-acting safety valve, the valve, J, which is held shut by the steam in the boiler when at or below its regulated pressure, and opened by the steam in the boiler when its pressure rises above that which it is designed to carry, substantially as described.

3d, Also, in combination with the passage, H, the projecting top piece, L, to prevent said passages from being stopped up, but at the same time allow the steam to escape through them when blown off through the safety valve, as described.

4th, Also, the combination of the crank shaft and lifter with the weight, D, and valve, C, so that the attendant can at any time open the safety vale, and allow the steam from the boiler to pass through, but cannot close said valve to prevent the escape of steam when its pressure exceeds that for which the safety valve is computed, as set forth.

72,241.—STILLS.—Isaac P. Tice, New York city.

I claim, 1 t, The arrangement of the filling and discharging orifice of a still below the surface of the wash, for the purposes herein described.

2d Also, the valve opening inward upon the main pipe.

3d, Also, the valve attached to the overflow pipe in such a manner as to be opened when the still is operating, and closed when it is not working.

4th, Also, connecting the two valves, c and d, so that they will act simultaneously, as herein described.

5th, Also, the combination of these valves with the still and its necessary working apparatus.

6th, Also, inclosing the collapse and blow-off valves of a still, and connecting them, by means of a pipe, with the doubler, worm, or any other part of the enclosed circuit.

72,242.—STONE FOR HEATING SADIRONS.—John P. Troxell, Hancock, Md.

I claim, 1st, The horizontal recesses, M, in the top part of the stove, provided with slots, O, formed by the partitions, N, and the chamber, E, at the sides and rear of the recesses, M, substantially as and for the purposes described.

2d, The chamber, E, formed as described, connecting with the fireplace by means of the openings, D, and provided with holes, P, for cooking purposes, in combination with the recesses, M, substantially as and for the purposes described.

72,243.—BOOKBINDER'S BEVELING MACHINE.—H. L. Tumy, Cincinnati, Ohio.

I claim, 1st, The roughened beveling leaf, C, for the purpose above specified.

2d, The bedplate, B, beveling leaf, C, gaging bar, D, and pawl, g, arranged and operating substantially as and for the purpose herein described and set forth.

72,244.—ARGAND BURNER.—E. R. Walker, New York city, assignor to E. P. Gleason.

I claim the combination of a disk or plate of metal with a regulating screw, for the purposes fully described.

72,245.—ATTACHING PICKS TO THEIR HANDLES.—J. P. Walsh, Helena, Montana.

I claim the attachment of a tool to its handle, a dovetail projection, a, from the tool, interlocking with a corresponding slot, e, in the head of the handle, and retained therein by an encircling band, E, a transverse pin, or other equivalent device, substantially in the manner set forth.

Also, the independent metallic side pieces, D, when formed substantially as herein described, and united to a handle, B, so as to receive and retain a dovetail projection, a, of a tool, substantially as and for the purpose herein specified.

72,246.—MODE OF PREPARING FAGGOTS FOR MANUFACTURING WROUGHT BEAMS OR GIRDERS.—George Walters and Thomas Shaffer, Phœnixville, Pa.

We claim a pile or fagot for wrought-iron beams, composed in part of a solid bar or bars, with a rib or ribs, e, and in part of a number of bars riveted together and wedged to the said rib or ribs, all as set forth for the purpose specified.

72,247.—CORK EXTRACTOR.—William G. Waterman, Middletown, Conn.

I claim the combination of the corkscrew, B, and the spring, E, both being attached to the handle, A, in the manner herein set forth and described.

72,248.—WHIFFLETREE.—Geo. Watt, Richmond, Va.

I claim, 1st, The whiffletrees A A', formed of bent metal, with three straight sides, one of which is enlarged in the center, to sustain end wise pressure, as described.

2d, In bent metal whiffletrees the replaceable rings or thimbles, B, substantially as and for the purposes set forth.

72,249.—STRAW CUTTER.—J. Weichart, San Francisco, Cal.

I claim, 1st, The manner of operating the feed roller, B, by the toothed wheel C, and cam, D, substantially as and for the purposes described.

2d, The cam, E, in combination with the arms, d d', jointed to the knife, and the spring, H, for throwing it back, substantially as described; and

3d, The movable pressure plate, b, spiral springs, c c, so that the material to be cut will be held firmly in place, substantially as described and shown.

72,250.—MARBLE-CUTTING MACHINE.—G. W. Wheeler, New Fairfield, and H. I. Stevens, Bethel, Conn.

We claim the frame, B, constructed as described, so that the roller guides may be adjusted as described.

72,251.—RAILROAD SWITCH.—James M. Whiting, Providence, R. I.

I claim the construction and arrangement of the switch, S, in such a manner as that it may be properly shifted by the rail car in the act of passing over the same, substantially as described.

72,252.—SOAP REST.—J. Whittemore, South Reading, Mass.

I claim, as a new article of manufacture, a soap rest, consisting of the shelf A, and bracket and spring, D C E, made substantially as described and for the purpose set forth.

72,253.—LAMP CHIMNEY.—J. D. Willoughby, Shippensburg, Pa.

I claim, 1st, A lamp chimney with the flange, I, or its equivalent, as and for the purpose set forth.

2d, A lamp top with the catches, o o, or their equivalents, as and for the purpose set forth.

3d, The lamp chimney with the flange, I, and the lamp top with the catches, o o, in combination with the spring, U, or its equivalent, as and for the purpose set forth.

72,254.—APPARATUS FOR MELTING AND STRAINING CRUDE TURPENTINE.—Josiah E. Winants, Brooklyn, N. Y., assignor to himself and John F. Griffin.

I claim the employment of a rotary heating and straining cylinder, substantially in the manner and for the purposes set forth.

72,255.—BUCKLE.—E. L. Woods, Alliance, Ohio, assignor to himself, Joshua H. Woods, Benjamin F. Woods and James L. Woods.

I claim the plate and clips, B B, projection, a, in combination with hinge holder, D, and tongue, d, constructed substantially as described and operating as set forth.

72,256.—MILLSTONE DRESS.—Notley W. Wortham (assignor to himself, S. C. Headry, M. L. Watson and P. W. Printup), Union Point, Ga.

I claim the improved millstone dress consisting of the four furrowed sections at right angles to each other, in the manner described and for the purpose specified.

72,257.—STALL FOR CATTLE AND HORSES.—Louis B. F. Sibley, Portland, Me.

I claim the improved stall substantially as described combining the secondary floor and bedding box, as and for the purposes set forth.

72,258.—STEAM PIPE FOR CONNECTING HEATING PIPES IN RAILROAD CARS.—Charles R. Abbot, Elmira, N. Y.

I claim the combination and arrangement of pipes, A and B, ball and socket joints, C and D, and pipes, E and F, substantially as and for the purposes described.

72,259.—COFFEE MILL.—John R. Adams, New York city.

I claim the pivoted lid of the mill attached by an arm to the grinder shaft, for the purpose of turning the grinding cone, as described.

72,260.—HARROW.—John Aiken, Warner, N. H.

I claim connecting the rollers, B, to each other in pairs by chains, C, or equivalent flexible or jointed connection, substantially as herein shown and described and for the purpose set forth.

72,261.—COMBINED DAMPER AND VENTILATOR.—Alexander Anderson, London, Province of Ontario, Canada.

I claim, 1st, The slotted damper, B, with depressions or pockets, b, to provide an indirect passage for the smoke when closed and with a weight, b1, to retain it in its open position.

2d, The sliding lever, D, constructed and applied substantially as shown and described in combination with a notched plate, E, by which the lever and damper are held in any desired position.

3d, The combination with the joint of stovepipe, A, provided with apertures, a a, and horizontal slots, a1, of the damper, B, and perforated ventilator, C c, constructed, arranged and adapted to be separately operated by the same handle, substantially as set forth.

72,262.—SIGNAL LANTERN.—L. V. Badger, Chicago, Ill.

I claim a signal lantern for street railroad cars composed of a box inserted in the roof and provided with a lamp, reflectors and glass or transparent sides, substantially in the manner as herein shown and described.

72,263.—RAILROAD WEED CUTTER.—J. S. Boicourt, Boonsboro', Iowa.

I claim the arrangement of the circular cutters, d, and the straight cutter bar, F, or either of them, in combination with a railroad truck, A, substantially as and for the purpose herein described.

72,264.—SHAFT COUPLING.—M. C. Boyer, Norristown, Pa.

I claim the within-described coupling composed of the two clamps, B and B', adapted to the shafts and nuts, D and D', adapted to tapering screws, a a on the clamps, all as set forth and for the purpose specified.

72,265.—ANIMAL POKE.—G. W. Carpender, Jarvis, Ind.

I claim the bow, A, rounds, B and C, bar, D, rod, E, and collar, F, with its points, the several parts being constructed and used as and for the purpose set forth.

72,266.—TRACE CLAMP.—D. H. Clock, Monroeville, Ohio.

I claim the construction of a clamp in the manner substantially as described as a new article of manufacture when applied to the purpose specified.

72,267.—SORGHUM EVAPORATOR.—Noah Clouse, Buffalo Village, Pa.

I claim, 1st, The manner herein shown and described of hanging the vessels, A, in the carriages, B, by means of plates, C, having pins, a, and screws, b, and by means of steadying pins, c, as described.

2d, The carriages, F F, when provided with adjustable casters having plates, e, on their upright axles and secured by pins, d, in any desired position, as described.

3d, The arrangement of the frame, E, divided into sections to allow the easy transportation of the vessels, A, from one section to the other, as described.

4th, A sorghum evaporator consisting of a series of separate vessels, A A, hung in carriages, B B, and moved in succession from the filling place over the furnaces, F and G, to the cooling pan or discharge, substantially as described.

72,268.—BOAT LOWERING APPARATUS.—A. F. Crosman, Steamer *Ossipee*, U. S. N.

I claim the notched spring catch, G, in combination with the weighted chains, b, and jointed davits, E, as herein described for the purpose specified.

72,269.—STUMP EXTRACTOR.—Alonzo Crowner, Wellsville, N. Y.

I claim, 1st, The screw shaft, A, applied to transporting trucks and provided with means for rotating it for the purpose of extracting stumps and stones, substantially as described.

2d, Providing a screw shaft, A, which is applied to two trucks substantially as described with drums, G G', connected together by gear wheels so as to rotate in opposite directions, in combination with right and left pawls, h h', and ratchet wheels, e e', substantially as and for the purposes described.

3d, The pendent guides, J J, for supporting pulleys, I I, over which the ropes, k k', of drums, G G', pass in combination with a machine operating substantially as described.

4th, Sustaining the front end of the screw shaft upon or by means of a head block, D, which is attached to a bolster, D', by a staple, E, so that it can rise and fall, substantially as described.

5th, The combination of the screw, A, nut, a', and prop, P, substantially in the manner and for the purpose herein described.

6th, The combination of rods, F F', with a right and left screw shaft, A, which is supported upon trucks, and operated substantially as described.

72,270.—HORSE HAY FORK.—Fred Culver, Elkland, Pa.

I claim the combination of upright shaft, C, rivets or pins, B B, arms, D D, with slots, a a, at their upper end and barbs at their lower end, the whole arranged substantially as and for the purpose specified.

72,271.—NEEDLE CASE.—P. D. Cummins, Portland, Me.

I claim the combination of the cylinder, a, rod, b, tube, d, and cushion, k, substantially as and for the purposes set forth.

72,272.—DEODORIZING INDIA-RUBBER, GUTTA-PERCHA, ETC. Edward de la Granja, Boston, Mass.

I claim, 1st, The solution above described, when used as and for the purpose specified.

2d, The process of deodorizing and perfuming india-rubber and gutta-percha, above described.

72,273.—WOOD-TURNING LATHE.—David Dick, Corning, N. Y.

I claim, 1st, The two sliding tool beds, M O, provided with adjustable cutting tools and operated simultaneously toward and from each other at opposite sides of the lathe bed by means of the cam, E, arm, J, rock shaft, H, and double crank, L, all constructed and arranged to operate substantially as shown and described.

2d, The slotted arm, J, with the pin, b', of the cam, E, applied to the cam, F, and rock shaft, H, substantially as shown for the purpose of moving the slides, M O, slowly toward each other and with a quick movement outward from each other, as set forth.

3d, The rising and falling hopper, W, operated automatically from the sliding bar, D, through the medium of the arms, Z C', and pin, u, all constructed to operate substantially as and for the purpose set forth.

4th, The lubricating chamber, Y, in the hopper, W, arranged in relation with the center point, a', operating substantially as and for the purpose specified.

5th, The flanged center point, b, on the mandrel, C, with the groove, r, working over said point and operated automatically from the sliding bar, D, constructed and operating substantially as and for the purpose set forth.

72,274.—RAILROAD CAR VENTILATOR.—William B. Dunning, Geneva, N. Y.

I claim a window sash or other frame made of two frames one within the other and hinged or otherwise hung the inner to the outer and the outer to any suitable frame, so as to be susceptible of the operation substantially as and for the purpose described.

72,275.—LAMP CHIMNEY TONGS.—Jacob Euteneur, Peoria, Ill.

I claim the grasping claws and handle of chimney tongs, when constructed and arranged substantially as shown and specified.

72,276.—RAILROAD SPIKES.—Morrison Foster, Cleveland, Ohio.

I claim, in combination with hook-headed railroad spikes the so enlarging the head and continuing it as flat there will be formed in continuation with the head a shoulder at the rear of the spike, on a line below the under side of the hook of the spike, so that said shoulder shall come in contact with the wood into which the spike is driven a little before the hook comes in metal contact with the flange of the rail it is to hold and thus prevent any liability to fracture or over strain the head of the spike, substantially as described.

Also, in combination with the shoulder at the rear of the spike, when formed with a continuation of the head and located with regard to the under side of the hook, as above described, the shoulders at the sides of the spike and on a line with the shoulder, b, and auxiliary thereto for the purpose of shedding the rain or other water from the hole made by driving in the spike and thus preventing the rotting of the cross tie and consequent loosening of the spike, substantially as described.

Also curving the lower portion of the shank of the spike backward in combination with the rear inclination to form the point for the purpose of causing it to hug the edge of the flange of the rail as it is driven in alongside of it, substantially as described.

72,277.—JACK FOR PULLING HOP POLES.—O. S. Foster, Durhamville, N. Y.

I claim the metallic head, D, having trunnions and claws, E E, all formed of one piece and connected to L-shaped standards, B B, which are secured to a block, A, and provided with a suitable handle, C, all constructed and used for the purpose specified.

72,278.—FURNACE FOR STEAM BOILER.—Charles Fownes, Pittsburg, Pa.

I claim, 1st, The smoke consumer composed of the diaphragm, T, with its set of burners, U U' U'' U''' U'''' etc., and burner, V V, channel, J J, openings, K K, and blowers, M M, or their equivalent, arranged and operating as specified.

2d, The diaphragm, T T, curved or corrugated so as to obtain more heating surface and to form channels for collecting the dust, as described.

72,279.—HINGING TEA KETTLE COVERS.—Charles Fownes, Pittsburg, Pa.

I claim, 1st, Swinging the lid of a tea kettle around a center placed or located to the right or to left of the bail ear, D, out of the center line of the spout and nearer to the spout than to the back of the tea kettle so that the lid in pivoting around that center will swing clear of the bail lug, G, without being elevated to pass over it, as set forth.

2d, The combination of the pin, M, or pins, N N, with the knob, G, or its equivalent.

3d, The combination of the split piece, P, or pieces, P P', with the knob, G.

4th, The combination of the screw, V, cast or chilled in with the piece, G.

5th, The combination of the washer, W, with the pieces, M N N P P' V, and the knob, G, and rim, H, used for the purpose set forth.

6th, Securing the lids of tea kettles by means and with the use of the screw, F, bolt, V, pin, M, pins, N N, or pieces, P P', as described.

72,280.—SADIRON HEATER.—S. C. Frink, Indianapolis, Ind.

I claim, 1st, The peculiar-formed base piece, L, as represented in Fig. 3, with the air, gas and cotton chambers attached separated by gauze wire or perforated metal, substantially as set forth.

2d, Also the metallic ring or band, K, Fig. 4, when used to bind or make fast the gauze wire or perforated metal, P, on the gas, air or cotton chambers, I 1, as represented in Fig. 3 of drawings, substantially as herein set forth.

3d, Also the peculiar-shaped shell or cover, F, with the inclined plane, A, lug, O, and bevelled sides, C, to receive the flat or tailor's iron, as represented in Figs. 1 and 2, substantially as herein set forth.

4th, Also the whole device, when constructed and operated substantially as set forth.

72,281.—WASHING MACHINE.—Thomas Q. Frost, Indian River, N. Y.

I claim the combination of the dashers, C, rods, D, gear wheel, E, pinion, F, crank shafts, G d, pitman, K, grooved rollers, O, and adjustable rollers, L, as herein described for the purpose specified.

72,282.—HORSE HAY FORK.—William B. Gabel, East Cocalico Township, Pa.

I claim the vertical bolt, D, entering the eyes of a flattened hook, C, which terminates a single arm, A, forked at the other end and connected to a similar forked arm, B, by a central rivet all arranged as above described and in combination with the lever, E, ring, I, and one or two pulleys, K J, all arranged and operating in the manner and for the purposes specified.

72,283.—IRON SAFES.—William Gardner, New York city.

I claim, 1st, The Z-shaped frames, e and e, in combination with the pins, f f, substantially as and for the purpose herein shown and described.

2d, The Z-shaped frames, e and e, in combination with the pins, g, on the door, A, substantially as set forth.

3d, The removable pins, g', and plate, i, in combination with the Z-shaped frames e and e, substantially as set forth.

4th, The grooved bottom, K, of the safe in combination with the false bottom, m, the latter being provided with a dovetail or other projection, l, substantially as herein shown and described.

72,284.—CHECK REIN ATTACHMENT.—M. A. Gates, Troy, Pa.

I claim the combination of the check rein hook, B, strap, C, turret ring, A, stop ring, D, hook ring, E, strap, F, and ring, G, and hook, H, with each other when used in connection with the check rein, saddle or pad, and back strap of a harness, substantially as herein shown and described and for the purpose set forth.

72,285.—LUBRICATING SPINDLE.—A. H. Gilman, Hopedale, Mass.

I claim the combination of the chambered nut, E, provided with an absorbent material as set forth with the bolster or with the same and the bushing to extend down from such bolster, as explained.

Also the combination of the chambered nut, E, provided with an absorbent as set forth with the bolster and its chamber, e, furnished with an absorbent material, arranged so as to lie against the spindle, as specified.

Also the combination of the chambered nut, E, the chambered bolster and bushing provided with a passage and an absorbent material to extend through such passage and against the spindle, as described.

Also the combination of the lubricating chamber, i, and its supply passage, k, with the gear, F, the bearing thereof and the conduit, e, or its equivalent, arranged in the bolster and to open against the spindle, as specified.

72,286.—HORSE HAY FORK.—J. S. Gochnauer, York, Pa.

I claim, 1st, Operating the movable toes by means of an oscillating roller, C, substantially as herein shown and described.

2d, Strengthening and bracing the tines by means of the roller which operates the toes, in the manner substantially as herein shown and described.

3d, The combination of the spring lever, F, with the oscillating roller, C, and the tines, A, substantially as herein shown and described.

4th, The locking recess, b, when used in combination with the spring lever, F, substantially as herein shown and described.

5th, The discharge lever, K, arranged and operating in combination with the said locking recess and the spring lever, as set forth.

72,287.—VALVE FOR BOILER FEEDER.—Richard Gornall, Baltimore, Md.

I claim the combination of the float, F, and valve, v, seating upward, with the chambers, C and C', the pipes, D S W, and the cylinder, A, the valve being attached directly to the float, F, by the valve stem, f, and the parts operating without levers or gear of any description, but substantially in the manner and for the purposes specified.

72,288.—BOLT-HEADING MACHINE.—Robert Gracey, Pittsburg, Pa.

I claim, 1st, The combination of the cam, C, the weighted drop lever, C', the toggle, F, and the heading hammer, constructed, arranged and operating together substantially as described.

2d, The combination of the cams, D and D', the levers, E and E', the toggles, G and G', and the movable heading and griping dies, constructed, arranged and operating together substantially as described.

3d, In combination with the heading hammer the toggle, F, the drop lever, C', and cam, C, an elastic post, stud or other elastic bearing to arrest the descent of the drop lever and cause it instantly to rebound and remove the hammer from the heated iron, substantially as shown and described.

4th, In combination with the heading and gripping dies the piston, k, and stake, s, arranged and operating as described to detach the finished bolt from the dies.

72,289.—POTATO DIGGER.—E. V. W. Griffith, Utica, N. Y.

I claim, 1st, The fork, D, the bent lever, D1, and the pin, G1, or their equivalents, in combination, for the uses and purposes mentioned.

2d, The fork, D, operated by the lever, D1, and pin, G1, in combination with the screen, H, substantially as described and for the uses and purposes mentioned.

3d, The fork, D, and the bent axle, A1, and lever, D1, in combination, for the uses and purposes mentioned.

4th, Operating the fork automatically by means of the gearing, E and F, and the pin, G1, substantially as described and for the uses and purposes mentioned.

72,290.—ASH HOUSE.—Moses Hall, Jr., Osborn, Ohio.

I claim, 1st, A fire-proof ash house and leach tub combined, substantially as shown and described and for the purposes set forth.

2d, The fire-proof box, A, in combination with the hopper, B, and screen, C, substantially as shown and described and for the purpose set forth.

3d, The fire-proof leach tub, D, in combination with the parts, K, and screen, S', substantially as shown and described and for the purposes set forth.

4th, A fire-proof box, C, in combination with the fire-proof leach-tub, D, substantially as shown and described, and for the purposes set forth.

72,291.—MACHINE FOR SPLITTING RATTAN.—Levi Heywood, Gardner, Mass.

I claim an independent tube or quill, E, which may be adjusted more or less in advance of the cutters, substantially as and for the purpose set forth.

72,292.—MACHINE FOR BENDING WOOD.—Levi Heywood, Gardner, Mass.

I claim the molds, A and B, in combination with the lever, D, or its equivalent, all constructed to operate in the manner substantially as and for the purpose set forth.

72,293.—MACHINE FOR BENDING WOOD.—Levi Heywood, Gardner, Mass.

I claim connecting the links, A, of a chain for bending wood by one or more flexible ropes, B, substantially as set forth.

72,294.—CINDER SHOVEL.—J. E. Hignutt, Denton, Md.

I claim the cinder shovel herein described, constructed with a vertical handle, A, and a horizontal or nearly horizontal toothed scoop, C D, substantially as and for the purpose set forth.

72,295.—BURIAL CASE.—Robert F. Hill, Philadelphia, Pa.

I claim the body, A, provided upon its upper edge with the flange, d, projecting within and without the case, having in its under side, within the case, the countersunk nuts, i, the corresponding flange, h, upon the lower edge of the cover, B, said flanges, secured together by the thumb screw, C, passing through both and into the countersunk nut, i, the head of said screw being without the cover, and the end within the body, A, as herein described, for the purpose specified.

72,296.—KNITTING MACHINE.—Wm. H. H. Hollen, Fastoria, Pa.

I claim, 1st, The combination and arrangement of the wheel, B, having a groove, b'', with the arm, C, of the rock shaft, H, as described and shown, for the purpose of giving the necessary movements to the stitch lifter, C, thread carrier, D, and the pressers, E and F F, as described.

2d, In combination with the elements of the preceding first clause, the studs, b' b' b', in the disk-wheel, B, and the teeth, a'', in the needle carrier, A, when arranged to move the said carrier, A, at the periods required by the said stitch lifter, C, thread carrier, D, and pressers, E and F F, as described.

3d, Also, the grooved and bent needle, a', in combination with the stitch lifter, C, both constructed as described, for the purpose specified.

4th, Also, the stitch lifter, C, made in the form shown, *i.e.*, with the three projections, 1 2 3, for the purpose of causing the stitch lifter of the machine to operate, in combination with the grooved and bent needles, a', in the manner and for the purpose described.

5th, Also, the thread carrier, D, made with curved sides and edged ends, substantially as and for the purpose described.

6th, Also, the vibrating stitch presser, E, formed as described, at its lower end, for the purpose of causing it to pass more closely along the lower sides of the needles in forcing back the stitches, as described.

72,297.—CULTIVATOR.—Henry Howe, Oneonta, N. Y.

I claim, 1st, Extending the rear end of the central beam, C, back to receive and support the rear or central plow standard, D, substantially as herein shown and described.

2d, The gage-wheel frame, J, constructed substantially as herein shown and described, and pivoted to the central beam, C, or to some other support at the central part of the cultivator frame, as and for the purpose herein set forth.

3d, The combination of the lever-latch, N, with the beam, C, and gage-wheel frame, J, substantially as herein shown and described, and for the purpose set forth.

4th, Pivoting or hinging the standards, D and F, to the cultivator frame, by means of the brace-ears, d' and f', substantially in the manner herein shown and described, and for the purpose set forth.

72,298.—AUTOMATIC RAIN CONDUCTOR.—James B. Hudson, Fayetteville, Pa.

I claim the cylinder, A, having a removable cover, B, and provided with a hopper, n, strainer, a, partition, E, pivoted disk, D, operated by float, F, and rod, R, and pipes, C P m and W, all constructed, arranged, and operating substantially as and for the purpose described.

72,299.—MACHINE FOR TRIMMING HEDGES AND CUTTING CORN.—John W. Hull, Connersville, Ind.

I claim, 1st, The combination of the frame, A, the hinged wheel, B, the cog-driving wheel, C, connected with gearing to move the horizontal shaft, c, and the vertical shaft, e, the rotating disk, G, with the hedge-cutting knives, b b, the forked guide, H, and the treadle, E, arranged and operating substantially as and for the purpose herein described.

2d, The combination of the main frame, A, the side frame, I I, the forked cornstalk cutter, K, the fixed arms, m m, the pivoted arms, m' m', and the treadle, E, arranged and operating as and for the purpose herein set forth.

72,300.—FOOT POWER.—Ezra Hutson, Brockport, N. Y.

I claim the rollers, d and e, ratchet, g, and pawls, m and n, the whole combined substantially as and for the purpose herein set forth.

72,301.—VEGETABLE CUTTER.—Enos B. Ives, Bristol, Conn.

I claim the wheel, E, provided with knives, g g g and e e e, substantially as described.

72,302.—DOOR BOLT.—C. C. Jones, Portland, Me.

I claim the combination of bolt, c, knob, e, and spring, f, in the case, a, with the plate, g, substantially as and for the purposes herein described.

72,303.—SLED.—George F. Krollpfeiffer, New York city.

I claim the attachment to sleds, sleighs, and other land conveyances, consisting of a pivoted frame, B, rod, E, and handles, F, substantially as and for the purpose described.

72,304.—HORSE HAY FORK.—Mary Jane Laird, Middletown, Pa., administratrix of the estate of Andrew J. Laird, deceased.

I claim the guard, D, when applied to hay forks for the protection of the lever or arm, substantially as described and set forth.

72,305.—PLOW.—S. J. Leach, Tuscaloosa, Ala.

I claim, 1st, Facing the mold-board of a plow with a thin detachable sheet or plate of wood, steel, or other suitable material, substantially as herein shown and described, and for the purpose set forth.

2d, Forming the mold-board, B, of a plow with a shoulder, b', and with slots or sockets, C, to receive the forward edge and tongues of the facing-plate, D, substantially as herein shown and described, and for the purpose set forth.

72,306.—LAMP CHIMNEY CLEANER.—George Leas, Shirleysburg, Pa.

I claim the lamp chimney cleaner, as described, the disk, B, of which is provided with a serrated metallic flange, as herein set forth.

72,307.—SEAT FOR VEHICLES.—John R. D. V. Linton, New Bedford, Mass.

I claim, as a new article of manufacture, a cast-metal seat riser, made substantially as herein shown and described.

72,308.—BEE HIVE.—Joel R. Martin, Martinsburg, Ind.

I claim, 1st, The block, G, connected to the end of the hive, A, and provided with its cleats, d d, pivoted as set forth, and for the purposes described.

2d, The combination of the hive, A, as constructed, with block, G, having cleats, d d, and supported by the standards, H H, above the pyramidal-shaped block, K, all constructed and used for the purposes set forth.

72,309.—PROTECTING STEAM BOILERS FROM CORROSION.—David Matthew, Prairie du Chien, Wis.

I claim a galvanic pile, which is composed of copper and zinc plates, or other metals equivalent in galvanic properties, applied upon a metal rod, which is provided on its ends with supporting disks, said pile being employed substantially in the manner and for the purposes described.

72,310.—CHURN.—James Maxey, Kewanna, Ind.

I claim the arrangement of the churn-body, A, standards, H H, shaft, I, wheels, G and F, and staff, B, provided with the wheel, D, and the paddles, C C, as and for the purpose set forth.

72,311.—TRACE FASTENER.—Ira C. McAllaster, Milo, Mich.

I claim the buckle constructed as described, consisting of the frame, E, having parallel side guards, F, and ear pieces, G, through which the rivets, H, pass, and slotted upon its upper side to receive the lever, M, hung by a slot, a, on a cross pin, b, upon which it slides, and provided with the tongue, L, at one end, its other end fitting upon the surface, P, of the buckle frame, as herein described, for the purpose specified.

72,312.—BACK-BAND FASTENER.—David L. McGregor, Charlestown, Mass.

I claim the metallic band-fastener, e, in combination with a saddle, substantially as described, and for the purpose set forth.

72,313.—SASH STOPPER.—J. N. McIntire, New York city.

I claim the catch or cam-like hook, so constructed and arranged as to interlock with and disengage from suitable pins or projecting stops in substantially the manner described, for the purposes set forth.

72,314.—WINDOW-SASH SUPPORTER.—John S. Merrill, Newtown, Md.

I claim the use of the self-acting metallic roller, D, in combination with the inclined metallic box, C, in the one side of the sash, and two friction rollers, E E, attached to the opposite side of the sash, when arranged, combined, and operating with the sash, as herein described and for the purposes set forth.

72,315.—HORSE RAKE.—Myron Miles, Middlesex, N. Y.

I claim the combination and arrangement of the hinged draw-bars, D D, guide standard, G, connecting rod, H, brace bars, M M, and stop, L, substantially as herein specified.

Also, the slots, m m, in the brace-bars, and the springs, c, in combination with the stop, L, for the purpose herein specified.

Also, the arrangement of the caster or carrier-wheels, N N, in combination with the rake, and with the draw-bars, D D, substantially as and for the purpose herein set forth.

72,316.—WASHING MACHINE.—John Mitchell, Newark, O.

I claim the frame, L, hung by arms, H H, to bar, T, when provided with ribs, I I, and weight, F, in combination with the box, A, having standards, D, inclined bottom, O, and stationary ribs, M, all constructed, arranged, and operating as and for the purpose described.

72,317.—VENTILATOR FOR FLOUR MILLS.—Christopher Moegling, Milwaukee, Wis.

I claim, 1st, In connection with an ordinary open-top curb, the stops, l m, or n, or their equivalent, as and for the purposes set forth.

2d, The educting pipe, D, when provided with the water stops, k k, or k', whether said pipe leads off from the curb, B, or from the receptacle, C, for the purposes specified, either with or without the aid of the wings, E.

3d, The vertically-adjustable frame, F, when used as and for the purposes specified.

72,318.—SEED PLANTER.—William R. Mozier, Higginsville, Ill.

I claim the combination of the trigger or hand lever, J, spring, L, lever, I, connecting bars, K and H, crank, G, recessed cylinder, F, and seed box, E, with each other and with the forward plow standard, B, plow beam, A, and handle, D, substantially as herein shown and described, and for the purpose set forth.

72,319.—PROPELLER.—Nicholas Nolan, New York city.

I claim the blades or paddles, D D, fitted in the rock frame, B, and operated from the driving shaft, K, through the medium of the crank wheel, J, and connecting rod, I, or their equivalents, in combination with the rod, M, attached to the crank, L, on the driving shaft, and provided with the hook, lx, and shoulder, j, to catch over pins, h h', the bevel segment, H, and the bevel wheel, G, on shaft, F, connected with the bar, E, all being arranged to operate in the manner substantially as and for the purpose set forth.

72,320.—SAIL-RELEASING APPARATUS.—Ferd. Gust Oehme, M. D., Plymouth, Mass.

I claim, 1st, Connecting the sail to the boat by means of an apparatus formed by the combination of inclined planes, spiral springs, and double-acting hooks, substantially as herein shown and described, and for the purpose set forth.

2d, The combination of the perforated grooved and slotted block, A, adjustable flanged blocks, E and G, springs, H, coiled spring or springs, B, pin, D, block, J, and hooks, K, with each other, substantially as herein shown and described, and for the purpose set forth.

72,321.—HORSE HAY-FORK.—Saml. Page, McAlisterville, Pa.

I claim the bar, C, having a slot at its upper end, through which is passed the lever, D, said bar being provided with the curved teeth, G G, and used in combination with the bars, B B, having pointed head, H, and tines, A A, all operating as specified.

72,322.—MODE OF TREATING SPONGE FOR PRODUCING TEXTILE FABRICS.—Alfred Paraf, Mulhouse, France.

I claim the herein described method of treating sponge to convert the same into fiber capable of being felted, spun, &c.

72,323.—LIFTING APPARATUS FOR GRAIN DRILL.—C. E. Patric, Macedon, N. Y.

I claim, 1st, The employment of the racks, R, and pinions, w, in connection with the hand-lever, F, and shaft, H, for the purposes set forth, whether the lifting-chains are made to wind upon the shaft or not.

2d, The arrangement of the locking-latch, D, with the shaft, H, when it is also made to act as a support, substantially as and for the purposes set forth.

3d, The arrangement of the guards, G, with the racks, R, and pinions, w, substantially in the manner herein shown and described, and for the purposes set forth.

72,324.—COMB.—William Pauly, College Point, N. Y.

I claim the combination of the two side-combs with the spring by which they are connected substantially as described.

72,325.—BELT-FASTENER.—C. O. Pike, North Leverett, Mass.

I claim, 1st, The half-collar, a, and the clamping-wedge, c, for fastening the ends of a bolt, constructed and operating substantially as described.

2d, The double levers, d d', constructed and operating as described, in combination with the above fastening device.

72,326.—PORTABLE EVAPORATOR.—H. L. Plumb, Hamer, O.

I claim the longitudinal partition, F, over the fire-chamber, as and for the purpose set forth.

The grate, J, constructed and operating in the manner shown and described.

The damper, arranged and operating in the manner shown and described.

Surrounding the fire-box of a portable evaporator with a jacket of sand or earth, substantially in the manner and for the purpose set forth.

In combination with the fire-box and evaporating-pan of a portable evaporator, the cover, I, secured in place by screws or clamps, and provided with pipes, b b, or their equivalents, for the purpose set forth.

72,327.—VISE.—H. K. Porter and T. W. Porter, Boston, Mass.

We claim, 1st, Controlling the sliding levers of vises by means of a spring, whose pressure may be varied at will by a screw inserted in the head of the vise-screw, substantially as set forth.

2d, The combination of the plunger, the spring, and set-screw, substantially as and for the purpose described.

72,328.—WASHING-MACHINE.—G. Reneky and J. Keiss, Cedar Falls, Iowa.

We claim, 1st, The vertical shaft, D, having vertical wings or flanges, E, rigidly attached to it, and perforated disk, C, having radial flanges, F, rigidly attached to it, said shaft and disk being rigidly connected together, in combination with the corrugated tub, A, substantially as herein shown and described, and for the purpose set forth.

2d, The combination of the crank, M, shaft, K, bevel-gear wheels, N and I, and cover, G with each other, with the winged or flanged shaft, D, and flanged disk, C, and with the corrugated tub, A, substantially as herein shown and described, and for the purpose set forth.

72,329.—HOISTING-JACK.—S. B. Rittenhouse, Plymouth, Ind.

I claim, 1st, The spring, g, secured between the sides of the box, A, and forming its front side arranged in relation therewith, and with the pawl, f, as herein shown and described.

2d, The construction and arrangement of the box, A, spring, g, pawl, f, projection, B', upon hoisting-bar wheels, b, cog-shaft, C, shaft, D, and pinion, E, as herein set forth and for the purpose specified.

72,330.—BRICK MACHINE.—Wm. F. Shanks, Louisville, Ky

I claim, 1st, The combination of the parts, H H, Q Q, R R, uprights, P P, thumb-screws, N N, cross-pieces, J J, uprights, K K, and sliding plate, G, substantially as described, and for the purpose specified.

2d, In combination with the above, the rod, m, attached to the crank, B, belt, S, cogs, b, and rod, E, substantially as described, for the purpose specified.

3d, The sliding plate, G, operated by means of the cogs, D, and rod, E, substantially as described, for the purpose specified.

4th, The rollers, A A, adjusted by means of the cogs, b, and crank-wheel, B, whereby the thickness of the stream or column of mud is regulated, substantially as herein shown and described.

72,331.—WATER-WHEEL.—H. W. Shipley, Portland, Oregon.

I claim the combination and arrangement of the conical hub, F, and radial buckets, C C, when arranged at the bottom of the shaft, A, with the upper ring, r, constructed with exterior and interior flanges of the shape described, the lower ring, r, and the exterior buckets, D E E, forming a water-wheel which operates in the manner and for the purposes specified.

72,332.—INSIDE WINDOW-BLIND.—S. W. Shorey, Galesburg, Ill.

I claim, 1st, An inside window-blind, constructed, arranged, and operating substantially as herein shown and described.

2d, The combination of the frame, A, having the grooves, a, webbing, c, slats, D, frame, B, and hinges, C, as herein described, for the purpose specified.

3d, The combination of the adjustable frame B, with the grooved frame A, for closing and holding in a closed or partially closed position, the slats of a window blind, as herein shown and described.

72,333.—SEED PLANTER.—John Stark, Thomasville, Ga.

I claim, 1st, The arrangement of the vertical arbor, e, carrying revolving arms, j and l, respectively below and above the bottom of the seed box, substantially as herein shown and described.

2d, The frame F, of a seed planter, when hinged to a supporting frame A and when connected with the same by means of supports b b, all made and operating substantially as herein shown and described.

3d, The funnel-shaped lower part I, of the seed box, when secured to the frame F, in combination with the hopper J, secured to the frame A, all made and operating substantially as herein shown and described.

4th, The driving wheel C, of a seed planter, when connected by means of suitable rods or shafts with the revolving arbor e, having the arms j and l, all made and operating substantially as herein shown and described.

5th, The fertilizer box, when arranged substantially as herein shown and described, in combination with the seed box H, driving wheel C, and frames A and F, all made and operating substantially as herein shown and described.

6th, The arrangement and combination with each other of the plow N, tube r, shares O, flattener P, adjustable marker R, seed dropper J, shares S, and roller D, all made and operating substantially as herein shown and described.

72,334.—HARROW.—Nicholas Starr, Jr., Homer, N. Y.

I claim, 1st, Constructing a harrow of four sides, in two sections or divisions, and each division composed of two sides hinged together, and said divisions connected at the diagonal corners to form a single square harrow.

2, Also, the connecting or coupling rod c, with its bolts at either end, to connect such divisions together and keep the sides expanded.

72,335.—MANUFACTURE OF IRON.—David Stewart, Kittanning, Pa.

I claim purifying the pig-iron or blast-furnace metal from its carbon and other impurities by passing it in a stream through ozone, atmospheric air, or other oxygen-bearing gas or vapor, substantially as and for the purposes hereinbefore described.

72,336.—EXCAVATOR.—B. T. Stowell, Quincy, Ill.

I claim an excavating or ditching machine, constructed substantially as herein described, with cutters at each end, arranged to cut in either direction as the machine moves backward and forward, and which delivers the earth on to a common carrier or revolving apron, substantially as described.

72,337.—TIRE HEATER.—Harry Stroud, Jr., Clinton, Ill., assignor to himself and R. W. Robinson.

I claim the flues E E, and damper D, in combination with the lid B, and chamber A, the whole combined and operated substantially as and for the purpose set forth.

72,338.—CHURN.—Clark M. Terrall and Nathan W. Hussey, Oskaloosa, Iowa.

We claim the combination of the grooved base A, churn G, standard B, with button E', and lever C, provided with an adjustable metal plate D, for connecting the dasher E, the whole constructed, arranged, and operating in the manner as specified.

72,339.—BASE-BURNING STOVE.—Joel Tiffany, Albany, N. Y.

I claim the use or employment of downward streams or jets of hot air upon the surface of the burning fuel, in combination with lateral streams or jets of cold air, taken over the top, through the sides, or otherwise, of the fire pot, and specially directed or conducted, by means of tubes, projecting plates or other equivalent means, so as to meet the streams or jets of hot air, at the point of impingement upon the surface of the burning fuel, substantially as forth.

72,340.—PISTON-ROD PACKING.—Sidney S. Turner, Westboro, Mass.

I claim the tubular elastic packing, confined rigidly by its ends, so arranged as to be compressed laterally against the rod by the direct action of the steam or other medium of pressure, substantially as and for the purpose set forth.

72,341.—CLOTHES DRYER.—Joshua Walker, Kansas City, Mo.

I claim the frames A A' and B, the cord C, and sheave c, when combined and arranged as set forth.

72,342.—COOKING STOVE.—Geo. W. Walker, Boston, Mass.

I claim, in combination with a flame and smoke flue at the back of the oven, an oven-ventilating flue or flues, arranged to operate substantially as set forth.

Also a provision upon the oven door for swinging articles into and from the oven, and arranged to be folded out of the way when not in use, substantially as set forth.

Also, in combination with the fire pot and ash pit, the sifting chamber, provided with a sliding grate, substantially as set forth.

Also, in combination with such sliding grate, the opening at the end of the sifting chamber for obtaining access to the grate, in connection with a protecting wall or plate, substantially as described.

Also, in combination with such sifting grate, the scraper bar, to dislodge the coal when the grate is drawn out, substantially as set forth.

Also, the construction of the sifting grate with diagonal bars, substantially as and for the purpose set forth.

72,343.—TIDAL-WATER ELEVATOR.—Philip Weck, Brooklyn, N. Y.

I claim, 1st, The box F, and buoy J, in combination with the chain E, and weight G, toothed pulleys D D' H, ratchets K K', and pawls L L' P, all arranged to operate in the manner substantially as and for the purpose set forth.

2d, The pendant S, attached to the pawl L, in connection with the rods M R, which connect the pawls L L' P, to insure a simultaneous detachment of said pawls from their ratchets K K' O, and a simultaneous application thereto, substantially as and for the purpose specified.

3d, The float V, connected with the valve lever T, in box F, and arranged to operate in the manner substantially as and for the purpose set forth.

4th, The supplemental chain Ux, applied to the chain E, and buoy J, substantially as and for the purpose specified.

72,344.—PITMAN.—Thos. Welch, Churchville, N. Y.

I claim, 1st, A skeleton or shell pitman for harvesters, made of suitable cast metal, the skeleton or shell head to receive the crank-pin box being cast to and with the pitman, for the purposes set forth.

2d, The crank-pin boxes with spherical bearings, in combination with a pitman head having a suitable concavity, as and for the purpose specified.

3d, A set screw having a concaved end, when used with the pitman head and crank-pin box in harvesters, for the purposes set forth.

72,345.—MODE OF PROTECTING LIKENESSES IN MONUMENTS.—Isaac H. Wells, Pagetown, Ohio.

I claim, 1st, The elastic packing C c c1 c2 c3, applied and compressed between the several parts of the frame and the frame and stone, substantially as and for the purpose specified.

2d, The combination of the bars D, holes b4, screw d, back E, and flange b3, substantially as described.

3d, In combination with the frame B, the removable door or shutter F, for excluding light from the surface of the picture, when the same is constructed and applied substantially as set forth.

72,346.—BOX FOR PRESERVING CORPSES.—Peter Wendhiser, Rockville, Conn.

I claim the corpse table C, with the removable metallic cover E, having the opening F, when said table is supported upon legs, D and placed within the wooden box A, lined with the metallic lining B, and provided with the water-outlet pipes H, all constructed as described for the purpose specified.

72,347.—LOCKING-KNOB LATCH FOR DOORS.—Jacob Wertsbaugher, La Grange, Ind.

I claim, 1st, The curved dog G, constructed substantially as herein shown and described, in combination with the sliding frame D, as and for the purpose set forth.

2d, The hollow stem or tube J, having a slotted arm K, attached to or formed upon it, substantially as herein shown and described, and for the purpose set forth.

3d, The combination of the plate L, with its adjustable ward or wards, with the hollow stem J, and slotted arm K, substantially as herein shown and described, and for the purpose set forth.

72,348.—STEAM JET FOR CLEANING BOILER TUBES.—Joel M. Wheeler, Oxford, Conn.

I claim the head A, constructed with inclined slots or openings, substantially as herein shown and described, and for the purpose set forth.

72,349.—HARVESTER.—William N. Whiteley and Andrew Whiteley, Springfield, Ohio.

We claim, 1st, The combination of the spring t, or its equivalent, with a harvester's clutch lever, for the purpose specified.

2d, The combination of the adjustable piece p, with the rear end of the harvester's tongue, substantially as set forth.

3d, Attaching the draught bolt R, Fig. 3, by which the team draws the machine, to the outer side of the tongue (that next the uncut crop), to obtain the advantages stated.

4th, The combination of an adjustable draught point, by which the team draws the machine, and an adjustable driver's seat, and a detachable grain platform, in a harvester.

5th, The construction and connection of the main frame and driver's seat of a harvester in such a manner that this seat can be shifted from one to another of the herein-described places upon the frame, for the purpose stated.

6th, The platform B, or an equivalent thereof, constructed and connected to the finger bar and divider, in the manner and for the purpose set forth.

7th, The following arrangement of parts in a harvesting machine: The finger bar, substantially at right angles to its line of forward movement: the grain wheel, located so that some portion of its hub shall be in the same vertical plane with the finger bar; the finger bar further backward than the axle of the cutter's driving wheel; the grain wheel, placed so that its tread shall be as far inward as the point of the divider; a supporting metal plate, which always has a portion lower than the finger bar, and firmly secured thereto, while the divider and part of this plate are firmly connected by screw bolts.

8th, The adjustable guiding board K, constructed and connected to the divider, as shown and described, and for the purposes specified.

9th, Constructing and connecting a journal of a harvester's reel shaft to said shaft, substantially as described for the purposes specified, whether the reel pulley be made a part of this journal or not.

10th, In a harvester rake, the outer tooth of which moves over the platform faster than the inner tooth, and the points of the teeth faster than their other ends, connecting the inner end of the rake head to the main frame by means of a ball-and-socket joint, or its equivalent, the moving parts of which can always be kept in snug working order, as set forth.

11th, Making the post I', provided with a ball at its upper end, or an equivalent thereof, laterally adjustable, as and for the purpose described.

12th, Making the post I', provided with a ball at its upper end, or an equivalent thereof, vertically adjustable, as and for the purpose set forth.

13th, Placing the center of motion of a harvester's automatic rake at the front edge of the head of said rake, as and for the purposes set forth.

14th, Making the pitman by which a harvester's automatic rake is moved, when discharging the gavels from the platform, in two or more parts, and substantially as described.

15th, In combination with a harvester's automatic rake, which has the outer tooth moved over the platform faster than the inner tooth, and removes the gavels heads foremost, a guiding arch X, which is above the rake head, and further inward than the inner tooth, and by which said rake is raised up above the platform during its forward stroke.

16th, The arch X, constructed and combined with arch y, substantially as shown and described, for the purposes specified.

17th, The combination of a guiding arch X, and the rake carrier 3, or an equivalent thereof, with a harvester's automatic rake, which has the outer tooth moved over the platform faster than the inner tooth, and removes the gavels heads foremost.

18th, Combining with a harvester's automatic rake, which has its outer tooth moved over the platform faster than the inner tooth, and removes the gavels heads foremost, an arch, to carry the rake forward over the next gavel, when said device is provided with a latch which drops behind a part of the rake head as it passes backward, and compels said rake to come forward over the next gavel.

19th, The combination of the spring 8, carrier 3, and arch X, or an equivalent arrangement of parts, with a harvester's automatic rake that has the outer tooth moved over the platform faster than the inner tooth, and removes the gavels heads foremost for the purposes specified.

20th, Making the latch spring 8, adjustable, for the purposes specified.

21st, The combination of the adjustable gage plate 5, with the front portion of the arch X, for the purposes specified.

22d, The combination of the spring b, or an equivalent thereof, with a harvester's automatic rake, the outer end of which moves upon a center at the inner end, and is carried forward over the cut grain by means of the arch X, or an equivalent thereof.

23d, The rake projector 4, constructed as described, and connected with the head of a harvester's automatic rake, for the purposes specified.

24th, The raker's adjustable and removable foot board constructed and

connected to the main frame, substantially as shown and described, for the purposes specified.

25th, The adjustable raker's seat or stand S', constructed and connected to the machine as shown and described, for the purposes specified.

72,350.—SPRING BED BOTTOM.—George Widdicomb, Grand Rapids, Mich.

I claim the combination of the slats or long springs C, short springs, G, and blocks D, hinged to the blocks or bars E, by elastic hinges F, with each other and with the frame A B, substantially as herein shown and described, and for the purpose set forth.

72,351.—BOOT TREE.—F. S. Wilt, Allentown, Pa.

I claim, 1st, The bar E, the plates e f and g, constructed and arranged as described, in combination with the curved or convex surfaces c and d, for the purposes set forth.

2d, The slide J, and the lever h, arranged and operating as shown and described, in combination with the bar E, and plates f and g.

72,352.—BRICK FOR PAVEMENTS, ETC.—Robt. Wright, Philadelphia, Pa.

I claim a clay brick, having pieces of metal set into it, and coming to its surface, substantially as and for the purposes herein set forth.

72,353.—COFFEE POT.—John Zimmerman, Royalton Center, N. Y.

I claim the coffee pot above described, consisting of the boiler A, chamber D, strainer E, cover F, and tube G, bearing the chambers H and I, all arranged and combined substantially as and for the purpose specified.

72,354.—CULINARY BOILERS.—John Zimmerman, Royalton Center, N. Y.

I claim, 1st, The boiler A, having the central cone C, with perforated top, substantially as and for the purpose described.

2d, The detachable and foraminated bottomless vessels E G, substantially as and for the purpose described.

3d, The vessels Q S, substantially as described.

4th, The arrangement and combination of the boiler A, having the central cone C, with the cylinders D and F, or either of them, containing the bottomless vessels E G, and the inclosed cooking vessels, substantially as and for the purpose described.

72,355.—MANUFACTURE OF BASE BALLS.—Henry A. Alden, Matteawan, N. Y., assignor to New York Rubber Company.

I claim, 1st, a compound, formed of rubber mixed with the ingredients herein named, or their equivalents, in the proportion substantially as specified, which, when vulcanized, will have the hardness and elasticity required for base balls or other like articles, substantially as set forth.

2d, A base ball or other like article, made of the compound herein specified, the said compound being molded to the form required, and vulcanized, substantially as set forth.

72,356.—MANUFACTURE OF SMOKING TOBACCO.—Jonathan Ball, Elmira, N. Y.

I claim the mode herein specified of preparing smoking tobacco.

72,357.—APPARATUS FOR PREPARING PEAT.—Cyrus W. Baldwin, Boston, Mass.

I claim, 1st, The method herein described of effecting simultaneously the desiccation of peat, and its formation into bars or blocks, by subjecting the said peat to the action of centrifugal force, within a vessel constructed and operating substantially as shown and specified.

2d, The peat receiving vessel and diaphragm or partitions within the same, in combination with the bell, B, substantially as and for the purposes shown and specified.

72,358.—TRIPOD FOR SURVEYING INSTRUMENTS.—J. W. Barlow, U. S. Army.

I claim producing lateral adjustment on the tripod by means of the clamping plates or surfaces, B B, and the tightening screw, C, substantially as and for the purpose herein specified.

Also the central vertical aperture, d, through the adjusting screw and nut, and through the adjusting plate, for applying a plumb and line, substantially as set forth.

72,359.—WELL TUBE.—M. L. Bassett (assignor to himself and Egbert E. Pardee), West Haven, Conn.

I claim the arrangement described of the drip tube, F, and well tube, A, with the tube, B, when the said tube, B, is provided with a conical strainer or filter, E, substantially as herein set forth.

72,360.—DREDGE BOAT FOR EXCAVATING RIVERS.—Edwin L. Brady, New Orleans, La.

I claim, 1st, A dredging boat constructed with a series of water-tight compartments so proportioned and arranged that as they are filled with water the boat shall preserve an even keel, and the dredging mechanism be brought into action without any adjusting devices, substantially as set forth.

2d, The combination of the mud fan, A, attached to a rigid shaft, and a boat containing a series of water-tight compartments, E, so adjusted as to cause the boat to settle on an even keel, as the compartments are filled with water, and a pump, B, for exhausting the water from all the compartments, substantially as set forth.

72,361.—COMBINED LOW WATER INDICATOR AND SAFETY VALVE.—Charles Burley, Cincinnati, Ohio.

I claim, 1st, The safety valve, C'', affixed to a gravitating pipe, C C', which communicates with the water space, and is provided with a graduating lever F, in the manner and for the purpose set forth.

2d, the arrangement of bent tube, C C', and valve, C'', globe, D, bar, F, and adjustable weights, K, substantially as herein set forth.

72,362.—LOOM FOR CIRCULAR WEAVING.—John Buser, New York city.

I claim, 1st, A series of warp movers acting radially and moved by the mechanism shown, in combination with a shuttle revolved between the warp threads by the gearing, arranged and operating as set forth.

3d, The arms, C, in combination with the shafts, g', g'', and disengaging mechanism for stopping the machine if a warp thread breaks, substantially as set forth.

3d, The bow, 19, applied in the shuttles, in combination with the disengaging mechanism, substantially as set forth.

72,363.—STEAM PUMP.—A. S. Cameron, New York city.

I claim, 1st, The guide rod, D, resting in a socket, F, in the seat of one valve, and extending through the seat of the other valve, and operating in combination with the valves, B B, substantially as set forth.

2d, The projection, H, on the inner surface of the lock nut, G, in combination with the case, A, guide rod, D, valves, B B, and valve seats, C C', substantially as and for the purpose described.

73,364.—BINDER FOR PAINT BRUSHS.—J. F. Canning, Boston, Mass.

I claim the binder, D, as made and applied, when coated with a mixture composed of shellac and mastic dissolved in alcohol, in the manner and for the purposes set forth.

72,365.—KNIFE.—N. W. Caughy, Baltimore, Md.

I claim as a new article of manufacture a knife constructed and arranged to operate substantially as herein shown and described.

72,366.—FINISHING WOOD.—Geo. Chambers, Ithaca, N. Y.

I claim the preparation made of the ingredients and colors and used substantially in the manner and for the purposes specified.

72,367.—SCHOOL DESK AND SEAT.—C. T. Chase, Albany, N.Y.

I claim the combination and arrangement of the standard, D, with the hinged seats, C C', horizontal bar, o, and desk, A, substantially as and for the purposes set forth.

72,368.—GLASS BOTTLE MOLD.—James. J. Christie, Baltimore, Md.

I claim, 1st, The movable panel or slide, E, used in combination with the mold, either upon its sides or bottom, and provided with suitable inscriptions, substantially as set forth.

2d, The bed plate, B, provided with the openings, a a, to allow of the escape of small particles of glass, substantially as herein set forth.

72,369.—IMPROVEMENT IN ORGANS, ETC.—B. O. Church and Hervey Smith, Brattleboro, Vt.

We claim the beveled piece, E, in combination with the levers, C, frame, B, and screw pins, a, forming a fulcrum for the levers, C, and holding them in place be means of the pins, k, substantially as shown and described.

72,370.—WAGON BRAKE.—B. R. Codwise, Montrose, Md.

I claim the combination and arrangement of the lever, K, with the tongue of a wagon, a ratchet or catch plate thereon, a sliding brake bar and brakes, operating against the front wheels of the wagon, and an intermediate crank, having suitable connecting rods, all substantially as and for the purpose herein set forth.

72,371.—MACHINE FOR ROUNDING CORNERS OF SLATE FRAMES.—Eleazar Coffin, Flicksville, Pa.

I claim, 1st, The pulley frame, B, belt, K, and spring, O, or equivalent, in combination with the mandrel, M, mounted on a swinging frame, N, and the operating key, R, or its equivalent, substantially as and for the purpose described.

2d, The swinging frame, N, carrying the cutter head, P, for the purpose substantially as described.

72,372.—NOZZLE FOR HOSE.—Mosely S. Curtis and Geo. W. Harris, New York city.

We claim the tongues, e, stems, b', and toothed sectors, c, in combination with the body, A, and the annular rack, m, of the shell, D, substantially as and for the purpose specified.

72,373.—BINDING BOOKS.—William Daniels, Brooklyn, N. Y.

I claim the strip of cloth applied to the fold of the central sheet of the section of a box, in combination with a long slot or opening in said sheet of paper at the fold, for the reception of the thread used in sewing the book, as specified.

72,374.—GRAIN AND STRAW SEPARATOR.—Levis H. Davis, Newark, Del., assignor to Castro & Co.

I claim the combination, substantially in the manner described, of the screens having a reciprocating, longitudinal, undulating motion, with the interposed center bar, having a rectilinear movement, for the purpose of thoroughly agitating and rapidly discharging the straw.

Also the notched reciprocating center bar, arranged and operating as described.

72,375.—SULKY PLOW.—Ireneus Donaldson, Toledo, Iowa.

I claim, 1st, In combination with the plow and carriage frame, the compound levers, I I', and casters, H H', placed in front and rear of the plow for regulating the cut, substantially in the manner set forth.

2d, In combination with the driver's seat, G, the oscillating arm, L, cord, K, and adjusting levers, i i', arranged substantially as and for the purpose set forth.

72,376.—LAMP.—Levi F. Drake and Enoch Egginton, Portland, Me.

We claim, 1st, Making the cone with the ribs and small projections at the bottom, as and for the specified purposes.

3d, The chimney fitting over the cone when held on the same, as specified, and constructed with the grooves, as and for the purposes set forth.

72,377.—FRUIT DRYER.—Delectus Durfee, Fort Seneca, O.

I claim, 1st, The drawers, L L, arranged together within dovetailed grooves in the partition boards, C C', and connected by the pins, a, in their rear rails, as and for the purpose set forth.

2d, The grooved and hinged supporters, H, the drawers, L L, the stays, J, and arms, I I, arranged and used as and for the purpose set forth.

72,378.—PADLOCK.—Herman Eiffler, New York city.

I claim the lever stop, D, in combination with a series of loose tumblers, B, provided with hooks, c, and forming the bolt of a padlock, and loose false tumblers, B, situated as described, the tumblers being operated by a key through the opening a, in the side of the padlock, to open or lock the same, substantially as and for the purpose set forth.

73,379.—WARP FEEDING MECHANISM FOR LOOM.—Alfred B. Ely, Newton, Mass.

I claim, 1st, The feed rolls, E F, arranged as described, and operated directly from the lay, for the purpose set forth.

2d, The combination, substantially as described, of the yarn beam and lay with the rubber feed rolls actuated directly from the lay, for the purposes set forth.

72,380.—HEAD BLOCK FOR SAW MILL.—Charles R. Ely, Northfield, Vt.

I claim, 1st, In combination with the transverse gages of a saw mill, the position of which determines the thickness of the material cut from the stock, the pawls, k and k', when arranged to operate substantially as described.

2d, Also a rack bar carrying two or more inclines rigidly secured thereto, substantially as and for the purpose set forth.

3d, Also the plates constructed substantially as described, having a flange turned up in one direction on the inclined side, and a flange turned parallel with the rack bar on the straight side, and applied substantially as and for the purpose set forth.

4th, Also in combination with the pawls, k', the detaining pawls, p, when constructed and arranged to operate in connection with inclines and gages, substantially as described.

5th, Also the combination of the pawls, k' k, their traversing bar, and their supporting lever, with the lever, h, and its indicating segment and pins, constructed and operating substantially as described.

6th, Also in combination with the transverse gages, the index finger and rotary scale, constructed and operating substantially as set forth.

72,381.—MACHINERY FOR TANNING.—Charles N. Farnam, Norwich, Conn.

I claim, 1st, The winding of ropes, F F', on drums, N N', one side winding over and the opposite side winding under the drums, thereby raising both sides of the frame, G, equally, substantially as shown and described.

2d, Arranging the shaft to which the motive power is applied, by the combination of wheel, L, and pinion, P, having a ratchet, p, and pawl, p', worked by a windlass N, all arranged so as to pass the posts, thereby avoiding interference in transition from vat to vat, as specified.

3d, The construction of the frame, G I I', having a shoulder to rest on sides of vat, with lower edge or ends, I, and movable bars, I', of the frame immersed in the liquor in the vat, when the frame is down, substantially as shown.

4th, Also the two forms of hooks, J J', one for ends of frame and one for movable bars, keeping the hides or skins at a suitable distance from each other, so that they will increase in thickness on exposure to the air when raised, and during the process of tanning; also allowing the hides or skins to drain when raised from the vats, thereby facilitating absorption, substantially as herein described and for the purpose specified.

72,382.—PEN HOLDER.—D. D. Foley, Washington, D. C.

I claim two pens so united or fastened together, back to back, in a holder socket, as to form a fountain or reservoir between the nibs or points, substantially as set forth.

72,383.—STEAM PUMP.—J. B. Gardiner and Edward H. Hyde, Springfield, Mass.

We claim, 1st, The arrangement of the valves, E and H, pistons, G G', ports, f and e, e' and i', y and z y', and z', substantially as herein set forth.

2d, The arrangement in connection with the said valve gear, of the valve rod, c, steam piston, A, plunger, S, and reservoir, C, substantially as set forth.

72,384.—OIL CAN.—J. B. Gayle, Raleigh, N. C.

I claim the rods, D D', with the packing as described, and used with the can A, and handle C', said rods being provided with cone-shaped top and coil spring, x, respectively, and operated in the manner substantially as and for the purposes described.

72,385.—STRAP FASTENING.—Rodmond Gibbons, San Francisco, Cal.

I claim the band fastening composed of the two plates or portions of plate confined together, one plate having a tooth or long spur, which projects down into or toward a groove in the opposite plate, substantially as shown and described.

72,386.—PLOW.—Andrew Gilmore, Phœnixville, Pa.

I claim, 1st, The cleaning blade, J, when constructed of two pieces, j j', attached together in such a manner as to render the blade adjustable in length.

2d, The adjustable frame, F, in combination with the wheel, W, and eccentric, G, when used in connection with a plow, substantially in the manner and for the purposes specified.

3d, The combination of the adjustable frame, F, wheel, W, eccetric, G, arm E, lever, H, pitman, I, and pivoted cleaning blade, J, when the latter is arranged to work on the left side of the coulter, C, substantially as and for the purpose specified.

4th, The adjustable handles, D D, when used in connection with a plow, substantially as and for the purpose specified.

72,387.—MACHINE FOR SQUEEZING PUDDLED BALLS OF IRON.—Samuel Gissinger, Lawrenceville, Pa.

I claim the corrugated jaws, A and B, constructed, arranged, and operating substantially as herein described and for the purpose set forth.

72,388.—MACHINE FOR SQUEEZING PUDDLED BALLS OF IRON.—Samuel Gissinger, Lawrenceville, Pa.

I claim squeezers constructed, arranged, and operating substantially as herein described and for the purpose set forth.

72,389.—COAL BORING BIT.—Samuel Gissinger, Manchester, Pa.

I claim the bit or cutter, A, provided with the entering point, B, scoring and cutting points, e and f, and guide, d, substantially as herein described and for the purposes set forth.

72,390.—COAL MINING MACHINE DRILL CARRIAGE.—Samuel Gissinger, Allegheny City, Pa.

I claim the drill carriage constructed as herein described, and provided with drill bars made operative through the medium of the wheels, w w1 w2 i h and g, arranged and operating in the manner and for the purpose set forth.

Also in combination with the above the screw, e, and the clamp screw nut, x, constructed, farranged, and operating substantially as herein described and for the purpose set forth.

72,391.—RAM FOR VESSEL.—William Hagerty, Monongahela, Pa.

I claim the releasing ram, D, provided with shafts, t, furnished with screw threads, o, said ram being made operative through the medium of the revolving nuts, e, the whole being constructed and arranged substantially as herein described, and for the purpose set forth.

72,392.—MACHINE FOR FEEDING NAIL PLATES.—Franz Hain, Gasconade County, Mo.

I claim, 1st, The support block, E, and adjusting piece, F, constructed and combined substantially as and for the purposes set forth.

2d, The holder, D, its boss, l, combined with the block, E, links, K1 K, arm, y, and lever, Y, when acting substantially as and for the purposes set forth.

3d, The combination of the adjusting piece, F, with the main frame at f, and with the guide-bar, f1, and set screw, f2, when acting substantially as and for the purposes set forth.

4th, The combination of the pawl, y, the wheel, y1, and lever, Y, substantially as and for the purposes set forth.

5th, The combination of the disk, G, pins, g, and arms, g1, and vertical shaft, g2, substantially as set forth.

72,393.—MACHINE FOR CUTTING AND WORKING FIBROUS SUBSTANCES.—Albert W. Hale, New York city.

I claim, 1st, The making the flanges on the rolls thicker and of greater diameter at the feeding end of the machine than they are at the delivery end thereof, and the making of such flanges to gear into or lap by each other more deeply at the feeding-end of the machine than they do at the delivery end.

2d, In combination with a machine for cutting or working soft and adhesive materials, operating substantially as described, the arrangement of a water chamber and distributing orifices, f1, substantially as and for the purposes set forth.

72,394.—TRACE FASTENER.—Benjamin J. Hartman, Wooster, assignor to himself and George Liggett, Jr., Wayne County, Ohio.

I claim the plate, D, as constructed, when used in combination with the tugs, A and f', and the keeper, F, substantially as and for the purpose set forth.

72,395.—ROCKING CHAIR.—Edson Hartwell, Hubbardston, Mass.

I claim, 1st, The combination with the frames into which the chair is divided, of the spiral springs, H, and toothed arms, D, arranged for operation in connection with the racks, G, as and for the purposes set forth.

2d, The combination with the springs, H H, and cross pieces, I and J, of the nuts, b b, c c, d d, and e e, substantially as and for the purposes set forth.

72,396.—ANIMAL TRAP.—Wm. Huntington, Howell, Mass.

I claim the arrangement and combination of the gated apertures, F G, and tilting platform, H, with the box compartments, C and D, the latter being lighted, and containing brine or other antiseptic liquid, substantially in the manner and for the purpose herein specified.

72,397.—ROAD LOCOMOTIVE.—E. C. James, Baltimore, Md.

I claim the combination of the open wheels, with a road wagon, to be driven by steam, or other equivalent motive power, when operating substantially as required.

72,398.—SPRING BED SLATS.—Platt C. Ingersoll, Greenpoint, N. Y.

I claim the springs, f and g, in combination with the sheet metal slat bars, B, and arranged in relation to the end and horizontal portions of said slat bars, substantially as and for the purposes specified.

72,399.—DITCHING MACHINE.—Henry C. Ingraham, Tecumseh, Mich.

I claim, 1st, The wheel, K, when constructed with parallel flanges, united only by bars, K', substantially as set forth.

2d, So connecting the driver's seat, Q, with the plough and frame, by means of the rods, O', that the weight of the driver, and mechanism behind the axle, shall counterbalance that placed in front of the axle, substantially in the manner set forth.

3d, The combination of the flanged wheel, K, with the belts, M and N, between which the earth is elevated, substantially as set forth.

4th, The combination of the plough, L, wings, L2, belts, M and N, and wheel, K, substantially as set forth

5th, The combination of a flanged wheel, K, with bars, K', and intermediate open spaces, with the carrying belt, N, substantially as set forth.

6th, The combination of the lever, R, wheel, R', plough, L, lever, T, and rod, T', substantially as and for the purpose set forth.

7th, The combination of the plough with the guides, R2, substantially as set forth.

8th, In combination with the wheel, K, the adjustable extension slide, P substantially as set forth.

9th, The combination of the notched frame, O, lever, O', pawl, S2, rod, S1 and foot lever, S, substantially as set forth.

10th, The combination of the lever, H, axle, G, ratchet wheel, I, and pawl, I', said parts being constructed substantially as and for the purpose set forth.

11th, In combination with the plough, L, the adjustable shoe, L1, substantially as and for the purpose set forth.

12th, The combination of the flanged wheel, K, belt, M, hinged arm, M2 pulley, M1, and spring, M4, arranged to operate substantially as set forth.

13th, So constructing the main frame that the wheels may, by folding the parts of the frame, be adjusted to a wider or narrower tread, substantially in the manner set forth.

72,400.—CUTTING TOOL.—Gustav L. Jaeger, New York city

I claim the combination of the slotted and shanked stock, A, guide frame with cutter, B, bearing, C, and screws, b c, all arranged substantially as set forth.

72,401.—SLED.—John Johnson, Boston, Mass.

I claim a sled, in which the top or seat, B, is secured, at or near its forward end, to the front cross bar by hinges, b and b', while its rear end is supported by means of a spring, c, when such is combined with a steering apparatus, as described, the whole being constructed, arranged, and operated in the manner and for the purposes set forth.

72,402.—FENCE.—John B. Johnson, Laurel, Ind.

I claim the mode of constructing the fence, and sustaining it by pins, C, a the top of the braces, so arranged, in relation to the other parts, that they will first yield to force of currents of water, and permit the panels and braces to swing freely in the stream on the pins by which they are attached to the ground posts, substantially as set forth.

72,403.—FASTENING WEARING APPAREL, SHOES, ETC.—Roswell Judson and William H. Lynch, Matteawan, N. Y.

We claim the herein described device for fastening wearing apparel and other like articles, the same consisting of a double jawed slide, cast or otherwise formed in one piece, as provided with perforations, c c, in the manner specified, so as to admit of two or more of said slides being connected together, as and for the purposes set forth.

72,404.—HORSE RAKE.—J. E. Kendall, Plymouth, Ind., assignor to J. E. Kendall, and Charles Whitmore.

I claim the hinged rake head, G G' G'', provided with teeth, J J, and connected to the bar, K, by the springs, M, as described, said rake head being connected to the sulky frame, and adjusted by the toothed bar, R, and cord N, passing over the pulley at the driver's seat, the whole constructed and operating substantially as described.

72,405.—CONSTRUCTING CAR WHEELS.—Cornelius Kingsland, McKeesport, Pa., assignor to himself and I. K. Morange.

I claim the method herein described for constructing car wheels.

72,406.—SCAFFOLD.—A. S. Skinner, Volga, Ind.

I claim the construction and arrangement of the frame, B B, diagonal braces, C C, plates, D D, rollers, d d, together with the sliding beams, E E, thimbles, e e, sheaves, f g c k, cord, s, gearing, h, pawl, n, ratchet, o, cranks, m x, and metallic shoes, w w, or their equivalents, when in combination, substantially as and for the purposes specified.

72,407.—CLOTHES WRINGER.—David Lyman, Middlefield, Conn.

I claim, 1st, In wringing or other like machines, having cog wheels on each end of the roller shafts, providing said cog wheels with flanges or circular plates upon their exterior faces, as herein described, so that while preventing the meshing of the cogs beyond a certain limit, they shall afford additional support and strength to said cogs, substantially as set forth.

2d, In wringing or other like machines, having flanged or disked cog wheels upon each end of the roller shaft, making all said disks or flanges with equal diameters, so that when the disks or flanges of the continuous cog wheels are in contact, they shall move with a rolling in contradistinction to a sliding friction, as and for the purposes set forth.

72,408.—PERMUTATION LOCK.—Isaac W. Lamb, Salem, Mich.

I claim, 1st, The combination of the spindle, D, the pin or pins, e e, and key, n', with the wheels, C, when constructed and operated substantially upon the principle described.

2d, Also, producing the various combinations, by placing the wheels, C, in the lock in different order, substantially as specified.

3d, Also, the combination of the spring, F, with the pin wheel, E, as and for the purpose herein explained.

4th, Also, splitting the screw, g, at g', for the purpose specified.

72,409.—MODE OF COUPLING SHELLS TO ROLLERS.—J. M. Mason, New Albany, Ind., assignor to himself, Oscar T. Higgins, Charles E. Wilson, and Samuel Adlam, Jr.

I claim, 1st, The shell, B, coupled to the roller, A, by means of the dovetailed tongue, z, nutting into the groove, x, all being constructed substantially in the manner and used as and for the purposes set forth.

2d, Utilizing the old roller by means of the shell, when connected together substantially as specified.

72,410.—INSTRUMENT FOR EXPANDING FINGER RINGS.—Lewellyn Mason, Rochester, N. Y.

I claim, 1st, The improved instrument for stretching finger rings, constructed, arranged, and operating substantially as herein set forth.

2d, The combination, with the expanding shaft, B, and the core, C, of the scale, 1 2 3, etc, arranged substantially as described.

72,411.—GRADING AND DITCHING MACHINE.—Arthur A. Maxwell, Pratt, Ohio.

I claim the frames, A E, ploughs, B B, inclined plane, C, belts, D F, wheels, R S, band, T, and truck, N, with crank shaft, W, the whole arranged and combined with their respective devices for operating in the manner substantially as and for the purpose specified.

72,412.—MANUFACTURE OF ARTIFICIAL STONE.—David McCaine and William McCaine (assignors to themselves and Daniel McCaine), Groton, Mass.

We claim an artificial stone, made of materials and in the manner substantially as described.

72,413.—BOILER FEED REGULATOR.—William McCormick, Philadelphia, Pa.

I claim, 1st, The combination of the rod, H, with the whistle, K, supply cock, D, float, G, and index, F, substantially as described.

2d, The slot, e, of the rod, H, in combination with the pin, f, arm, d, of the whistle, K, and arm, G, of the cock, D, substantially as described.

72,414.—BURNER FOR HYDROCARBON FLUIDS.—Rufus S. Merrill, Boston, assignor to himself and William Carleton, Charlestown, Mass.

I claim, 1st, A burner for hydrocarbon fluids, in which the base or lower portion, when provided with a cap which covers or incloses the apertures leading to the fluid reservoir, is combined with the deflector and chimney holder of the said burner mounted upon the wick tube, substantially in the manner herein set forth, and for the purposes specified.

2d, The combination with the wick tube and capped or covered base of the burner, of the chimney holder, deflector, and sleeve, fitting upon said wick tube at a point above said covered base, under the arrangement herein shown and described.

3d, The combination with the wick tube, and the sleeve which carries the deflector and chimney holder, of the friction spring, for holding said sleeve upon the tube, substantially as set forth.

72,415.—GAS BURNER.—George Mooney, Providence, R. I.

I claim the combination of screw, C, with the base or pillar of a common argand, or other burner, with the cup, E, arranged with the opening, D, for the purposes specified.

72,416.—FAN BLOWER.—Nathan Parrish, Kalamazoo, Mich.

I claim, 1st, The pendulum fan, C, vibrating with the rock shaft, B, in close proximity with the stationary sides and bottom of the triangular case, A, in combination with the inlet and outlet valves, c and d, arranged and operating substantially as and for the purpose set forth.

2d, The triangular case, A, provided with the inlet and outlet valves, c c d d1, in combination with the vibrating fan, C, rock shaft, B, and its operating levers, and the air-box or receiver, D, the whole constructed and arranged in the manner and for the purpose set forth.

72,417.—STIRRUP.—Elizur Pond, New Haven, Conn.

I claim a stirrup, consisting of the metal shell, a, provided with an eye, A and the lining b, the whole constructed substantially as herein set forth.

72,418.—BONE AND PLASTER MILL.—Samuel W. Powell, Brookville, Md.

I claim, 1st, The clearers or discharging devices, f, applied within a space S, enclosed by the shells, C B, of a crushing machine, substantially as and for the purpose described.

2d, Applying the clearers, f', to a toothed ring, C', which is supported within the annular space, S, and driven by means substantially as described.

3d The reversible perforated case, or division, C, applied to a machine operating substantially as described.

4th, The construction of the cover, A, with a central, elevated, hollow enlargement, A1, forming a chair for receiving a vertically adjustable journal-box, which supports the upper end of the spindle, D, substantially as described.

5th, The arrangement, within a perforated case, C, of one or more revolving arms, carrying removable and reversible square-faced hammers, d, substantially in the manner and for the purpose described.

6th, The vertically adjustable journal box, b1, supported upon a chair formed on cover, A1, and adapted for receiving the tapering end, C', of the spindle, D, substantially in the manner and for the purpose described.

7th, The step, h, constructed with perforations in it, substantially as described.

8th, The construction of the oil cup, L, for receiving the step, h, and with a journal box, L', for receiving the foot piece, g, substantially as described.

72,419.—APPARATUS FOR FUMIGATING PLANTS.—C. C. Preston, Bayland, Texas.

I claim, 1st, A combination of the retort, A, with the flexible tube, F, substantially as described.

3d, The combination of the retort, A, tube, F, and bellows, C, substantially as and for the purpose described.

3d, The combination of the retort, A, tube, F, bellows, C, and carriage, substantially as described.

72,420.—DEVICE FOR EJECTING HOT WATER ON WAR VESSELS.—Abbott Q. Ross, Cleves, Ohio.

I claim, 1st, The combination of the boiler, A, condensing pipe, b', and the flexible hose pipes, c and c', connected therewith, arranged in a war vessel substantially as and for the purpose described.

2d, In combination with the boiler, A, and the pipe, b', the revolving pipe, d, with nozzle capable of being elevated and depressed by the means and for the purpose substantially as described.

3d, In combination with the boilers and revolving pipe, as described, the revolving turret, substantially as and for the purpose set forth.

4th, In combination with the revolving, swivel jointed pipe, d, the spreader, s, with lever, l, for operating the same, substantially as and for the purpose set forth.

72,421.—BRICK MACHINE.—Wm. Sangster, Joliet, Ill., assignor to himself, James Floyd Michael Kero, Wm. P. Dellman, John Smith and George Stuffler.

I claim a brick machine, consisting of the case, A, having shaft, B, arms, a

and slotted bottom, D, arranged with the slotted plates, E, with their rollers, H, for the vertical adjustment of the mold frame, F, provided with its knives, I I, all constructed and operating as and for the purposes set forth.

72,422.—MANUFACTURE OF CORRUGATED BELLS.—George S. Saxton St. Louis, Mo.

I claim the bell, A, when B is formed in corrugations, substantially in the manner and for the purpose set forth.

72,423.—MACHINE FOR FILLING HORSE COLLARS.—August Schulck and Henry Hildenbrand (assignors to themselves, F. C. Krayer and C. R. Schrick), St. Louis, Mo.

We claim, 1st, the scraper or scrapers, f f1, and their combination with the rock shaft, f4, substantially as and for the purpose set forth.

2d, The combination of the rotating shaft, H, and its prongs, h, with the rock shaft, I, and its prong, I, substantially as set forth.

3d, The eccentric bar, G, the shaft, I4, and the shaft, H, when combined and acting substantially as and for the purposes set forth.

4th, The combination of the eccentric bar, G, with the shaft, substantially as and for the purposes set forth.

5th, The arrangement of the partition piece, K, in the hopper, F, substantially as and for the purposes set forth.

72,424.—WAGON SEAT.—Jacob Sebastian, New York city.

I claim the spring arms, B, links, a, and spring slides, D, in combination with the seat, A, and uprights, C, substantially as and for the purpose described.

Also, the loops, b, and screws, c, in combination with the uprights, C, spring slides, D, arms, B, and seat, A, constructed and operating substantially as and for the purpose set forth.

72,425.—WAGON SPRING.—Jacob Sebastian (assignor to himself and Lewis Saal), New York city.

I claim, 1st, A clamp, A, composed of cross bars, a b, keys, c, and wedges, d, to act in combination with the clips, D, substantially as and for the purpose described.

2d, Providing the edges of the leaves of the spring with grooves or notches, to admit the edges of the keys, c, substantially as and for the purpose described.

3d, Providing the spring, at one or both ends, with an oblong eye, substantially as and for the purpose described.

72,426.—STEAM BLOWER.—L. F. Smith, Philadelphia, Pa.

I claim, 1st, The spreader, E, constructed and arranged within the pipe, A, with its partitions, B B, in the manner and for the purpose set forth.

2d, In combination with the spreader, E, in the pipe, A, with its partitions, the solid pipe or casting, D, having orifices, e e', and screw thread, all constructed and operating as specified.

72,427.—GAGE FOR SETTING WAGON AXLES.—David F. Stratton, Christiansburg, Ohio.

I claim a reversible gage for the purpose set forth, having on one side the adjustable standard, B, fixed standard, C, and adjustable swing, D, and on the other the longitudinally adjustable standard, B', fixed standard, G, and vertically adjustable standard, H, when constructed to operate substantially as described.

72,428.—ARTIFICIAL PLATE FOR TEETH.—Leander R. Streeter, Chelsea, assignor to Alfred B. Ely, Newton, Mass., trustee.

I claim, 1st, The use of hard resins, or resinous bodies, mixed with fibrous or textile materials, and shaped by means of heat and pressure, substantially as described.

2d, The use of thin plates of metal, horn, shell, gutta percha, wood, or other suitable material, capable of being pressed into shape, between or in combination with layers of resinous and fibrous compound, as and for the purposes substantially as described.

3d, Also, as a base for artificial teeth or gums, the use of fibre or fibrous material, saturated or mixed with lac, or other suitable substance, which, when heated and pressed, will assume the proper shape, and possess or acquire the proper hardness and elasticity, substantially as described.

72,429.—COFFEE MAKER.—J. Warren Thyng, Salem, Mass.

I claim the conical distributing chamber, f, arranged under the condenser, substantially as and for the purpose herein specified.

Also, the inverted perforated cone, i, in the bottom of the receptacle, B, in combination with the distributing chamber, f, substantially as and for the purpose specified.

Also, the extended flange, m, on the receptacle, for the purpose specified.

Also, the combination of the condenser, A, constructed substantially as described, with the receptacle, B, constructed substantially as set forth.

72,430.—TONGUE-SUPPORT FOR RAILROAD STREET CARS.—John M. Hernan, Pittsburg, Pa.

I claim the mode of supporting the tongues of street-cars and other vehicles or machines, while the same are being moved from place to place, or changed from one end of a car to the other, by the use of a curved or bent metallic bar or rod, attached to or swung under the tongue, together with the mode of operating the said bar by a lever fastened thereto acting against a bolt fixed to the tongue over the said bar, as the same is herein above described.

72,431.—MANUFACTURE OF LIQUIDS FOR MAKING ICE, AND FOR OTHER PURPOSES.—Pieter Hend. Vander Weyde, Philadelphia, Pa.

I claim, 1st, The manufacture of hydride of propyle or chimogene, from the so-called non-condensable gases escaping from any petroleum-still, by condensing them in a coil exposed to a freezing mixture, or by submitting them to a powerful pressure of a pump, or by both.

2d, The boiling of crude or refined petroleum at the common temperature by the suction of a vacuum, agitating it, and condensing the vapors produced by cold or pressure, or by both, thus producing a highly volatile liquid, boiling at about 50° Fahrenheit, and corresponding with hydride of ethyle.

3d, The application of these liquefied gases, or of gasoline, or any other very volatile product of petroleum, to the making of ice and of cooling in general.

4th, The temporary preservation of dead bodies by the perfectly dry cold produced by placing in the coffin one or more long, narrow cylinders filled with the above described liquefied hydrocarbon gases, or with liquefied sulphurous acid, carbonic acid, or nitrous oxide, or their equivalents, from which cylinders the gas is slowly escaping, regulated by a stop-cock, and thus maintaining any desired low temperature, the escaping gas at the same time serving as a preservative and disinfectant.

5, The use of the above described or other products of petroleum, or the use of crude petroleum, when escaping either by their own pressure, or projected, as a spray, by the atomizing action of a blast of air, oxygen or nitrous oxide, for an illuminating and heating agent, either under a steam-boiler using petroleum, in combination with a blast of air or steam, or both, as above described, or for a lime-light or blow-pipe, requiring only two very small vessels, each containing one of the liquefied gases—petroleum gas and nitrous oxide gas—as substitutes for the non-condensable hydrogen and oxygen.

72,432.—TAKING THE FORM AND MEASURE OF GENTLEMEN TO CUT COATS AND VESTS.—Theodore Vandoren, Sr., Washington, D. C.

I claim the use of a series of jackets, with the seams thereof formed as herein described, in combination with the patterns, to correspond with said jackets, when said jackets and patterns are used together in the manner described, as a system for cutting gentlemen's coats and vests, herein fully set forth.

72,433.—DIVIDER.—O. E. Weatherhead, Winchendon, Mass.

I claim the device for holding a pencil, point, or pen upon the dividers, consisting of the elbow, C, piece, E, with groove, e, and clamp, F, with set-screw, b, arranged and combined substantially as described.

72,434.—BREECH-LOADING FIRE-ARM.—D. B. Wesson, Springfield, Mass., assignor to the Wesson Fire-Arms Company.

I claim the slide, D, pushing-bar or bars, m, and studs, b', arranged in relation with each other, and with the extractor, C, and pivoted bar, E, substantially as and for the purpose specified.

72,435.—PEN-HOLDER.—H. F. Wheeler, Boston, Mass.

I claim a pen-holder, having sockets for two pens, substantially as described.

72,436.—BORING-TOOL.—Albert Wippo, Chicago, Ill.

I claim the above described tool for shaping the ends of the legs of furniture, constructed to operate substantially in the manner and for the purpose set forth.

72,437.—STOVE-PIPE DAMPER.—G. B. Wiseman, Sycamore, Ill.

I claim a damper, B, provided with a sliding rod which has a cylindrical and two or more rectangular portions, constructed substantially as and operating in the manner set forth.

72,438.—LAND ROLLER.—Wm. S. Worley, Tuscolia, Ill.

I claim the rollers, B B', provided with the bands, C C C, and shovels, b b, when arranged upon the frame, A, in the manner and operating substantially as and for the purposes herein specified.

REISSUES.

56,879, dated August 7, 1866; reissue 2,811.—TWEER.—John Bayles, New York city.

I claim a tweer, A, having a water chamber, B, provided with connecting water and steam pipes, D and E, in combination with the air pipe, G, air chamber, I, and air pipe, J, arranged together and operating substantially as and for the purpose represented and described.

49,354, dated August 8, 1865; reissue 2,812.—HORSE HOE CULTIVATOR.—R. B. Dunn and John C. Flint (assignees by mesne assignments of Alolon Webb), Bangor, Me.

We claim, 1st, Securing the share to a plate in such manner as to be readily removed therefrom or secured thereto, substantially as described.

2d, The employment of teeth or cogs as a means of adjustment, and holding in position a movable blade, substantially as described.

3d, Providing a wing or blade, and the part to which it is connected, with a rib in one and a series of notches or grooves in the other, to set and hold the blade in position.

4th, In combination with such rib and notches, a bolt and nut, or their equivalents, to loosen and tighten the same, as described.

5th, Supporting the forward ends of the share-supporting plate by means of screw-threaded rods entering screw-threaded eyes on the plate, to admit of lowering or raising the share, substantially as shown and described.

6th, Providing the cross bars with slots, or their equivalents, as and for the purpose described.

7th, Providing the cross bars with notches to receive the eyes of the loops, which secure the share-supporting rods in the desired positions.

8th, The curved support, D, made of a single block, when constructed and applied as and for the purposes described.

59,588, dated November 13, 1866; reissue 2,813.—CHIMNEY HOLDER FOR GAS BURNERS.—Elliott P. Gleason, New York city.

I claim 1st, The plate or strip forming the spring, f, bent and curved substantially as described.

2d, The spring, f, riveted to the arm, n, substantially as set forth.

3d, The equalizing spring for chimney holders, constructed substantially as set forth.

20,959, dated July 20, 1858; reissue 2,814.—RAILWAY SWITCH.—Mariette Smith, Ithaca, N. Y., assignee by mesne assignment of George R. Smith.

I claim, 1st, The described rack and pinion at the base of a perpendicular rotating or partially rotating shaft, when combined with a spring lever and a circle or segment of a circle, said lever being fixed at right angles to the said shaft, and playing on said circle or segment, and into slots in the same, said segment or circle being horizontal

2d, Also, the above-named combination, when further combined with a signal lantern, which lantern revolves wholly or in part when adjusted to the top of said shaft, said lantern having different-colored glasses, and revolving on an axis drawn perpendicularly through the center of said lantern.

3d, Also, when in connection with a railroad switch and adapted thereunto, the construction and arrangement of the shaft, a a, the hand lever, h, and the segment or circle, g g, as described.

4th, The arrangement and adaptation of the segment or circle, hand lever and shaft just named, to its frame, holding up the shaft, a a, so that the shaft and hand lever shall revolve together, and the segment or circle be fixed or stationary about the shaft, as described.

5th, The construction of the segment, g g, with slots to receive the lever, h, at the places or points requisite for the switch changes, as described.

6th, The construction of the hand lever, h, so as to be self or readily operated by its spring at the just-named places or points of switch changes in the said segment, as described.

7th, The combination, with the shaft, a a, hand lever, h, and segment or circle, g g, of the rack and pinion, b c, and rod, e e, and changeable track or tracks, as described.

57,006, dated August 7, 1866; reissue 2,815.—HYDRAULIC MAINS OF GAS WORKS.—I. N. Stanley, Brooklyn, N. Y.

I claim as an improvement in hydraulic mains for gas works, the combination with the main, C, of the external supply tubes, D, cast with or made separately from and attached to the main, and communicating with the same below the water or fluid therein, substantially as and for the purpose herein set forth.

62,084, dated February 12, 1867; reissue 2,816.—WASH BOILER.—M. W. Staples, Catskill, N. Y.

I claim, 1st, In combination with a portable wash boiler, having a perforated partition or diaphragm, E, made as described, one or more tubes or conduits, D, arranged and operating substantially as hereinbefore set forth.

2d, Also, the water space o chamber, B, in a portable wash boiler, provided with a perforated partition, E, made as described, and conduits, D, made and operating in the manner and for the purposes hereinbefore set forth.

64,163, dated April 23, 1867; reissue 2,817.—HORSE HAY FORK.—A. R. Sprout, Hughesville, Pa.

I claim, 1st, Providing the extreme penetrating point or points of a horse hay fork with a cutting edge or edges for cutting its way into the hay, said points being so constructed that they can be operated so as to catch and hold in the hay for elevating it and be released at will from the hay for discharging it.

2d, The conform points, f and g, provided with cutting edges, and shoulders and hooks, 6 and 7, constructed, arranged, and operating substantially as herein described and for the purpose set forth.

54,431, dated May 1, 1866; reissue 2,818.—HORSE HAY FORK.—Ariel B. Sprout, Picture Rocks, Pa.

I claim, 1st, Combining in one implement a hay elevator and hay cutter, so constructed that, when used as an elevator, it will cut its way into the hay, and so operating that it will catch in the hay for elevating it, and then may be released at will from its hold in the hay for discharging it, substantially as described.

2d, The combination and arrangement of the bars, A and B, provided with barbs and cutting edges at their lower extremities, and levers, n and w, substantially as herein described, and for the purpose set forth.

DESIGNS.

2,848.—WINDOW FASTENER.—G. B. Kirkham, N. Y. city.

2,849.—PAPER COLLAR.—Wm. F. Moseley, Brooklyn, N. Y.

2,850.—OIL-CLOTH PATTERN.—James Patterson, Elizabeth City, N. J., assignor to W. W. Gearn & Co., Newburg, N. Y.

PENDING APPLICATIONS FOR REISSUES.

Application has been made to the Commissioner of Patents for the Reissue of the following Patents, with new claims as subjoined. Parties who desire to oppose the grant of any of these reissues should immediately address MUNN & Co., *37 Park Row, N. Y.*

26,808.—MANUFACTURE OF BOOTS AND SHOES.—William N. Ely, Stratford, Conn., assignee by mesne assignments of Francis D. Ballou, Abingdon, Mass. Dated Jan. 10, 1860. Application for reissue received and filed Dec. 5, 1867.

I claim attaching by sewing mechanism the welt sole or welt strip of leather etc., to the upper of boots and shoes, substantially as described.

199 (whole No. 31,203).—SEWING MACHINE.—Willian N. Ely, Stratford, Conn., assignee by mesne assignments of F. D. Ballou, Abingdon, Mass. Dated Jan. 22, 1851. Application for reissue received and filed Dec. 5, 1867.

1st, I claim attaching the soles of boots and shoes by sewing them to welts or taps, or their equivalents, by sewing machinery, substantially as described.

2d, Cutting away the table, A, or part where the work is to be supported and the needle to operate so as to present the work to the needle with greater facility for stitching the shanks of shoes or concave lines of work etc., near the edges thereof, substantially as described.

3d, Raising or projecting upward a lip or standard, c, above the adjacent parts of the machine for the purpose of supporting the article at the point of sewing, substantially as described.

4th, Interposing a guard or guard plate between the needle or awl or both and the upper or raised part of the leather, substantially as described.

5th, The adjustable foot, C, when used as a guard or gage, or both, substantially as described.

6th, The lip or standard, c, when used as a guard or gage or support, or all of them, substantially as described.

7th, The moving surface, E, for aiding the forward movement of the work in combination with a feeding mechanism, substantially as described.

8th, The opener, G or G', substantially as and for the purposes described.

9th, The presser, D, in combination with the adjustable foot pieces, C or C', or both, substantially as described.

10th, The curved bearing plate, B, and lip or standard, C, in combination with the presser bar, substantially as and for the purposes set forth.

11th, The projecting curved horizontal table plate, A, constructed and arranged substantially as and for the purposes described.

12th, The open throat between B and E, when arranged substantially as described and for the purposes set forth.

13th, The projecting curved perpendicular plate, B, with standard, c, substantially as and for the purposes described.

20,134.—LAMP.—William N. Ely, Stratford, Conn., assignee by mesne assignments of L. Bailey, Charlestown, and R. Thayer, Boston, Mass. Dated May 4th, 1858. Application for reissue received and filed Dec. 6, 1867.

1st, I claim suspending the body of the lamp within an outer case so arranged that the air shall pass within the case and around the lamp body to the flame, substantially as described.

2d, A hollow lamp case, pedestal and base, constructed and arranged in relation to the lamp body, substantially as described.

3d, An annular lamp body in combination with an outer case, substantially as described.

4th, Constructing and arranging the parts so as to deflect the air coming up from outside the lamp body toward the flame, substantially as described.

5th, Supplying air to the flame by means of the channel formed between the body of the lamp and the outside shell or case, substantially as described.

6th, Arranging and using the rod or wire, K, in relation to the flame and hollow pedestal and case, substantially as and for the purposes described.

7th, The concavo convex button constructed and arranged substantially as and for the purpose described.

28,568.—MACHINE FOR WEIGHING AND BAGGING GRAIN.—Harriet M. Fish, New York city, assignee of L. K. Plimpton and Wm. Fowt, Buffalo, N. Y., executors of James M. Fish, deceased. Dated June 5, 1860. Application for reissue received and filed Nov. 7, 1867.

What is claimed as the invention of said James Fish is, 1st, in combination with a weighing scale a grain bin fitted with a sloping bottom or sides, a bagging spout and gate to regulate the flow of grain, substantially as described.

2d, The use of a grain bin fitted with a sloping bottom or sides a bagging spout and gate to regulate the flow of grain substantially as described for the purpose of facilitating the bagging and weighing thereof, substantially as described.

3d, The arrangement of the bin, A, doubly-inclined floor, O, vertical gates, D, spouts, L, frame, B, and scale, M, the whole being constructed and combined substantially in the manner and for the purposes explained.

59,466.—SCHOOL DESK AND SEAT.—Calvin W. Sherwood, Chicago, Ill. Dated Nov. 6, 1866. Application for reissue received and filed Dec. 9, 1867. Div. A.

1st, I claim the joint composed of the nave, C', and axle, B', constructed and operating substantially as set forth.

2d, The arrangement and combination of the arms, C, nave, C', and axle, B', with the seat, D, and standard, A, substantially as specified.

3d, The double-acting stop, K, constructed and operating substantially as specified.

4th, So locating and arranging the stop, k, and axle, B', on the head, B, that with the nave, C', a covered and compact joint is provided, substantially as and for the purposes specified.

5th, The double-acting stop, k, in combination with the shoulder, l, operating in the slot or space, substantially as specified.

59,466.—SCHOOL DESK AND SEAT.—Calvin W. Sherwood, Chicago, Ill. Dated Nov. 6, 1866. Application for reissue received and filed Dec. 9, 1867. Div. B.

1st, I claim the jointed braces, F, when provided with lips, a, and ledges, b, substantially as and for the purposes specified.

2d, The combination and arrangement of the ledges, b, lips, a, and pins, d, with the braces, F, and hinged shelf, K, substantially as specified.

3d, The arrangement and combination of the hinged arms, H, jointed braces, F, and hinged arms, G, with the standards, A, and desk top, I J, substantially as and for the purposes specified.

54,135.—WATCH.—S. D. Engle, Hazleton, Pa. Dated April 24, 1866. Application for reissue received and filed Dec. 7, 1867.

1st, I claim the employment of a box or supplemental case, B, to receive the movement of a watch secured in the external or principal case of the watch by means of studs or pins and a groove or by other suitable means for the purpose herein set forth.

2d, I claim the cup, h, with its flange, h2, and washer, i, arranged with the key hole, g, in the manner and for the purpose herein described.

53,195.—LUBRICATOR FOR STEAM ENGINES.—John Storer, New York city. Dated March 13, 1866. Application for reissue received and filed Dec. 10, 1867.

I claim in a lubricator for steam engines a movable cap or valve and a screw or clutch to secure the cap or valve in position (when so arranged that the screw or cluth can turn without carrying the valve or cap round with it) in combination with a soft metal ring for making a joint between the valve or cap and the body of the lubricator, all substantially as and for the purpose specified.

☞ NOTE.—*The above claims for Reissue are now pending before the Patent Office and will not be officially passed upon until the expiration of 30 days from the date of filing the application. All persons who desire to oppose the grant of any of these claims should make immediate application.* MUNN & CO., *Solicitors of Patents, 37 Park Row, N. Y.*

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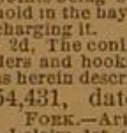
TRADE  MARK

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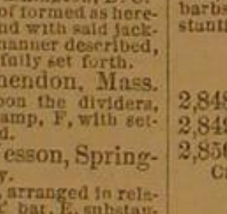

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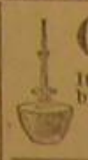
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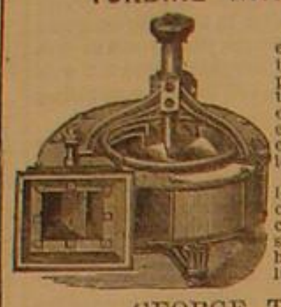

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SCIENTIFIC AMERICAN

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

Vol. XVIII.—No. 2. [NEW SERIES.]

NEW YORK, JANUARY 11, 1868.

$3 per Annum. [IN ADVANCE.]

Improved Steam Engine for Rolling Mills.

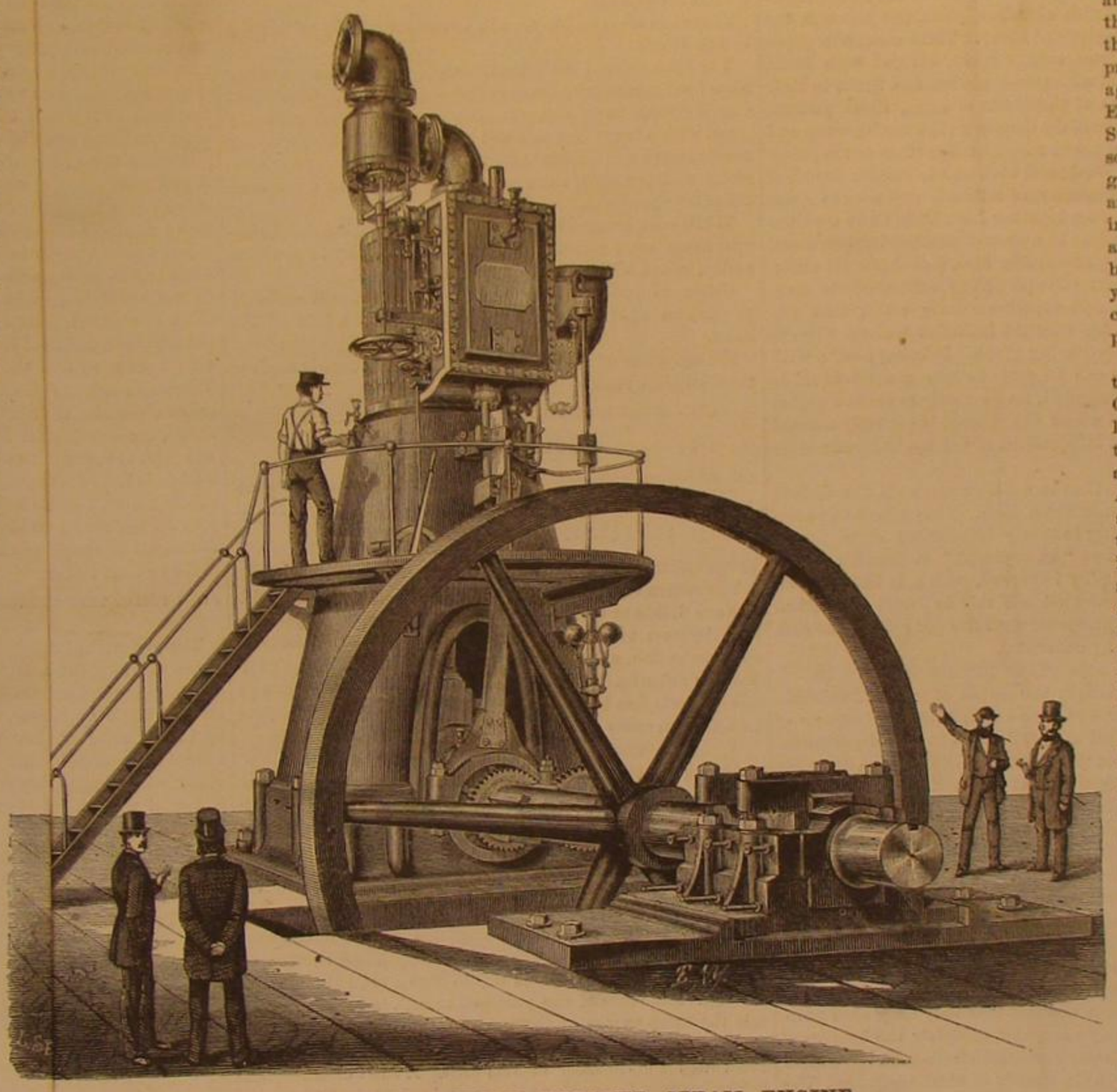
The engraving is a fine perspective view of a new steam engine lately constructed at the Brooklyn Steam Engine and Boiler Works, for the Phoenix Iron Company—Cooper, Hewitt & Co.—and now erected in their rolling mill. The machine is massive in its proportions, and presents a splendid appearance. We made, in company with a number of practical engineers, a critical examination of the engine on the occasion of its completion a few weeks ago, and the opinion then expressed was unanimous that it was a remarkably fine specimen of workmanship. It is fitted with the Babcock & Wilcox cut-off valve, of which we gave a detailed description in No. 17, Vol. XVII., first page, to which we refer our readers. The valves and connections are of course somewhat modified to suit the circumstances of the case. Those who saw the engine there described at the late fair of the American Institute will readily understand the operation of this.

An immense cast iron open pedestal sustains the cylinder, steam chest, and connections, the connecting rod and crank working inside the column near the bottom. The fly-wheel and spur-wheel are secured to the shaft by three massive feathers forged on the shaft, the intervals between which and lugs cast in the interior of the hubs are filled with hard wood wedges, intended to receive and diminish the jar and concussion to which an engine employed for driving rolls must be subjected. The fly-wheel is unusually heavy, weighing 55,000 lbs., and is 22 feet in diameter. Especial attention has been given to securing durability in the working parts, they being made as hard as will allow tool finish. The forgings are made of barrel metal, and the brasses of the best government composition. The crank-pin is lubricated by an automatic attachment acting through its center, and the slide-valve by a roller dipping in drip-cup. For the benefit of engineers we give the principal dimensions and weights:

Cylinder, 46 inches diameter by 10 inches stroke, with steam jacket and double lower valve chest, weighs, with steam chest, 10,910 lbs.; column connecting cylinder to bed-plate, 23,513 lbs.; cast iron bed-plate with outboard pillow blocks, 18,923 lbs.; eccentric, 32 inches diameter and 5 inches face; piston rod, 6 inches diameter with cross-head forged on; wrought iron crank, 2,130 lbs.; wrought iron shaft, 15 inches diameter, 16 feet 6 inches long, 27,000 lbs.; inboard journal brasses, 15 inches diameter and 15 inches long; outboard brasses, 15 inches diameter and 15 inches long. The total weight of the machine is 151,518 lbs.

The engine is calculated to make 60 revolutions per minute at a steam pressure of 80 lbs., and although so compact, of 1,200 estimated horse power which must be acknowledged as a remarkably good result when the dimensions of the machine are taken into consideration.

From the above, and the view of the engine given in the engraving, a tolerably correct idea may be formed of its massiveness, compactness and solidity.



THE BABCOCK & WILCOX UPRIGHT STEAM ENGINE.

REPORT OF THE ACTING COMMISSIONER OF AGRICULTURE.

The following selections from this public document will be found to be of general interest:

PROGRESS IN AGRICULTURE.

It is gratifying to note the evidences that are apparent even to the superficial observer of increasing interest of our people in the advancement of agricultural science—of the quickened mental activities of farmers, as shown by the widening demand for agricultural books, newspapers, and the reports of this department—of the disposition to experiment, test alleged improvements, and adopt labor-saving expedients—of the growing inclination to employ in agriculture money, business energy and active enterprise, which are so successfully employed in other departments of business.

In nothing is this intellectual activity shown to be so manifestly beneficient to the agriculture of the present era, as in the improvement of agricultural implements. In 1847, the number of agricultural patents granted was but 43; in 1863, it had increased to 390; in 1864, to 563; in 1865, to 642; while in 1866, the wonderful increase to 1,778 was made; and during ten months of the present year, the patent-office has issued no less than 1,777. Thus the number of agricultural inventions perfected yearly is now more than forty-fold greater than twenty years ago. Already has this nation surpassed all others in the excellence and variety of its agricultural machinery. Partially represented as was our agriculture in the recent world's exposition of industry, at Paris, and almost ignored officially in the national recognition of that great exhibition, our honors plucked from the field of European competition were almost exclusively industrial, and largely agricultural. So successful have been our farming implements in repeated contests on European soil, that their rapid introduction into foreign markets is only impeded by the greatly increasing demand at home. These improvements are rapidly revolutionizing the agriculture of the West, and reducing to the lowest minimum ever attained, the proportion of manual labor employed in its operations. As an instance, the reaper, first doing the labor of a half dozen, then a half a score of men, is supplemented with a self-raker, which does the work of others still; and now further to facilitate and economize the harvest work, the same machine is furnished with apparatus for instantaneous binding of the sheaves. And the further this labor-saving progresses, the higher the wages of harvest workers, the broader become the harvest fields, the greater are the profits of the farmer, and the more extensive become the garners of the world.

While adverting to these evidences of progress in American agriculture, it is proper to drop a word of dissatisfaction, and even utter a note of warning, in view of the improvidence and reckless waste which is stripping the fairest fields of their wealth of fertility, exposing them to the constant action of the elements, and subjecting them to an annual drain of the same constituents, none of which are ever returned to the soil. The department estimate of the average production of wheat in Ohio, last year, was about four bushels per acre; the State statistics, so far as returned, made the yield scarcely three bushels. None will doubt that it is more owing to bad culture and want of drainage than to the severity of the season that the product did not average twenty bushels Every new Western State is remarkable for sounding reports of great crops of wheat, and the same States, in a very few years, are equally remarkable for reduction in yield of wheat, increase of insects, and prevalence of disease.

The freshest areas in this culture, east of California, will scarcely yield an average of twelve bushels per acre the present year. A systematic rotation, some attention to fertilization, greater care in the selection of seeds, better tillage, and more thorough culture, will alone prevent deterioration in products and real values of farm property

This stigma upon American agriculture may be attributed in part to the cheapness of Western lands, the original price of which bears so insignificant proportion to their intrinsic value, that the owner erroneously deems it cheaper to remove to new lands than to sustain and increase the productive capacity of his present farm. One result of this fatal error, is the removal westward, year by year, of the center of wheat production, thus adding transportation and other charges to its ultimate cost, threatening to make difficult the future supply of our population, and to render export impossible.

The railroad interest has secured among other favors and franchises of the government, grants of public land, amounting to 184,000,000 acres, in aid of lines extending in all directions, to the borders of civilization, under the plea of furnishing facilities for travel and the transportation of the fruits of agriculture and the products of mines; and the results have been seen in extended settlement, and expanding cultivation: yet growing stronger, disregarding the general welfare, these monopolies have combined in their tariff of rates to discriminate unfairly against farm products, and to require much the larger portion of the value of the crops for their transportation to market. So onerous is this burden, that the cost of transportation of wheat from Chicago, and other Western centers, to the Atlantic cities, is greater than from San Francisco, via Cape Horn, to the same points. It is hoped that the attention of rural voters to this subject may ultimately correct this evil which proves so serious a drawback to their industry; but it can only be accomplished by untiring vigilance over State legislation, and by securing the enactment of laws that shall restrain these corporations from the absorption of the entire products of the farm, instead of allowing them to control the legislation of the country against the best interests of the people, and especially to the detriment of the consumer, who is made to pay tribute to this combination which breaks down a fair competition incidental to all other classes and associations in the business of life

In this connection I desire to express the hope that Congress may devise and perfect some plan for facilitating the early construction of a ship canal for the transportation of

N110610

Western products from the lakes to the ocean, or for the building of a double track freight railway, open to all, forwarding on equal terms, and supported by an equitable system of tolls.

THE SOUTHERN STATES.

These States possess decided natural advantages over the Northern and Western sections in their ability to produce every article which may be grown in the higher latitudes, with the almost exclusive advantage of producing cotton, hemp, rice, sugar, and other products of the lower temperate zone. With longer shore-lines than any other section of the continent, facilities are furnished for coastwise and inland navigation to the whole tide-water area, which is endowed with a climate peculiarly adapted to market gardening, with forests abounding in the most valuable timber, and waters teeming with edible fishes and crustacæ. Florida is destined to be a winter garden, yielding market supplies to Northern cities without a risk of competition, and oranges, figs, and olives, and other fruits of semi-tropical climes. Between tide-water and the lower slopes of the mountains is a region producing wheat of a better quality than that of any section north of it, the entire range of farm products in great profusion, and such fruits as apples, cherries, and grapes, with certainty and success. The mountain region, almost unappropriated and unknown, at an elevation varying from 1,500 to 6,000 feet, is the great grazing section of the North America, sufficient to furnish abundant pasturage through the year to millions of cattle and sheep. These mountain slopes are generally free from surface rocks, covered with forest growths interspersed with grassy glades, and fertile to their summits. In bodies of thousands of acres, these pastoral areas await the advent of the dairyman, the wool-grower, and and the herdsman, at prices not exceeding those of the public lands of the distant West; and even on the eastern aspect of the Blue Ridge, in proximity to railroads and near to great markets, whole counties together have little more than ten per cent of their territory in a state of nominal improvement.

There are grounds for assuming, also, that this must ultimately become the great wine-producing section of the country; for observation and experience fully attest that the higher, colder, and more humid latitudes will not ripen to perfection the wine-producing grape. It being now a well-settled fact that wine can be made in this country equal to the best that can be imported, we have only to select a region of our great country where the climate is perfectly adapted to grape culture to be independent of the world for our wine supplies.

It appears that the Southern States vie with the distant West in extent of unoccupied land. They possess an area, not in farms, amounting to nearly 300,000,000 acres, nearly two-thirds as much more "unimproved" in farms, and less than 75,000,000 nominally improved, which is but thirteen per cent of the whole, and not half this in actual cultivation. It is safe to say that little more than five per cent of the area of the South is annually cultivated.

THE SEED AND PLANT DISTRIBUTION.

The distribution amongst the people of new and valuable seeds and plants appears to be one of the principal objects of Congress in the annual appropriations to the department. This has become a most delicate and difficult duty, for what is new in one country may not be valuable or useful in another; the most valuable of seeds or plants may be, in some sections of our own country, the most common varieties, yet unknown in other sections; and those which would be of the utmost value in one latitude might be worthless in another. Experience has fully shown that a change of seeds and plants from one section to another, has greatly improved the yield and quality. These results can only be attained by repeated and constant tests of the adaptation of the several varieties to soil and climate. New varieties are obtained whenever satisfactory evidence has been adduced that they have been properly tested; and the people are now enjoying the benefits of many new and valuable products which have been introduced into the country through the agency of this department. The crops of sorghum alone would more than compensate for all the money expended by the department for seed.

The total distribution of seeds for the year amounted to 1,426,637 papers. Of this number 352,000 were distributed through senators and members of the Thirty-ninth and Fortieth Congresses; 88,482 through agricultural and horticultural organizations; 164,953 to corps of statistical correspondents, in acknowledgment of valuable gratuitous services; 299,975 to individuals upon letters of members of Congress, or upon personal application, or in answer to letters from individuals; and 521,227 to the Southern States, under the special appropriation for that purpose.

The distribution of plants from the experimental and propagating gardens, from January 1 to May 6, 1867, amounted to 42,123, principally through senators and members of Congress, reaching every State and Territory in the country. The articles have consisted mainly of the smaller varieties of fruits, of which the grape has been in large proportion. The introduction of the best varieties of this valuable fruit, their adaptation to various climates, and for special purposes, has been prominently kept in view. The main purpose of the garden, that of testing the respective merits of new varieties, is still kept strictly in view, and all new varieties are procured as early as practicable, and the knowledge gained concerning them embodied in the department reports.

STATISTICS.

The work of the division of statistics has been various and laborious. A mass of ascertained facts, of foreign and domestic agriculture, with approximate estimates of current productions of the staples of the farm, will be found in the report of the statistician, condensed and systematized, with careful analyses and explanatory illustrations and comments.

For several years the estimates of production included only the Northern States, until people had become familiarized with aggregates representing the production of only a portion of the country. The incorporation of the Southern States in a grand summary of agricultural results, was doubly difficult, in view of the cessation of all regular agricultural order during the war, and its shattered and uncertain status on the return of peace. The wonderful agricultural progress of the distant Pacific States has complicated the difficulties of accurate compilation of the statistics of production. Yet, with the aid of a large corps of zealous and intelligent reporters, in all sections of the country, valuable results have been achieved in this branch of the department.

In comparison with 1860 the table of numbers and prices of farm stock exhibit a decrease of six per cent in horses, with a slight increase over the exhibit of the previous year. The heaviest loss is shown in the South; the most rapid recuperation in the West. Prices of horses have retrograded less than values of other stock during the year.

Cows appear to be increasing more rapidly than other horned cattle, as a result, in part, of the success of the associated dairy system.

Sheep, it is claimed, have nearly doubled in numbers since 1860, increasing from twenty-three to more than forty millions, and their wool from sixty to one hundred and fifteen millions of pounds.

There has been an increase in swine since 1860, principally in the West.

The farm crops of the present season, with some exceptions, have been more abundant that those of last year. The wheat crop, for three years comparatively small, has been generally good, with a large acreage and a moderate yield. Including the Southern and Pacific States, the returns, when fully complete, will probably show a total aggregate of more than 200,000,000 bushels.

While corn promised a large yield, with an increased acreage, there were serious local losses, principally in the Ohio valley, which will tend to reduce the estimates.

Cotton is yielding better than last year, and will probably produce an aggregate of more than two and a half million bales.

For estimates of the principal products reference is made to the statistical report.

Correspondence.

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

SUB-AQUEOUS AND OTHER TUNNELS.

EDITOR SCIENTIFIC AMERICAN:

The return of the inclement season when boats and vehicles are liable to be impeded by snow and ice, will probably lend interest to the consideration of additional methods of communication, especially between large cities and their immediate suburbs. The subjoined history of various tunnels and projects has been compiled with a view to call the public attention anew to the subject.

THE THAMES ARCHWAY COMPANY.

Among the earliest of the projects for sub-aqueous tunnels were those introduced under the auspices of the Thames Archway Company, of London, in the beginning of the present century. This corporation having obtained authority from Parliament, raised subscriptions to the amount of £200,000, and prepared in 1809 to construct a tunnel under the Thames river for carriages and foot passengers. The charter prohibited them from obstructing navigation, and the company started with the idea of operating wholly below the bed of the river. The first business was to bore a preliminary drift through the route of the proposed tunnel, in order to ascertain the exact nature of the soil and the difficulties, if any, that the builders would probably encounter. Richard Trevethick was the engineer of this drift. A shaft of nine-inch brickwork was first sunk on the south bank of the Thames to a depth of 76 feet below high water mark, and the drift was then extended horizontally, in a northerly direction, toward the opposite bank of the river. The drift was a temporary tunnel 5 feet high, 3 feet wide at the bottom and 2 feet 6 inches at the top. It was lined with a frame of 3-inch planks.

The drift was successfully prosecuted for a distance of 922 feet, which was further than the actual width of the river, the real width being 850 feet at high water and 649 feet at low water. The drift was purposely run out in various directions, diverging from the true line in order to test the soil, At the extreme end of the drift, before it had quite reached the opposite bank of the river, the engineer encountered a quicksand, and finally gave it as his opinion that the construction of the proposed excavated tunnel on that line was impracticable. He, however, suggested other plans for laying a tunnel which he considered entirely practicable. Other engineers were, however, of opinion that the original plan was practicable, notwithstanding the quicksand. The Directors concluded that in so novel and important an undertaking it was desirable, before adopting any plan, to endeavor to avail themselves of the best which the engineering talent of the country could suggest. They accordingly caused advertisements to be published in the newspapers, offering a premium of £200 for the best plan of construction, and a further sum of £300 when such plan had been successfully completed.

In response to this advertisement no less than fifty-four plans were submitted and were examined by two able scientific men, entirely disinterested, Dr. Hutton and Mr. William Jessop. Many of the plans had great merit, but all were, for various reasons, rejected except six; and of these the examiners finally selected as best of all, the joint project of Mr. Charles Wyatt and Mr. Hawkins.

We propose now to give a brief outline showing the nature of each of these six projects, which at that time, 1809, attracted great attention. The plans were presented anonymously to the company, and we are therefore unable to present the names of the projectors, except in some instances.

PLAN FOR A BRICK TUNNEL.

The tunnel to be of brick, a complete circle, 13 feet diameter, three bricks thick, having a carriage way 7 feet 9 inches between the curbs, a foot way on one side, lamps the other. As this tunnel would be buoyant, the projector proposed to cover and ram it six feet below the bed of the river, with clay In laying down this tunnel the projector proposed to form coffer dams of fifty feet length at a time, in the direction of the tunnel, the walls of the dam being formed by driving down piles; the spaces between the piles to be filled with prisms of wood and the whole carefully calked; the bed of the river to be then excavated and a section of the tunnel built. While this was going on another section of dam to be put down. The piles to be sawed off even with the river bed on completion of each section.

PLAN FOR A CAST-IRON TUNNEL.

This plan was by R. Trevethick, the distinguished engineer, to whom is due the credit of the high pressure steam engine. This tunnel was to be 12 feet in diameter, composed of cast iron slabs each 6 feet long, joints to be calked. The method of laying down was to excavate the bed of the river from within a set of piles driven down within a movable coffer dam. The movable dam or caisson to be 50 feet long, 18 feet wide, 40 feet deep, made of 12-inch square logs, fastened with trunnions and calked. The caisson to be provided with two water-tight compartments, to float the whole machine. A sufficient weight of ballast to be used to sink the caisson when water is admitted to the compartments. The caisson being floated to the desired position, plugs in the compartments are withdrawn, water is admitted, and the caisson sinks and its bottom rests upon the bed of the river. Guiding frames are then arranged within the ciasson, piles driven, a ditch or channel for the tunnel excavated, the tunnel plates put together, and the excavated earth rammed down upon the tunnel even with the bed of the river, as fast as completed. When as much of the tunnel is complete as the length of the caisson permits, the latter is floated and moved one length ahead, the mouth of the tunnel being first stopped with clay and piles to prevent ingress of water. The water within the caisson is to be drawn off by boring an opening down into the existing drift, described in the first part of our subject. This plan for building a tunnel was highly commended for its ease of execution, simplicity and cheapness. Brick, if preferred, could be used instead of iron.

PLAN FOR A TEMPORARY CAST-IRON AND PERMANENT BRICK TUNNEL.

The projector of this plan proposed first to lay down a tunnel of cast iron, to be laid in a ditch dredged in the bed of the river. After the iron tunnel was completed he proposed to construct a brick tunnel by boring, the line to be deep enough to insure solid ground, below quicksands, etc. The iron tunnel he proposed to construct of separate cast plates, provided with flanges, and secured together with bolts. The laying of the tube was to be accomplished by means of capacious iron diving bells fitted with the means for convenient access of men and materials, air pipes, etc., operated by steam engines. It will be seen that the American patents granted for cast iron tunnels screwed together were anticipated in England more than fifty years ago.

GROOVED STONE TUNNEL.

This plan provided for the laying of a stone tunnel 30 feet in diameter, the edges of the stones to be tongued and grooved, and joined with water-proof cement. The stones to be carefully prepared before being brought to the river. Movable coffer dams were to be employed, within which a ditch was to be excavated and the tunnel constructed. The bottom edges of the dams were to be provided with a flexible curtain of tarpaulin, to prevent bottom leakage. The tunnel was to be two feet below the bed of the river, covered with clay, well rammed. This plan is somewhat similar to Trevethick's, before described.

A TUNNEL OF BRICK OR OTHER MATERIAL.

This plan provides for a tunnel to be laid like the foregoing in a ditch to be opened by means of a coffer dam. The tube to be covered with earth after construction and rammed so that the bed of the river directly over the tunnel will not be elevated. The chief peculiarity was in the construction of the dam, which was to be 90 feet in diameter, made up of stave logs a foot square, the bottom ends of the logs to rest on the bed of the river. Stability was to be given to the staves by means of internal hoops. After one section of the tunnel had been completed the dam was to be taken apart, moved along, and erected for the building of a new section.

PLAN FOR A WOODEN TUNNEL.

Apparently the cheapest of any of the plans, and perhaps the most easily executed was another of Trevethick's designs, for a wooded tunnel, 16 feet in diameter. The drift previously constructed by him was to be used for drainage of the wooden tunnel.

"The cut across the Thames is to be made beneath the water by a steam ballast raising engine 24 feet deep below the bottom of the river, and wide enough to receive the wooden tunnel, and with its sides sloped in an angle of about 45°. This cut is to be nearly horizontal at the middle of the river, but declining about 6 inches toward the south, for delivering the water from the road down into the drift; the remaining parts at each side are to be inclined one foot in fourteen, which is about the degree of inclination of the bottom of Holborn hill.

This slope will ascend to the surface at the south side about 100 feet south of the shaft, and at the north side about 150 feet north of Queen street, in the field adjoining to the Commercial Road; making the total length of the tunnel about 2,010 feet.

All the earth that is above low water mark may be removed with spades.

The wooden tunnel, for which this cut is to be prepared, is to be made of elm, in lengths of from 180 to 200 feet of six-inch plank, placed two in thickness, or in two layers, laid so that the joints shall be covered by the planks in the other layer, fastened together with trennels, hooped outside with iron, calked, pitched, and made water tight like a ship. The hooping to be put on in a spiral form, with the spirals two feet asunder.

The ends of each length of the tunnel are to be made to fit into each other, or to be put together with cast-iron ferrules, of 6 feet long, similar to the joints of a flute.

Each of these wooden cylinders will weigh about 200 tuns, and may be moved in water nearly as easily as a loaded barge. As many of these cylinders are to be prepared as will extend from side to side of the river above low water mark, when joined end to end, which will be about 1,340 feet. From each end of the wooden tunnel to the entrances, the passage is to be left at intervals open to the surface, to admit light, and is to have both its sides and bottom constructed of brick work 18 inches thick. This part will extend about 670 feet (at each side), and will complete the tunnel from the surface at one side of the river to that at the other. Staircases for descending into the tunnel are to be formed at each side; the interval of the tunnel between these, which will be about 876 feet, must be lighted by lamps always; the remaining 464 feet (at each side) will receive daylight through apertures made like wells from the surface, at intervals of about 30 feet from each other.

After the cut is excavated, piles are to be driven at its eastern side, about 60 or 70 feet asunder, to guide the wooden tunnel into its place. Then the wooden cylinders (which are intended to be made near the Surrey Docks) being ready, are to be rolled into the docks from the banks, and to be towed to the cut, a little before low water, when there is little or no tide, being previously loaded with rubbish sufficient to sink them, but kept buoyant by empty casks attached to them. Here they are to be placed across the river, resting against the piles above mentioned, their ends to be joined into each other and to be drawn tight together by a rope and chain put through them from end to end.

At extreme low water the lashings or cords are to be slipped from the casks, and the cylinders are to be let to sink altogether to the bottom of the cut, which is to be then filled up with strong clay, well rammed down, even with the bottom of the river. A hole is then to be bored into the bottom of the tunnel from the roof the drift (which is to be previously dug beneath the cut), to let the water down from the tunnel to the well of the steam engines.

When the tunnel is drained it will have a great tendency to float, but having an average of eight feet of clay above its top, with the weight of the road inside, its buoyancy will be overbalanced. If, after a number of years, the wooden cylinders decay, they may be easily replaced by putting cast-iron cylinders, one inch and a quarter thick inside; and if any difficulty is found in letting down the whole of the cylinders at one time, they may be put down separately, and afterward be joined together beneath the water.

ESTIMATE OF COST FOR 1,340 FEET AND THE LAYING THEREOF UNDER THE RIVER.

Cutting from low water mark to the first light well at both sides, 690 feet long, 80 feet wide at top, and 26 deep, about 45,000 tuns, at 2s.	£4,500
Cutting from said light wells to each entrance, 640 feet long, about 30 feet wide, and 12 deep, estimated at 6,500 tuns, at 1s. 6d.	487
Wooden tunnel, 1,340 feet long, 16 feet diameter from out to out, 1 foot thick, estimated 94,470 feet, of rough elm, or 2,362 loads, at £7 per load	16,534
Making, calking, and paving the tunnel, at £2 per load	4,724
Hoop iron for ditto., half-inch thick, and 3 inches wide, 150 tuns, at £30.	4,500
Covering the tunnel with 60,000 tuns of clay, at 1s. per tun	5,000
Piles and sundry other timber for the works	500
Bringing and fixing, the wooden tunnel in its place, with ropes, anchors, boats, etc.	500
Keeping the engine at work one year, attendance, agency, etc. at £50 per week	2,600
Incidental charges, 10 per cent on the whole amount	5,400
Total	£42,745

To be continued.

Oil Well Pumping.

MESSRS. EDITORS:—In your issue of December 14th, page 370, appears a communication, signed M. R. M. Robinson, Franklin, Pa., concerning oil well pumping, and his experiments and experience in that line, and which he concludes by asking for information, etc.

Allow me, through the same channel, to say that Mr. Robinson's assumptions of what constitutes a vacuum and its effects in his or any case are simply wrong and absurd, and I am surprised that your responsible editor should publish it, in its present form, without remarks or corrections, and for the reason that they are contrary to natural laws.

Mr. Robinson states, that he has, in his oil well, placed his seed bag one hundred and thirty-one feet above the bottom of his tubing, where his pump chamber is located, and assumes that the well fills up to the seed bag with water and oil, when not pumped; and that the well is air tight below the seed bag. He also asserts, that when he has pumped the water until its surface in the well has fallen, say thirty-five feet below this seed bag, that a perfect vacuum is formed; and consequently he cannot lower the water by pumping, but must have still remaining in the well, outside the tubing, the balance of this column of water and oil standing ninety-six feet above the bottom of the tubing, and that he cannot secure the oil which remains above the water in this column until he has supplied this vacuum of thirty-five feet with air or water which he admits through the half inch pipe, which pipe extends from the top of the well down, and just through the seed bag, and communicates with the well at this point below the bag. Now, this statement of facts is simply impossible, and for the same reason as first stated, and as will appear.

The offices of a pump are two-fold: the first is to lift the weight of the atmosphere from or off the column of water below it, and which is about fifteen pounds per square inch; and, secondly, to lift the superincumbent weight of water above the pump.

In thus lifting the sucker valve, a vacuum is formed beneath it by this removal of the atmospheric pressure; and if the surrounding water is open to the atmosphere with its pressure upon it, the water will thereby be forced into and up the pump, and will follow this sucker upwards until the weight of this column of water within the pump shall have attained the limit of fifteen pounds to the inch, when the column will cease to rise further, and it will remain just balancing with the atmosphere without. The sucker may be raised as much higher as one pleases, but the water will not follow it. Should the water or oil be heavier or lighter than fresh water, the hight will be more or less in the same proportion—fresh water raising about thirty-three feet at the ocean level.

Again, if the outside pressure of the atmosphere be impeded or removed, then the water within the pump will be raised less or not at all, as the case may be. Now, if by pumping his well, he can produce a vacuum, it must be the same within the pump as in the well outside the tubing; and as the water will find its own level with the same surroundings, it follows that, even with a perfect vacuum, the water or oil will flow into the pump, and fill it, so long as the surface of the water outside the tube is two feet above the bottom of tubing; and if it is but one foot above the bottom, it will stand the same hight within the pump, and the sucker in descending into the half filled pump will produce a thumping concussion, and continue to thump so long as the pump chamber is partially filled at each stroke.

If, however, the small pipe be opened, and a supply of air admitted to the well, and the pressure of the atmosphere therein restored, then the water and oil will be forced into the pump to its full capacity at each stroke, so long as there is a supply of either within the well to reach the lower end of the tubing.

If the letting down of water by the small pipe increases the flow of oil, it is from some other cause than that named by Mr. Robinson, and probably may be accounted for by the washing and floating down the oil from the sides of the well and from the crevices and small reservoirs which have been left full by the receding column in the last pumping; on no other hypothesis can the advantages of his "Fresh Water Washing Down" be accounted for, and on no other grounds can it be more advantageous than the admission of air, while the water makes just so much more work for the pump to lift it out again. The query which concludes his article is too inconsistent to need comment, when his statement in the same is so definite and plain.

I trust this will be acceptable, and received in the same spirit with which it is written, and that is to correct error, and to answer the communication referred to.

Albany, Dec. 10, 1867. HORACE L. EMERY.

The Warming of Cars.

MESSRS. EDITORS:—When reading the account of the terrible accident of the 18th inst., on the Lake Shore Line of railroad at Angola, it appeared to me to be the imperative duty of every newspaper of respectability to raise a voice for heating cars by hot water instead of stoves. Statistics appall one when we realize the horrors arising from fire in such cases as the accident spoken of. N. F. P.

APPLICATIONS OF ELECTRICITY AS SEEN AT THE PARIS EXPOSITION.

The following notices are from the correspondent of the *Nation*, and form an interesting group of paragraphs concerning electricity, although few of the inventions are new in this country. Most of them have been long in use here:—

THE METEOROGRAPH.—This is an apparatus destined to register meteorological phenomena, by means of graphic curves traced upon paper, the movement of which is registered by clock-work. It was invented by Father Secchi, director of the Observatory at Rome, Italy, and occupied a conspicuous place in one of the principal streets of the Palace. It was constantly at work, and was deemed worthy of a grand prize by the jury of awards. There were two prominent faces to the apparatus; one of them was surmounted by a clock, and provided with a paper tablet on which were registered automatically the indication of the barometer, the wet and dry thermometer, and the hour of rain. This roll or tablet of paper would finish its course in two days and a half, and present well developed curves, the study of which would give all of the details of the phenomena, especially the sudden changes during storms. The second face presented a tablet on which was registered the force and direction of the wind, as well as the indications of the metallic thermometer. This roll finishes its course in ten days, and its principal advantage is to present a *résumé* of the variations of the elements in the way to permit of an easy comparison. The manner in which the various instruments are connected with a galvanic battery is too complicated to admit of a detailed description without the aid of diagrams, but a general description may enable the reader to form a clear conception of the ingenious invention. A properly counterpoised piston floating on the mercury in the barometer, with pencils attached, and applied according to the parallelogram of motion, gives the curves on the tablet. The psychrometer consists of two thermometers, with dry and wet bulb. The thermometers are open at the top, and at the bottom have platinum wires fused into the bulbs to connect with the battery. Two platinum wires, supported on a frame which moves vertically, enter the capillary tubes of the thermometer, and can be plunged at any moment far enough to touch the mercury and thus establish the circuit with the battery. The clock sets in motion every quarter of an hour a little chariot, on which is a miniature Morse telegraph, and which marches back and forth recording in the neatest manner the variations between the wet and dry bulbs, and the moisture of the air. The hour of the rain is marked by the movement of a magnet attached to a wheel provided with buckets and placed on the top of the house. The quantity of the rain is measured by the indications of a float in a suitable reservoir in the basement, and is also automatic in its motions. The direction of the wind is measured by four telegraphs—the force of the wind by peculiar hemispherical wheels or capstans. The battery employed was a modification of Daniell's which only required the addition of a little water and sulphate of copper every month. A similar apparatus had been in operation for nearly seven years at the Observatory in Rome, and bound volumes of the observations taken during all that time were exhibited in Paris. The cost of the apparatus was $10,000, but it was unnecessarily luxurious in its appointments, and similar ones could be manufactured on a large scale, in a similar style, for one-fifth of that amount. It was a matter of regret among Americans in Paris that the automatic registering and printing barometer of Mr. G. W. Hough, which is in operation in the Merchants' Exchange in New York, was not sent to the exhibition, for comparison and criticism. It is now universally admitted that only by automatic instruments can we ever hope to solve the question of storms and other meteorological phenomena, and therefore all the inventions of this character must be studied and compared before we can hope to see any particular form universally adopted. Father Secchi's ingenious apparatus was pronounced by competent judges to do its work thoroughly and well, and we should be glad to see it introduced into this country.

ALARM THERMOMETER.—In the agricultural department was a self-regulating and alarm thermometer, constructed upon a plan similar to the one adopted by Secchi. A platinum wire is fused into the bulb, and a second wire inserted at the degree to which it was proposed to raise the temperature in a hot house or other building, and both wires were connected with a battery which drove a magneto-electric machine so situated that it could be seen at all times by the director of the establishment. In this way control was kept of the temperature, and any neglect on the part of servants at once noted.

ELECTRIC LIGHT FOR LIGHTHOUSE ILLUMINATION.—The English had a lighthouse of the natural size, the illumination in which was obtained from electro-magnets driven by a two-horse power engine. This light was visible at night from nearly all parts of Paris, and was of dazzling brilliancy. The value of this application for lighthouse purposes consists in the intensity of the light. The light is condensed into the smallest possible space, and, while it is not diffused enough for photographic purposes, excepting near by, its intensity exactly adapts it to be seen at great distances. An oil flame would require to be two thousand times larger to produce the same amount of light. The cost beyond the wear and tear was stated to be the fuel required to raise steam for the small engine and the carbon points used in the burners.

AN ELECTRIC PIANO.—A piano driven by electricty was certainly a novelty. The instrument was in the section of machinery, and looked exactly like an ordinary upright piano. It was provided with a key-board, and could be played upon in the ordinary way, or attached to a battery and made to work by electricity. It was the invention of a Swiss, familiar with the construction of music boxes, and was suggestive in its form of that class of instruments. There was a long metallic barrel driven by clock work, over which revolved a piece of thick pasteboard in which the musical notes were cut. Resting upon the pasteboard were teeth or copper pointers just like those in a music box, each one of which corresponded with the notes of the piano. The pointers were pressed down upon the barrel by springs, and were connected at the other end with a galvanic battery. As long as the pasteboard intervened between the end of these pointers and the revolving barrel, the current was broken and no notes are struck; but as often as the pointer came over a hole cut in the paper, it was thus brought in contact with the metal of the barrel, and the connection in the circuit was established and a note struck on the piano. By bringing these holes opposite the proper pointers, and at distances to correspond to the time of the piece, a complete tune could be played. The papers with the notes cut out looked like a pattern for weaving. Several pieces of music were performed by electricity, and the time and expression were so well imitated that any one would have supposed that the instrument was being played by hand.

MAGNETO-ELECTRO MACHINES.—There were several machines of this character, for which it was claimed that they could replace the ordinary galvanic battery in most operations, as, for example, telegraphing, electro-plating, and electric-light and it was asserted that they could be used as a motive power. For some unexplained reason, none of these machines appear to be successful. They looked well as specimens of workmanship; they were ingeniously contrived; they were theoretically correct, but in practice they do not secure the confidence of the public. The electro-magnetic company of Birmingham claimed for their motor that it could replace steam, especially where the force required was small, that the cost was the same as that of steam power, without danger of explosions. The price of a one horse power was two

hundred and fifty dollars. Some of the magneto-electric machines were so covered up that it was impossible to study their interior construction. In all of them the principle of the revolution of helices around magnets appear to obtain.

ELECTRIC ATTACHMENT TO LOOMS.—In case a thread broke in weaving, the fact was indicated by the violent ringing of a bell, and the stoppage of the machinery, all by automatic motion, and through the aid of a battery. The same attachment could have been applied to any other machine as well as to a loom.

ENGRAVING BY ELECTRICITY.—There were inventions of this character for copying in fac-simile any pattern whatsoever. One arm of a pointer moved over a picture, and the other over a lithographic stone or a metal plate, and the cutting instrument, by making or breaking the current of electricity, was made to cut or to pass over the plate, and to repeat the shading and depth of any original picture. There were several instruments of this character which apparently did their work well.

ELECTRIC CAR BRAKE.—The engineer is able to put down all of the brakes on a train of cars at the same moment, and to stop the train very suddenly by simply placing his thumb on the key which makes the connection with the battery. There were large cars with this attachment, and the whole thing worked well in the model.

ELECTRIC CAR SIGNAL.—In case the cars were broken asunder the fact would be instantly communicated to the engineer by the ringing of a bell.

ELECTRIC CLOCKS were as numerous as the ordinary timepieces—in fact all the clocks on the towers appeared to be driven by electricity, and they consequently kept uniform time.

CASSELLI'S TELEGRAPH.—This instrument was one of the greatest curiosities in the Exhibition. It represented in autograph the message of the sender. If instead of signing your name to a dispatch you were to make a skillful portrait of yourself with a peculiar kind of ink, an exact copy of the same would be sent. Writing, pictures, patterns, and autographs could be transmitted by this machine with entire accuracy, and if the apparatus was to be attached to the electric engraving machine previously mentioned, the dispatch could be engraved at the distance of a thousand miles from the original copy. A pointer moving over magnetic ink, by making and breaking the circuit, was made to repeat it in fac-simile whatever was put under it. It was all the same whether it was plain writing, a drawing, a pattern, or a picture. The electrograph of Lenoir was a modification of Casselli's, and appeared to work very well. We saw numerous pictures copied by it.

ELECTRIC SIGNALS of all kinds were exhibited. To announce that a switch was wrong, that the draw was open, that the down train had not started, that there was danger ahead, was all practically arranged. For use in the house there was no end to contrivances. If the servant did not answer the bell, the bell would keep on ringing all day and all night until it was attended to. If a burglar entered a door or window, his approach would be annonnced by a lusty ringing of bells. If the water was too low in the boiler, ding dong would go the bell. If the house was growing cold, the mercury would sink in the thermometer and again the bell would ring.

ELECTRIC GAS LIGHTING.—There were contrivances for turning on and off gas by electricity, lighting any number of burners at the same instant of time. By connecting this with the burglar alarm telegraph, the opening of a door or window would set the bells ringing and light all the burners in the house at the same instant.

THE CHRONOGRAPH.—For measuring short intervals of time no instruments have been devised at all equal to those in which electricity is employed. A most important instrument was exhibited by Professor Glassner, of Liège, for measuring the velocity of a cannon ball by recording the interval of its passage from one point to another. The ball in its flight was made to break copper wires placed on its track at measured intervals, and the breakage of the galvanic current was recorded upon a revolving cylinder in a way to indicate the smallest fraction of time. The variation in the velocity of the ball from the commencement in the cannon until it was spent was accurately measured in this way. The same instrument was adapted to the measurement of time in all other observations, the record in all cases being made by electricity.

ELECTRIC MIRRORS.—In order to attract larks in hunting it is customary to have revolving mirrors. But the machinery hitherto employed has rather served to frighten away the birds. Electric mirrors were exhibited which were claimed to be perfect in their way.

ELECTRIC SAFETY LAMP.—The danger of explosions in coal mines from the careless use of Sir Humphry Davy's safety lamp has been frequently demonstrated. It is proposed to obviate this danger by the introduction of a lamp composed of Geissler tubes properly protected by wire and driven by a small Ruhmkorf coil and battery carried in a knapsack on the back of the workman. These tubes have the air pumped out of them and the light comes from a constant stream of electricity passing from one end to the other. If the glass breaks, no fire can be communicated to the outer gases, as the connection with the battery is broken at the same instant and no spark can pass. This kind of a lantern could be used by travellers for reading at night on the railroad, as the whole apparatus can be carried in a carpet bag and can be easily suspended from a hook.

TESTING IRON BY MAGNETISM.

It is well known to engineers that it is a most difficult and often impossible thing to find out the existence of a false weld in a forging, or of a blow hole or honeycomb in an iron or steel casting. The only safe way of doing this is by carefully measuring the elongation of the piece under a given load, as with a false weld all the work is thrown on the diminished area at the defective weld, and the thicker parts are scarcely extended by the force which is perhaps rupturing the bar at the flawed spot. It need scarcely be said that there are many important cases where this process, or the equivalent, but dangerous one, of trying the effects of an impulsive force, could neither be mechanically nor commercially practicable. Every one knows that a simple method by which internal flaws and solutions of continuity in constructive details could be easily detected would be of enormous value to the world. Such a method, says the *Engineer*, has undoubtedly been discovered by Mr. S. M. Saxby, R. N., who has very judiciously been allowed by the Admiralty, during the course of this year, to experiment with it in the royal dockyards. Though comparatively new, and not yet completely worked out, the process will possibly have a yet more extended application than finding out only mechanical flaws in iron, and possibly in cast iron and steel.

The principle upon which this method is founded is so simple that it certainly seems strange that it had previously escaped notice. It has been known for nearly a century and a half, that when a bar or any mass of soft iron is placed in the position of the dipping needle, it is at once sensibly magnetic; the lower extremity being a north pole in our latitudes, and the upper extremity a south pole. In the southern hemisphere the poles are of course reversed. The same action, only weakened, takes place in a bar hanging in a vertical or any other position; only the effect is weaker the more the position of the longitudinal axis, for instance, a long bar, departs from that of the magnetic dipping needle.

When a small compass needle is slowly passed in front of a bar of very good iron, placed in an east and west direction, the needle will not be disturbed from its proper direction, which is of course at right angles to this, or north and south.

But this is true only with homogenous bars of best quality—to bars without any mechanical solutions of continuity. With internal flaws or interruptions of continuity the bar is no longer regularly magnetic. It has long been known that a good compass needle, or a good permanent magnet, must be homogeneous and without flaws in order to take and retain its maximum amount of magnetism. In a word, any mechanical solution of continuity is accompanied with a polar solution of continuity, and the given bar or mass with flaws—whether permanently magnetised or temporarily so by the inductive action of the earth—is no longer one regular magnet, but severél different magnets, with the different magnetism separated from each other. The delicately-poised magnet of a compass can thus be made to tell the presence of such solutions of continuity.

In making tests, practically, the bar is placed in the equatorial magnetic plane, or east and west. On moving the magnetic needle in a line parallel with the axis of the bar, as long as the iron is sound, the position of the needle is east and west; but on the recurrence of a flaw the latter deviates more and more until entirely reversed, when placed over the imperfect spot.

By the enlightened permission of the Admiralty Board, Mr. Saxby, as stated, has already been allowed to test his method in various ways in the royal dockyards of Sheerness and Chatham, and we will describe some of the practical results of these experiments. Amongst these were a number of very remarkable trials conducted in the presence of the master smiths, the foremen of the testing houses, and several of the chief engineers of the royal navy. Mr. Saxby, for instance, was requested to find out the weakest spots in a number of bars, and to tie a string or make a chalk mark on each spot. Immediately afterwards all these bars were put into the testing machine and broken, the prediction in every case being verified.

The smiths of the royal dockyarks seem to have properly tried Mr. Saxby's powers in almost every possible way, and most ingenious devices were sometimes resorted to for the purpose. As examples out of many, in the center of a bar of 1 inch square forged iron, was welded a piece of unmagnetised steel about 5 inches long. The needle detected a fault at about the center of the piece of steel.

A bar welded together out of a piece of bowling and a piece of common iron, had at about its middle a drilled hole, into which a magnetised steel pin had been riveted. The compass magnet soon found out the pin, the difference in quality of the two ends of the bar, and also an unsuspected fault at the end. A bar of round iron was brought to him painted over; it had been "jumped together" in three different pieces and qualities of iron—a bar worked up out of scrap of galvanised iron, another of common iron, and the third of bowling. The needle detected very unequal qualities, the verdict being that the bar was unfit for being manufactured into any article.

In another case, in which Mr. Saxby's experiments were carried out in the presence of a large number of naval chief-engineers, he put down in writing the results of his magnetic examinations, in order that they might be subsequently compared with what was known as to the actual quality of each bar. A bar, one and a quarter inch round, and three feet eleven inches long, was pronounced by the compass needle as being not of the same iron throughout, and with a south end better than the other. It was then stated by the master smith to have been made up of pieces of good and bad. A rather shorter bar was found to be good iron, but doubtful in condition; it was afterwards explained to be "uncertain," and on testing it in the machine it was stated to be "crystallised." A third piece was found to be of very good iron, but with slight irregularities; the smiths stated it to be scrap iron, and the best to be got in the shop. Two pieces of five-eighth inch manufactured iron were discovered to be not good. Another piece of one and a quarter inch bar was found to be good iron, though made of different qualities—it had been afterwards annealed. With another bar, to Mr. Saxby's written question whether it was not steel, it was answered that the bar in question was a near approach to steel, being a piece of galvanised wire rope welded up. To the remark that another bar was unfit for use he was told that it had been twisted round when at a low heat, and then hammered cold. Some singular proofs of the power of magnetic testing over the ordinary methods of determining quality and condition of iron have been shown. Pieces of iron brought for testing by most able and experienced master smiths, of such quality as would be selected for the most important work, have, on being tested, been marked at spots as defective, and on cutting have accordingly been found at those spots to be partially fibrous, partially crystallised.

The following experiment was made in order to throw light on an important practical question in smiths' work: A round bar 17½ inches long was specially worked, and had been brought to be tested without anything of its history being known to Mr. Saxby. He found that in the middle of its length it was seriously faulty, and even unfit for use. He was then told that the bar, though solid, had been "upset" in the middle of its length, and then hammered down to its original diameter at a temperature below welding heat. This will be held to confirm the opinion of good workmen that "upsetting" should be done at a temperature as near as possible below that of welding.

Mr. Saxby has not yet been successful in testing rolled plates for lamination. In these, again, the neutral, or zero lines, should run at right angles to the dip in a homogeneous plate; but the more complex structure of the plates has made the investigation more difficult. Another difficulty doubtless consists in the fact that the usual shape of a plate does not allow the magnetism to separate itself in such a marked way as in a bar, usually longer by many diameters. The investigation, with a resulting perfect method, can scarcely be said to be completed in this direction. The chief difficulty at present seems to be that the internal structure is too irregular.

Up to the present but few experiments have been made with steel, and very few with cast iron; those already made have, however, been satisfactory. Any difficulty that might be supposed to attend the presence in wrought iron of what is termed by the Astronomer Royal sub-permanent magnetism is easily overcome. A few taps on the end of a bar of wrought iron, when lying east and west, sufficient to cause vibration, would demagnetize it, and leave it in a fit state to be examined by the needle; and polarity subsequently found would indicate either a steely nature of the bar or inferior iron.

Some brief considerations will now determine the value of Mr. Saxby's invention to engineers, whether for trying new work of all kinds, or even working details in a suspicious state. In estimating the value, in the widest sense of the term, of any wrought iron forging, three qualifications may be considered as governing: (a) Its limits of elasticity, or the amounts it will yield in any given direction without taking permanent sets; (b) its ductility, or the permanent alteration it will take before actual rupture; and (c) its ultimate resistance, or the amount of the load it will stand, per original unit of cross sectional area, before actual rupture. These three qualifications, in a complete forging, are evidently—1st, The absence of defective welds, or of large solutions of continuity in the mass; 2d, the absence of smaller flaws or solutions of continuity—either due (a) to the presence of scoria or slag, causing what are termed "greys," or small flaws, either parallel or across the longitudinal axis of a bar, or (b) to cracks (often unsuspected) caused in the working when portions of the forging are too cold; or (c) to actual separations at the facets of the elongated crystals of which iron always consists, and due to loads of whatever kind beyond the elastic limit; 3d, the chemical constitution of the bar—such as its freedom from phosphorus, sulphur, arsenic, silicium, manganese, etc. (apparently everything but carbon in small quantities)—originally governing its mode of crystallization, and hence more or less its elasticity, ductility, and ultimate resistance to rupture. Now Mr. Saxby's method can detect the presence, and negatively of course the absence, of small or large solutions of continuity. It can detect false welds, smaller flaws caused by bad workmanship or wear, and, we believe, what is commonly termed "crystallization," which will, probably, once be generally acknowledged to consist in a disruption or parting of the facets of the amorphously arranged crystals of which iron is built up. It can, of course, only detect the results of the chemical constitution of iron, as evidenced in the less perfect cohesion of the crystals when alloyed, in relatively considerable quantities, with foreign bodies. There is little doubt that the magnetic method is a test of the homogeneous character of the iron and of its freedom from fissures and cracks, and so far it undoubtedly forms a test of quality. It will appear scarcely credible that a common pocket compass needle should be able—almost like the divining rod said to be used for finding out springs of water—to discover important defects in large iron bars. A mere statement of the fact does sound almost incredible until the simple means actually employed are explained.—*Engineer*.

Improvement in Sheep Shears.

The advantages of these shears over those ordinarily used are apparent at a glance. A movable cutter, A, is pivoted to the face of the stationary cutter, B, which is divided into fingers or bars, each one presenting a cutting edge to the action of the movable blade. A slot in the free end of the spring handle, and a screw in the end of the vibrating cutter, with a stop, C, on the opposite side of the plate, B, governs the throw of the blade. The forks of the plate readily enter the matted fleece, thus facilitating the operation of shearing, and the action of the blades insures a drawing cut requiring less power, and producing a cleaner cut than the ordinary shears. The form of the cutter and its throw can be regulated to suit any hand. These shears are also well adapted for shearing horses.

RALSTON'S PATENT SHEEP SHEARS.

Patented by John Ralston, June 4, 1867, who may be addressed for rights, etc., at Slippery Rock, Butler county, Pa.

THE SCIENCE OF EXTINGUISHING A FIRE.

Accounts of experiments showing that violent conflagrations may be extinguished by very small quantities of water, by means of buckets or small hand pumps. By M. Van Marum: The flame of any burning substance must cease, according to well known principles and experiments, as soon as any cause prevents the atmospheric air from touching its surface; thus, when a small quantity of water is thrown upon a body in a state of violent conflagration, this water is at first partly reduced to vapor, which, rising from the surface of the burning substance, repels the atmospheric air, and consequently represses the flame, which, for the same reason, cannot again appear whilst the production of the vapor continues.

From experiment it appears that the art of extinguishing a violent conflagration with very little water consists in throwing it where the fire is most powerful, so that the production of vapor from the water, by which the flames are smothered, may be as abundant as possible; and in proceeding to throw the water on the nearest inflamed part, as soon as the fire ceases in that where you began, till you have gone over all the burning parts as expeditiously as possible. In thus regularly following the flames with the water, they may be everywhere extinguished before the part where you began has entirely lost, by evaporation, the water with which it was wetted, which is frequently necessary, to prevent the parts from taking fire again; after the flames of a burning body are extinguished, it cannot again take fire, for the above-mentioned reason, till all the water thrown upon it be evaporated.

Being convinced that very little water may suffice for extinguishing ordinary conflagrations, particularly at their commencement, I have endeavored to convince many of my fellow citizens of it by repeated experiments; and I have advised the procuring of small portable engines to be used in cases of necessity. One experiment was the following, a small hand pump being used: I constructed a shed of dry wood, forming a room twenty-four feet long, twenty wide, and fourteen high, having two doors on one side, and two windows on the other. This shed was provided with the wood-work of a roof, but was not covered, and stood about six inches from the ground, that there might be a thorough current of air to increase the fierceness of the flames when the building should be set on fire. The inside of it was completely covered with pitch, and lined with straw, which was likewise pitched. To this straw lining I fastened wood shavings, and cotton dipped in oil of turpentine, to set fire to the whole inside of the shed at once. Soon after the fire was applied, the flames, being increased by the wind, were every where so violent that all the spectators thought they could not possibly be extinguished. I however succeeded, in about four minutes, by the method already described, with five buckets of water, part of which was wasted through the fault of those who assisted me, as the following experiment proved.

I invited but very few to be present at this first experiment on the 8th of May, but on the 11th I repeated it in the presence of a very numerous company, after repairing and restoring the shed to its original state. The fire was not less violent than in the preceding experiment. I then directed the water myself, without any assistance, and effectually extinguished the fire in three minutes, having used only three buckets of water, each containg about four gallons and a half.

Another experiment was made at Gotha, where a shed of old and perfectly dry wood was erected, under the direction of M. Van Marum, in front of the duchess's garden. Its dimensions were in every respect equal to that which served for the same experiment at Harlem, being twenty-four feet long, twenty wide, and fourteen in hight. There were two doors on the northeast side, and two large apertures, in the form of windows, on the northwest side. The top was quite open to give the flames a free passage.

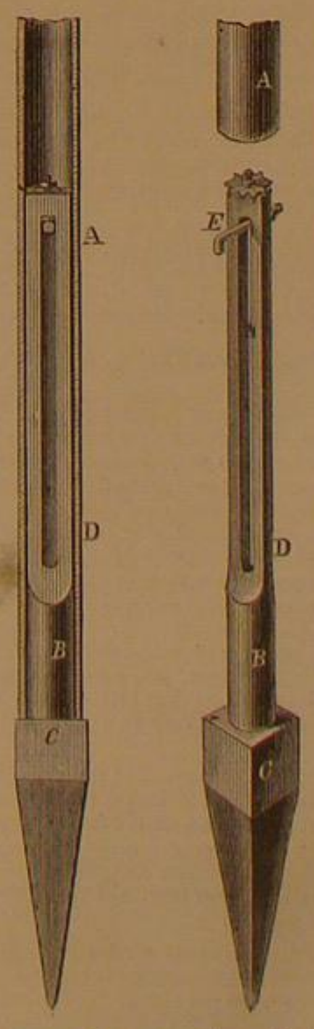
The inside of this shed was covered with pitch, and afterwards with straw mats, plentifully besmeared with melted pitch. To the bottom of these straw mats were fastened cotton wicks, dipped in spirits of turpentine, that the place might take fire in every part at once. In consequence, the fire, being considerably increased by the wind, was at first so powerful, and the flames, enveloped in thick clouds of smoke, rose with such violence to the hight of several feet above the opening of the roof, that the nearest spectators were obliged to retire precipitately, and many of them declared that it would be impossible to extinguish the conflagration, and that the shed would be entirely reduced to ashes. When the straw mats were completely consumed, the wood of the shed was soon in flames in every part. The circumstances under which this experiment was made were highly unfavorable; for the wind drove the flame exactly out at the doors on the northeast side, at which the water for extinguishing it was to be introduced. But notwithstanding this, M. Van Marum placed a small portable engine before the door, nearest the southeast side, without regard to the fears and opposition of his assistants, and ordered it to be worked there, stationing himself as near as the heat of the fire would permit him; he first directed the water to the southeast side, as near the door as possible, and as soon as the flame was extinguished in one part he guided the water to another. He then directed it along the north east side, so that in a few minutes the flames were completely extinguished on those two sides. The engine was then placed before one of the apertures made in the form of windows, on the northwest side. He in a very short time extinguished the southeast side, and then coming to the middle of the shed, which was still on fire in several places in the crevices of the planks and the holes made by the nails, he completely extinguished the fire, which from time to time broke out again in small flames, and this terrible conflagration was entirely got under. According to the calculation of several of the spectators, the fire was extinguished in three minutes at most, after the engine began to work, three buckets of water being used.

From what has been stated, it results, that to stop the most violent flame it is necessary only to wet the surface of the burning substance where the flame appears, and for this purpose only a small quantity of water is required, if it be applied with judgment to the burning part.

BENNETT'S DEVICE FOR SINKING WELL TUBES.

The practice of procuring water by simply sinking or driving iron tubes to the water deposit, instead of digging and walling wells, is now quite common, and to facilitate the formation of such wells is the object of the contrivance herewith illustrated.

A represents the tubing, which is driven into the earth by positive force. In this is fitted the shank, B, of the opening point, C. The point is made square in cross section or pyramidal in form, instead of round, as usual, the advantage of which is that it retains its position and preserves its direction better in driving and holds better in place when the tubing is partially raised to admit water. For a certain distance above the shoulder of the point the shank is cylindrical, fitting quite closely the caliber of the tubing. Above this point, D, it is beveled or chamfered, forming, above that point, a flat bar having a longitudinal slot, through which is passed a bolt, E, that also passes through the sides of the pipe. At the top of the shank is a star-shaped diaphragm, which cuts off the passage in the center of the tube, and compels the contents to pass up around the outside of the diaphragm through the radial openings. This device serves as a check to the sand in the center of the tubing, where the current is strongest, and precipitates it down on the outside next the sides of the pipe where the friction will tend to prevent its ascension. Testing can be done at any time during the progress of the work. It is done by raising the tube just above the point, D, enough to admit the water. It will be noticed that by securing the diaphragm to the top of the shank it will always stand at the same hight above the water, no matter how much the tubing itself may be adjusted up or down. This prevents the deposits of sand near the induction point.



Patented Oct. 20, 1867, by R. N. Bennett of Branchport, N. Y. Territorial rights for sale by him, or by John Schanck, Pittsford, Monroe Co., N. Y.

Death by Lightning.

The effects of a shock of artificial lightning on a gentleman of our acquaintance, who is very sensitive to the electric discharge, may be here described. Under ordinary circumstances, the discharge from a small Leyden jar is exceedingly unpleasant to him. Some time ago he happened to stand in the presence of a numerous audience with a battery of fifteen large Leyden jars charged beside him. Through some awkwardness on his part he touched a wire which he had no right to touch, and the discharge of the battery went through his body. Here life was absolutely blotted out for a very sensible interval without a trace of pain. In a second or two consciousness returned; the recipient of the shock saw himself in the presence of his audience and apparatus, and, by the help of these external facts, immediately concluded that he had received the battery discharge. His intellectual consciousness of his position was restored with exceeding rapidity, but not so his optical consciousness. To prevent the audience from being alarmed, he observed that it had often been his desire to receive accidentally such a shock, and that his wish had at length been fulfilled. But while making this remark the appearance which his body presented to him was that of a number of separate pieces. The arms, for example, were detached from the trunk, and seemed suspended in the air. In fact, memory and the power of reasoning appeared to be complete long before the optic nerve was restored to healthy action. But what we wish chiefly to dwell upon here is, the absolute painlessness of the shock; and there cannot be a doubt that to a person struck dead by lightning, the passage from life to death occurs without consciousness being in the least degree implicated. It is an abrupt stoppage of sensation, unaccompanied by a pang.—*Harpers.*

Manufacture of Iron.

From a paper read by Mr. Frederick Smith, and published in the Transactions of the Institution of Mechanical Engineers, we extract the following notice of the processes gone through in producing the different kinds of iron made at the Round Oak Works, England, and known as "common," "best," "best best," and "best best best:"—"'Common' iron is made from puddle bars from hot-blast mine pig, cut, piled, and heated with best coal for about an hour and a half in one of the bar mill furnaces, and rolled in the bar mill to the section required. 'Best' iron is made from a mixture of cold and hot blast pigs, but the top and bottom of the pile are of puddled iron that has been worked over twice at the hammer and forge rolls, so that all 'best' iron is worked over at least twice, while the upper and lower parts of the pile are worked over at least three times. 'Best best' iron also consists of a mixture of cold and hot blast pig, and is treated nearly the same as 'best,' only that the whole pile is worked over thrice at the hammer and forge rolls. 'Best best best' iron is made entirely of cold blast mine-pig, and rolled out into 3½x⅝-inch bars. They are sheared into small snippings, and then run in barrows to the ball furnace, where they are worked together into a ball of about one cwt. in the course of a few moments. The ball is hammered and reheated in the furnace; hammered again, and then put through the forge rolls; the bars produced by these rolls are then cut up and piled, heated at a bar mill furnace, and rolled in the bar mill. In this process, to form 'best best best' iron it is heated five times, hammered three times, and rolled three times."—*Bulletin of American Steel and Iron Association.*

What Advertisers Say.

LAWRENCE, MASS., Dec. 24th, 1867.

MUNN & Co., SCIENTIFIC AMERICAN, New York:

DEAR SIRS:—Your favor is received, announcing increased rates for advertising. You will please continue our advertisement until forbid. Were we to curtail our advertising, the SCIENTIFIC is the last that we should withdraw from.

We are yours, truly, J. C. HOADLEY & Co.

191 BROADWAY, NEW YORK, Dec. 24th, 1867.

MESSRS. MUNN & Co.:

GENTLEMEN:—Yours at hand announcing advance terms for advertising. Please insert inclosed advertisement on your outside page until otherwise ordered. Even at your new prices this is the most profitable advertising I can do. I know it from the fact that I have expended $12,000 in the leading journals, and no one has brought me the same profitable harvest as the SCIENTIFIC AMERICAN. May you always prosper. Yours truly, GEO. E. WOODWARD.

USE OF A GRINDSTONE.—Mechanics who value a good condition of their tools and other appliances for doing work, should never allow their grindstones to be used by strangers indiscriminately without some restrictions as to the manner of using. Every stone for grinding tools should be provided with a rest and the men taught how to use it.. We have seen the face of a stone gouged so as to require a thorough razing by ten minutes' injudicious grinding. Such accommodations are costly.

CORRECTION.—In acknowledging a fine list of subscribers from Castleton, Vt., two weeks ago, we stated that the club was made up by Mr. H. O. Osborn. The credit should have been given to H. O. Brown. A gentleman from the place, calling our attention to the mistake of name, states that Mr. Brown is too modest to call our attention to the error, and adds that when the seventy men in his mill become better acquainted with our paper another large list of subscribers will be forthcoming.

Labor the Basis of Republican Institutions.

If, as has been said, idleness is the mother of mischief, occupation and industry are the progenitors of virtue and good order. The universal haste for wealth, coupled with unwillingness to toil for its acquisition, is fruitful of crime and destructive of business integrity. Throughout the whole country the cities and towns are thronged with idle Micawbers, waiting for something to turn up by which they may become possessed of a fortune and pass their lives in luxurious ease. Such men are the bane of society. They seem to believe that labor is degrading, and think nothing more honorable than sumptuous dependence. And yet society is filled with them. Not a reader of this paragraph but can point to those within his immediate acquaintance.

The folly of the present age is its want of appreciation of true manliness. He is not the best type of American nobility who apes the foreign aristocracy and considers honest labor degrading and unworthy. The genius of our democracy is the exaltation of labor and the laborer; and its triumph is the vindication of toil from the contempt of an effete nobility that clings with the tenacity of life to ancient ideas and obsolete distinctions. We are a great and a progressive nation because we are shaping out our own destiny by the iron hand of labor. We have been singularly successful in our experiment of self-goverment because we made it the first principle of conduct to depend upon ourselves for results, and not to hope for anything from ancestral title or inherited wealth. The founders of the American republic were men of independence. When they landed on these shores they shook off the trammels of European customs, they laid aside forever the pride of family that had enervated the youth of their native land, and with an unswerving fidelity to the great principles of Democracy, laid the foundations of a government whose corner-stone was respect for honest industry.

It was the law among the ancient Jews, that every man should learn a trade. He was not bound by any obligation to follow it, for if his inclinations prompted him to afterward seek another profession, he was at liberty to do so. The wisdom of this law commends itself to every mind. If, in adverse times, misfortune should lay its hand upon them, and they should be compelled to leave their chosen pursuits, they were provided with an occupation which was a safeguard against extreme poverty or want. If such a law existed in this country it would prevent many of the evils that now prevail, and render our people more prosperous and happy. However true to the principles of democracy our fathers may have been, we are fast leaving them behind. Instead of honoring labor we are attempting to degrade it. Parents, ambitious for their children, often express the hope that their lot will not be so arduous or toilsome as their own has been, forgetting that by their labor the country has been blessed, and because of the industry of their sons, generations yet to come will be grateful that they were born in republican America.

It is the first duty of parents to instil into the minds of their children the necessity and the dignity of labor. To be useful in any sphere of life should be the ambition of our youth. Our vast fields of enterprise invite competition and promise satisfactory rewards. The producer is he whose loss is most felt by society. Success in mechanic art is as honorable as professional eminence; agricultural industry is far more profitable to the nation than ambitious statesmanship. The watchwords of democracy are that all honest labor is honorable. It is not what one does, but the manner of doing it, that dignifies the man. Nothing can be more degrading than a quack in medicine, a pettifogger in law, or a blockhead in priestly garments—no one can be more honorable than an industrious and skillful artisan or a faithful and intelligent tiller of the soil.

It is a mean and worthless spirit that despises the garb of the laborer and scorns to welcome him to places of equity. Nothing can be more false that our usual idea and definition of a gentleman. It is not the dress, it is not the employment that permits this appelation. It is the kindly heart, the industrious virtuous life that makes the gentleman. A career of idleness is generally a career of crime. It is not family or wealth that entitles one to honor. It is the intelligent manhood that entitles him to respect. We honor those who have risen from humble spheres of life to places of trust and usefulness, not because of the riches they possess, not because of the position they occupy, but because of the energy and industry which they manifested in the attainment of what they have. Fortune smiles on some while she frowns on others, but her favorite is no more entitled to honor than he who with equal industry strove to win her regard. The world's distinctions are often wrong. It is dilligent, patient labor that is to be honored by the true friends of republican institutions. The drone in society, whether possessed of millions or dependent upon public charity, should be despised and avoided by every honest man. We, as a nation, must change our ideas of nobility, or we shall decline in prosperity. He is only noble who uses to the best advantage the powers of body and mind with which his Creator has endowed him. Any claim not founded on this is false and pernicious. When the people of any nation cease to give to labor its true dignity and affect to despise the laborer, their own dishonor is assured, and the doom of national prosperity is pronounced.—*Erie Dispatch.*

Foreign Recognition of American Surgery.

One of the most competent of French surgeons, M. Bouvier, lately, in the most flattering terms, commended to the notice of the Academy of Medicine two forms of apparatus invented by Dr. C. F. Taylor, of 1,303 Broadway, New York City, and designed, the one for the correction of vertebral deviations consequent upon Pott's disease, and the other for the treatment of hip-joint diseases. The peculiar beauty of this apparatus is that it combines all the advantages of horizontal position, as if the patient were reclining upon a bed, while at the same time the privilege is granted him of exercise and fresh air. In form, the apparatus is a simple lever which raises the superior part of the spinal column by using the transverse processes as a fulcrum, so that while safely increasing pressure on the articulations of the transverse processes, pressure on the bodies of the diseased vertebræ is considerably diminished. The instrument is hinged and acts as a supplementary vertebral column. Its arrangement is such that the degree of force employed may be modified at the discretion of the attending physician, and hence the treatment may be rendered constantly and regularly progressive.

Doctor Taylor is one of the most skillful practitioners, in the specialty in which he treats, in this country. For spinal and hip diseases, contraction of limbs, and kindred complaints, he manifests wonderful skill. His apparatus for straightening contracted muscles, and manipulating his patients by the use of the many mechanical contrivances he has invented and put in use at his rooms, are very ingenious. Instead of requiring his patients to conform to a special exercising chair or extending frame, or whatever other contrivance it may be necessary to use, he makes new applications to meet the form, size, and necessities of his patients, and from this source alone greater comfort as well as benefit, is administered to the afflicted, than is possible where a set of mechanical contrivances are made to perform the same office on various-sized persons, although the maladies may be the same. Every case of malformation or disease of bone or muscle must be treated differently at certain stages, and Doctor Taylor has the requisite mechanical genius to make his own implements, and the skill and judgment requisite for their most favorable application. Doctor Taylor has published an illustrated work on the diseases of which he treats, which will interest the afflicted.

At the late Exposition, Dr. Taylor's apparatus was the most noticeable feature in the section of orthopœdy, and in their official report the Imperial Commissioners incorporated the communication in full of M. Bouvier to the French Academy, as noted above, thus paying a marked compliment to his opinion, and making a double endorsement, in the most emphatic terms, of the merits of Dr. Taylor's inventions.

Hints to Public Speakers and Singers.

When singing, writes Dion Boucicault, in the *Pall Mall Gazette*, the vowels are principally used because it is necessary to dwell upon a note, and we cannot prolong a consonant. In speaking, on the contrary, we depend for articulation on the consonants, but their short percussive sound does not travel. When we shout, or in open air speaking, which partakes of shouting, we prolong the vowels, drawing the syllable at each word, but what we gain in sound is lost in clearness of articulation; expression is lost in monotony; because its fineness depends on the infinite variety of which the consonant is capable and bestows on the vowel. Two thousand voices singing or speaking together, travel no further than one voice. They may fill a certain area more completely with that intricacy of waves which, when very troublesome, we call a din, but each voice exerts its own influence on the air according to its power, and dies away within certain limits. A second voice acts independently, and produces its own separate effect, not fortifying the first but distinct from it; and so with any number of voices—say ten thousand—shouting together, if a single trumpeter were placed among them, the notes of his trumpet would be heard clearly at a distance where the Babel of voices would have expired in a murmur. Yet among the din produced by the ten thousand notes the trumpet would be inaudible. To illustrate this theory more clearly, it is plain that two thousand persons cannot throw stones further than one person. It is true that the air within certain limits will be more full of stones, but they will all come to the ground within a limited area.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

The existence of the gold fields of Nova Scotia is probably known to but few of our readers, yet a report,—a little rose-colored, perhaps,—which has been sent us while recording progress and results, claims that compared to the extent of gold producing area, the quantity of quartz mined, or the number of men employed, these fields are by far the most productive in the world. In 1866 the yield of gold was 25,454 ounces; for this year, according to every indication, it will exceed 30,000 ounces, the gross value being $600,000, or one half the value of their great staple, the coal yield. During the six years since gold was first discovered here, about 4½ tons of the precious metal has been found. The average amount to each miner last year was 57 grains per day; its value, about $2.50. There are less than 800 persons engaged in the mines. The future prospect for these mines is cheering, both American and Canadian capitalists are investing in them, and means are being taken to work them on a larger scale and system, insuring larger returns and less waste.

At the last conference of the associated North German railways, resolutions were passed looking to the promotion of the comforts of the traveling public. Among others, it was decided to warm the passenger cars by circulating a continuous current of hot water in pipes through the whole train. The heating apparatus occupies a special car, which is placed next the locomotive, and short lengths of India-rubber pipe will form connections between the cars.

Canadian railroads carried two and a half million passengers last year, and killed only seventy-seven of them. Their receipts were eleven millions, or less than ten per cent of the cost. Nearly nine thousand persons are employed, of whom almost two thirds belong to the Grand Trunk road alone.

California has found a new source of wealth in her iron deposits. It is claimed that there is scarcely a county in the State in which the mineral is not found in greater or less value. The Coast Range, though never thoroughly explored for iron ore, has many and extensive surface deposits, which indicate considerable richness.

We learn from good authority that Mr. E. A. Stevens, of Hoboken, is about to engage in the enterprise of constructing horse railroads in the streets of Paris, and has engaged the engineering services of Gen. G. B. McClellan. London, also, may soon be supplied with these democratic traveling conveniences, the Metropolitan Tramway company having given notice of intended application to Parliament to lay down rails for six different roads.

Two tuns, or 16,000 yards of wadding, is the daily product of one establishment in Pawtucket, R. I. In addition to this amount, the works turn out nearly three tuns daily of cotton waste, for use in cleaning machinery.

We have noticed in many of our exchanges the astounding announcemen that a Canadian inventor has constructed an arrangement for coupling cars automatically. Let him come to our Patent office and we will show him a hundred such contrivances, and the exhibition might be repeated every month with an entirely new stock, fully equal in variety and ingenuity to those now on hand. The number of these self-couplers annually patented is astonishing, but railroad companies seem reluctant to adopt them.

NEW PUBLICATIONS.

DICKENS' WORKS.

T. B. Peterson & Brothers, Philadelphia, are issuing an edition of Dickens works so cheap that almost every one can afford a complete set of this entertaining author's writings. Martin Chuzzlewit, Dombey & Son, Nicholas Nickelby, and Christmas Stories are the three works already reproduced in this cheap form. Price 25 cents each.

THE BROADWAY.

Geo. Routledge & Son, London, and 416 Broome street, New York. Price $3 a year; 25c., single numbers. This new monthly is one of the most entertaining of the many magazines now publishing. The illustrations are well done, and the subjects generally partake of the humorous, and vividly portray incidents in the stories in which they appear.

Recent American and Foreign Patents.

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

MACHINE FOR MAKING MOLDS FOR STEREOTYPING.—John McNair, New Orleans, La.—This invention relates to a new and improved device whereby letter types may be pressed directly into a plastic substance and a stereotype mold obtained direct, or without the trouble of first "setting up" the type and then taking a cast from them, as is now practiced.

LOCK.—H. Jackson, New York city.—This invention consists of an expanding stump arranged in relation with tumblers and a slide bolt of peculiar construction, whereby a greater security than hitherto is obtained against the picking of the lock; and the invention further consists in corrugating or notching one edge of the tumblers and having a pin on a slide to engage with the notches and prevent the tumblers being moved or tampered with by a pick when brought in contact with the stump, which arrangement also serves as a safeguard against picking. The invention also consists in a novel manner of attaching the springs to the tumblers, and also in a step for the tumblers.

GRAVER.—Ralph S. Mershon, Zanesville, Ohio.—The principal object of this invention is to so construct a graver that it can be readily adjusted and set in use upon a surface, whether more or less concave or hollow.

SEED PLANTER.—Joseph R. Frantz, Goodville, Pa.—This invention consists of seed hoppers supported upon a carrying or supporting frame, the sides of said hopper being operated by gearing from the driving wheel, and of covering shoes also operated by said frame, by means of which the seeds are planted and covered at the same time.

CHURN.—Thomas Payne, Grand Rapids, Mich.—This invention relates to a new and improved churn of that class in which a rotary dasher is employed, and it consists in a novel manner of constructing the dasher, whereby it is believed that the cream is acted upon in a more favorable manner than hitherto for the expeditious production of superior butter.

EXTENSION LADDER.—Hosea Barnes, Somers, Wis.—This invention consists in connecting together several sections or lengths of a ladder (three, more or less) in such a manner that the sections may be rigidly connected so as to form one continuous length when required, and admit of the lengths being folded when not required for use, and also adjusted so as to form a step ladder when required.

GLOBE VALVE.—John B. Lowell, Baltimore, Md.—In this invention a new device is employed for grinding the valve to its seat without removing the valve.

BURNING CULM AND OTHER FUEL.—Alfred Dart, Carbondale, Pa.—In this invention the stove is so constructed that the fuel will be burned in their strata, in order that oxygen may pass freely through it, and thereby better keep up combustion.

FIELD ROLLER.—S. B. Mann, Indianapolis, Ind.—In this invention the roller is a hollow cylinder in which are placed heavy metallic balls, for the purpose of increasing the weight without changing the bulk of the apparatus. The spring that supports the seat is also arranged in a novel manner.

AUTOMATIC GATE.—Charles F. Mawbey, Woodbridge, N. J.—In this invention a platform is arranged on each side of the gates, and connected with them by a peculiar and exceedingly simple and effective device. When a horse or other weight comes upon either platform the gates fly open from him. As the horse passes through and steps upon the other platform, the latter operates to hold the gates open till the carriage has passed, when they swing together and latch by their own weight.

COMBINED PLANTER AND CULTIVATOR.—John Vaughn, College Grove, Tenn.—This invention consists in a new combination of the planter, cultivator, revolving hoe, plow, scraper, and revolving rake, by means of which every operation required in raising cotton can be performed with one instrument, and fifty per cent of the time and labor required by the old methods can be saved.

LANTERN.—J. H. Richardson, Philadelphia, Pa.—This invention relates to a new and improved lantern, designed more especially for ship and railroad lanterns. The invention consists in feeding the flame with oxygen from the top of the lantern, a direct draft upward from the bottom through the top of the same being avoided, whereby the flame will not be liable to be extinguished by gusts of wind or the swinging of the lantern, as is now the case with those which have a draft of air passing through them from the bottom upward and are exposed to or carried in the open air.

FENCE.—H. A. Kephart, Fletcher, Ohio.—This invention relates to a new and improved fence for farm purposes, and of that class which are commonly termed portable, and it consists in a novel manner of applying the stakes to the panels, whereby the fence may be firmly supported in position with the bottoms of its panels above the surface of the ground.

IMPROVEMENT IN DRYING AND SEASONING LUMBER.—E. C. Bender, York, Pa., and Wm. Steffe, Philadelphia, Pa.—This invention relates to a new and improved process of treating lumber, for the purpose of drying and seasoning it, and is designed to remedy serious defects in processes heretofore adopted for that purpose, which is most effectually accomplished, by the use of a close chamber, or kiln, provided with proper flues and dampers, for controlling and regulating the temperature and discharging the moisture, by which means the pores of the wood are kept open a sufficient length of time to allow of the absorption and carrying off of the moisture from the interior as well as the exterior, thus seasoning without injury by checking or otherwise, and with less attention, labor, and fuel than by any other process Patented Dec. 17th; see claim in last issue.

HORSE AND WAGON BRAKE.—G. Haberland, Pontiac, Ill.—This invention relates to a new device for preventing horses from running away, and consists in arranging straps around the horses' legs, which are connected by suitable lines or cords, with a drum fitted to the front part of the wagon. By revolving the drum, the lines will be wound around it, and the horses feet will be drawn together, preventing the horse from running.

ROAD SCRAPER.—L. W. T. Lodge, Petersburg, Ky.—This invention relates to an improvement in the construction of scrapers for excavating road beds and other similar purposes.

CAR COUPLING.—Robert Goole, Abingdon, Ill.—This invention relates to a new and improved method of coupling or connecting the cars of a railroad train.

HAND TRUCK FOR MOVING BARRELS.—T. W. Kennedy, Avon, Ill.—This invention relates to a new and useful improvement in the construction of a hand truck for moving barrels about from place to place in an upright position.

SHARPENING HORSESHOE CALKS.—N. Hays, Wm. Duncan and E. A. Bowen, Vinton, Iowa.—This invention relates to an improved tool for sharpening the calks on horseshoes, and consists in the combination of a hand lever, clamp and a circular rasp or cutter operated with a crank by which the calks on a horseshoe are rapidly and effectually sharpened on the horse's foot.

CULTIVATOR.—Charles E. Storrs, William E. Keyes and David W. Jones, Grandville, Mich.—This invention consists in forming a cultivator plow with its sides curved upward resembling a scoop and provided with a cutting edge to facilitate its passage through the soil, the whole attached to a frame.

FEED MOTION FOR HEAD BLOCKS OF SAW MILLS.—M. C. Lewis, Glasgow, Mo.—This invention relates to an improvement in the feed motion device of the head blocks of a saw mill each lever being so arranged that both the head blocks may move simultaneously or work separately.

OVENS.—John Adam Kinkele, Sacramento City, Cal.—This invention relates to a new and improved method of constructing ovens for baking bread and other articles, and it consists principally in a revolving hearth or bottom and in hot and cold-air flues in connection therewith.

GATE.—John Shartle, Lima, Ind.—This invention relates to an improvement in gates and consists in so constructing and hanging the gate that it can be raised and lowered in position for overcoming obstacles, such as snow, mud, etc.

ANIMAL TRAP.—W. H. Davis, Lexington, Ind.—This invention relates to an improved animal trap, and consists of a box the floor or trap door of which is pivoted in the walls. A crank shaft having its bearings in the walls of the box and operated by a spring or weight is connected with said floor by a connecting rod or pitman attached to the floor by a staple.

MEANS FOR SECURING JIG OR MULEY SAWS TO THEIR SLIDES.—Wm. Inman, Middletown, N.Y.—This invention relates to a new and improved means for securing jig or muley saws to their slides, whereby the saw may be very readily secured to and detached from their slides, and when secured to them firmly held, without the possibility of becoming detached.

INDICATOR FOR STEAM BOILERS, ETC.—James Slater, Philadelphia, Pa.—This invention relates to an improved and novel construction of a valve, or indicator for steam and other boilers, etc., and in the manner of suspending a weight thereon, whereby many important advantages are secured.

FENCE.—Augustin Ellis and Oliver Albertson, Salem, Ind.—This invention relates to a new and improved portable fence, such as is designed to be readily put up and taken down. The invention consists in a novel application of braces, or supports to the fence, and the manner of constructing the panels together, whereby a firm and substantial straight fence is obtained, and the "worm" or zigzag fence avoided.

TOOL HOLDER FOR SLIDE RESTS.—Israel F. Brown, New Lonndon, Conn.—This invention relates to a new and improved tool holder for slide rests and other machines, and it consists in the employment or use of a V-shaped gib, or key, in connection with notches in the tool and a slot in the tool holder, all being arranged in such a manner that the tool may be held firmly in position in the tool holder, and at the same time be capable of being readily fitted in and removed therefrom.

FILTER.—George W. W. Goodwyn, New Orleans, La.—This invention consists in a novel arrangement of a filtering machine, with a water vessel and a vessel to receive the filtered water, whereby a very portable combination of a filter and water chamber is obtained, and in connection with a cooler if desired.

APPARATUS FOR PAPER MAKING MACHINES AND OTHER MACHINES HAVING TRAVELING WEBS AND FABRICS.—F. Thiry, Huy, Belgium.—The object of this invention is to restore the endless cloth or wire on which the pulp or paper travels (in the manufacture of paper and the webs or fabrics in other manufactures) to its true course, when from any cause it has a tendency to depart therefrom.

LAMP BURNER.—Charles W. Russell and Niel Clifford, New York city.—This invention relates to a new and improved lamp burner, designed for burning coal oil and other similar volatile hydro-carbons. The invention consists in a novel form or shape of draught chimney, in connection with a cone or deflector arranged in such relation with each other that the flame of the burner will be supplied with a requisite amount of oxygen to support combustion and produce a brilliant illuminating flame.

COPY HOLDER.—Herman A. Tremper, Hammonton, N. J.—This invention relates to a copy holder, intended for the use of compositors, and also for the use of proof readers, book keepers, lawyers and copyists, by substituting a change of support, so as to allow of its being used on a table or desk.

COMBINED THERMOMETER AND CANES.—James L. Reber, Philadelphia, Pa. This invention relates to a new and improved method of using thermometers, whereby the same are rendered much more convenient for reference than they have hitherto been, and consists in constructing the index-plate of a proper form and attaching the thermometer permanently, or enclosing it in the wood or other material of walking canes, umbrellas, parasols, looking-glasses, etc.

MACHINE FOR BORING POST-HOLES.—Wm. R. Iles, Lancaster, Ohio.—This invention relates to a new and improved machine for boring post-holes in the earth, and consists in operating an earth auger, by an upright shaft, by cranks and gearing.

MACHINE FOR BENDING HOOKS.—R. B. Sears, Providence, R. I.—This invention relates to a new machine for bending wrought iron, or other hooks into the required shape, and consists in the use of a stationary die, to which the lower end of the bar, which is to be bent into a hook, is held by means of a follower, carrying a pin, that fits through an eye formed in the lower end of the hook-bar.

TRACK AND STREET CLEANER.—Ernest Abbiati, New York city.—This invention relates to a new device for cleaning railroad tracks and streets from snow, and consists in the use of a revolving, horizontal disk, carrying oscillating wings, which are drawn in and out by the action of crank shafts, revolved by means of gear-wheels from the shaft to which the disk is secured. This shaft is secured to the front part of a truck, which moves in front of the locomotive or car, or to the front part of a wagon or car, and receives rotary motion from one of the wheels of the locomotive, car, or wagon, or from any other suitable device.

CORN PLANTER.—Hans J. Johnson, St. Peter, Minn.—This invention has for its object to furnish an improved machine for planting corn, cotton, sugar cane, and other seeds, in hills which shall be easily operated, and accurate in operation.

STEREOSCOPE.—Oscar Goerke, Brooklyn, N. Y.—This invention has for its object to simplify and improve the construction of stereoscopes so as to make them less expensive in construction, and more effective and convenient in operation.

HAY FORK.—L. N. Tinkham, Sylvania, Penn.—This invention has for its object to furnish an improved horse hay fork, simple in construction, easily operated, and effective in operation.

TIRE-SHRINKING MACHINE.—Jacob Gettemy, Donigal, Penn.—This invention relates to an adjustable tire shrinker, which can be set to bend the tires to fit different wheels, and which is so arranged that it will require but very little power to bend tires of great strength and thickness.

FOLDING MACHINE.—Leroy A. Gleason, Southington, Conn.—The object of this invention is to construct a machine for bending sheet metal so that with one folding bar, either sharp or round bends can be made thereon, and that it can be adjusted for any thickness of metal, and for any desired length of overlap.

SYRINGE VALVE.—Nathan Lawrence, Taunton, Mass.—This invention relates to a new manner of securing the valves in the metal valve cylinder of a syringe, so that the said valve cannot drop out of its place. The invention consists in securely arranging a pin across the metal cylinder in which the valve is held, whereby the aforesaid object will be attained.

GATE AND BARN DOOR FASTENING.—W. W. Peck, Cassapolis, Mich.—This invention relates to a new fastening for gates and barn doors, which is so constructed that the gate or door can be opened from the inside and outside, or from the former only, as may be desired, and so that the same cannot be raised and opened by hogs and other animals.

FOLDING GATE.—Robert Gidley, Lagrange, N. Y.—This invention relates to a new folding gate, which can be easily opened or closed by persons in a carriage or on horseback. It consists of a picket gate, pivoted to a bar, which is suspended in a post, so that, when the said bar is swung back by means of suitable levers, the gate will also be swung back with the bar.

REFLECTOR.—Wm. Ulrich, Newark, N. J.—This invention relates to a new reflector, which is so arranged that it can be easily attached to or detached from gas burners or lamps of suitable description, and that it can be revolved around the same, so as to throw the light or shade to any desired spot, and which can be folded out of the way if desired.

HOOP-SAWING MACHINE.—George H. Shearer, Bay city, Mich.—This invention relates to a new manner of arranging the bearings for the axles of the feed rollers and saw of a gang sawing machine for cutting laths and hoops, and consists in so casting a bearing for each end of all the axles of a sawing machine, that those, or any one of those of the feed rollers can be removed whenever desired.

BANJOS.—Jerome Mayberger, New York city.—This invention relates to a new manner of arranging the sound board of a banjo, and consists in the use of an annular drum or box, which is covered by a board having S-shaped holes similar to those in the sound board of violins. The parchment head is secured to a ring, which is fitted upon the sound board, enough above the same to permit the escape of the vibrating air between the said head and the drum, while the circular open space in the center of the drum serves as a channel for a new supply of air.

VALVE.—Alfred Crossley, Brooklyn, N.Y.—This invention relates to a new valve for steam and water pipes, and consists in so arranging the parts that the packing is below the screw thread, by which the stem is moved in the bonnet, so that the water will not come in contact with the screw thread; the invention also consists in arranging a recess or chamber within the upper part of the bonnet, around the valve stem, said recess being above the screw thread.

TRUSS.—J. R. Blake and J. L. Jarrell, Dyer Station, Tenn.—This invention consists of a band or belt, adapted to embracing the body, around the bowels, to an under strap of which belt the hernia pad is applied by a loop, in such manner as to be susceptible of adjustment within a vertical and horizontal or lateral plane, and in either plane independent of the other.

PURIFYING TRAY.—B. E. Chollar, Leavenworth, Kansas.—This invention consists of pectinated bars, of any desired form, forming the ends of the tray. In the spaces between the teeth grate bars are placed, and the same are held in position by other bars or clamps, which said clamps are bolted down upon said grate bars.

ANIMAL TRAP.—Augustine Ellis and Oliver Albertson, Salem Co., Ind.—This invention consists in a novel construction and arrangement of the trap, whereby many important advantages and features are secured.

NAIL MACHINE.—Adrian Shaw, Westford, Mass.—This invention consists principally in hanging the hammer or hammers to the outer ends of a revolving beam or cross-arm, in such a manner that as such beam revolves the hammers will be thereby swung down and upon the anvil-block, which at the same time being moved upward then recedes or moves down again at the same time as the hammer draws up from the anvil-block, from the continued rotation of the helve or beam carrying the same.

WHEEL CASTER.—Jos. White, Providence, R. I.—This invention consists of a solid disk, secured to the spindle, provided with a groove in the under side of the same to receive metallic balls, on which the under plate, to which the wheel is attached, rests, whereby the supporting arms of the wheel move more freely and with less friction around the spindle.

HARNESS PAD.—John Maclure, Newark, N. J.—The object of this invention is to so construct a pad plate for a harness pad that the mountings or trimmings can be easily changed without destroying, or in anywise impairing the the beauty or utility of the pad, and also so that the cheapest as well as the most expensive kinds of pads may be made on the plate.

MACHINE FOR MAKING PLUG TOBACCO.—J. E. Withers, Toronto, C. W.—This invention relates to a machine for making plug tobacco, and consists of a series of rollers pressing the tobacco in troughs, running on flange rollers, a large wheel revolving in a transverse direction, shifts the troughs on to a series of rollers, revolving in the opposite direction, by which they are carried back to the end from which they started. An inclined knife removes the tobacco from the troughs when sufficiently pressed.

MACHINE FOR FORMING TUBULAR BEADS ON SHEET METAL GUTTERS FOR ROOFS.—O. W. Stow, Plantsville, Conn.—Sheet metal gutters for roofs are constructed of thin metal plates (most generally termed sheet iron,) bent in semi-circular shape, with a tubular bead formed on the center edge in order to stiffen the gutter and keep it in proper shape. This invention relates to a new and improved machine whereby a very simple and portable device is obtained; one which may be constructed at a small cost, and operated with the greatest facility.

SEED PLANTER AND CULTIVATOR.—M. R. Snodgrass, Jamestown, Ohio.—This invention relates to a new and improved seed planter and cultivator combined, and it consists in a peculiar construction and arrangement of the several parts, whereby the machine may be made to work in either of the above named capacities in a perfect manner.

PROCESS FOR REMOVING BURRS AND OTHER VEGETABLE MATTER FROM WOOL.—Wm. Sykes, Newton Lower Falls, Mass.—This invention relates to a modification and improvement of a process for removing burrs and vegetable matter or substances from wool, for which Letters Patent were granted to this inventor bearing date July 10, 1866.

SKATE.—George Brownlee, Princeton, Ind.—The present invention consists, 1st. In transversely dividing the foot rest or support to the skate at a point between its toe and heel, and where the ball of the foot will rest upon the same, into two parts or sections that are hinged together, in combination with the runner or blade, also similarly divided, but so formed at their joint that as they are opened, as it were, by the action of the pressure by the foot upon the support or rest of the skate, the runner will present an unbroken and continuous surface of edge to the ice or other ground on which the skate is used. 2d, In arranging upon the under side of the foot-rest or support, a driving jaw or claw or claws, in such manner that by the movement of the foot-rest or support, in the act of skating such claws will operate upon the ice or other surface, in a manner to propel or to assist the skater forward; the arrangement of the jaws being such as to be susceptible of adjustment at pleasure, and as may be found necessary. 3d, In securing to the side of the runner blade to a skate and along its length a parallel edge, by means of which the direction of the skater is turned, as he leans over upon the side corresponding with such edge.

EXTENSION NOTICES.

Ambrose Nicholson, of Poland, N. Y., having petitioned for the extension of a patent granted to him the 21st day of March, 1854, for an improvement in self-fastening shutter hinges, for seven years from the expiration of said patent, which takes place on the 21st day of March, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 2d day of March next.

Marilda Starks, of Genoa, N. Y., administratrix of the estate of Isaac Starks, deceased, and Lyman Perrigo, of Groton, N. Y., having petitioned for the extension of a patent granted to the said Isaac Starks and Lyman Perrigo the 13th day of June, 1854, for an improvement in device for holding pieces in spoke machines, for seven years from the expiration of said patent, which takes place on the 13th day of June, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 25th day May next.

Horace Smith and D. B. Wesson, of Springfield, Mass., having petitioned for the extension of a patent granted to them the 8th day of August, 1854, for an improvement in cartridges, for seven years from the expiration of said patent, which takes place on the 8th day of August, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 22d day of June 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."

☞ *All reference to back numbers should be by volume and page.*

C. F. R., of Conn., claims to have a recipe for a paint—the principal ingredient of which is coal tar—admirably adapted to preserving the bottoms of ships. He has also a plan for rendering wood fire-proof, but neither gives the recipes nor offers to sell the preparations. He says: "Perhaps your readers would be pleased to obtain them on the same terms as those of water-proof fine fabrics: well, let them, I have no objections." Which must be very satisfactory to the "readers."

J. F., of La.—Concrete for foundations is made usually of one part hydraulic cement and two parts clean sharp sand, into which as mixed, is thrown five parts broken stone, the whole to be deposited at once in place. No amount of water, whether salt or fresh, can impair it.

P. S., of N. J.—Horn is merely a generic term applied to several widely differing animal substances. The horns of the stag, moose, antelope, etc., are very different from those of the genus *bos*, as domestic cattle, and that of the rhinoceros differs from both. Treatment for one of these qualities of so-called horn in manufacturing will not do for others.

G. W. S., of Mass.—Gutta-percha is a perfect non-conductor of electricity and is used because of this quality for submarine and underground telegrrphic wires. Its non-conducting quality is not surpassed by any known material.

J. J. D.—Microcosmic salt, Syn: with phosphorus salt, salt urinal nativum is the triphosphate of soda and ammonia and is found in certain kinds of guano. Still it is not extracted from them, but prepared directly in heating 6 parts of phosphate of ammonia, 1 part of sal ammonia and 2 parts of water in a porcelain vessel, when in cooling it will be obtained in colorless needles. In recrystallizing them, having previously added some ammonia, the salt is obtained perfectly pure. As far as we know, it is only applied as a flux in blow pipe analysis.

W. E. L.—Common rosin melted with a little gallipoli oil and spirits of turpentine has been found to answer very well for preserving polished ironwork bright. The proportions should be such as to form a coating which will adhere firmly, not chip off and yet admit of being easily detached by cautious scraping.

H. B.—The following is a recipe for the preparation of yeast given us by a brewer: 72 lbs. of unkilned malt together with a handful of hops are gradually stirred in a clean tub containing 7 gallons of water of 170° Fah., and to this 5½ gallons of water of 200° are added. The tub is then covered tightly and left quiet for one hour. Supposing this to be done at 6 P.M., the whole is left undisturbed till 7 A.M., when it must be cooled rapidly, which is done by setting in cans filled with cold water. When the temperature of the mash has reached 70°, the tub is covered again and left during the day till 6 P.M.; at this time 1½ gallons of fresh beer yeast are to be stirred in. In 12 hours pierce a hole in the layer formed by the husks of the malt and dip 3½ gallons of the liquor beneath, then stir the whole up and dip 1¾ gallons from it (husks and liquor). This is your mother-barm from which you can generate yeast all the year round in using it in the way described instead of the ordinary beer leaven. To the remainder in the tub add 5 gallons of wort of 90°, and make use of it within two hours. The mother yeast also must be used the same day for fermenting another portion.

H. M., of Hawksville, asks: "Can you tell me the reason why a wrought-iron plow runs easier than a cast-iron one and yet a cast-iron sleigh shoe easier than a wrought-iron shoe?" 1. The closer the grain of the metal employed for mold boards in plows the less friction. 2. Our correspondent will have to furnish us with better proof than the mere statement that sleighs shod with cast iron run with less friction than those shod with wrought iron before we can answer his question.

W. S. R., of Pa., asks for the recipe of a good writing ink. 135 parts of logwood are exhausted by a boiling with 1,000 parts of water, and to the strained decoction one part of bichromate of potassa in solution is added; the ink thus obtained will not give any precipitate nor become moldy.

R. C., of Ill., asks for the means to restore stoves which turn red from use. Apply the ordinary stove polish once or twice a week and your stove will not change to that rusty red of which you complain. . . . The application of provence oil to the head will remove dandruff.

C. I. H., of N. Y.—Rubber or gutta-percha would not be injured by illuminating gas.

Business and Personal.

The charge for insertion under this head is one dollar a line.

Camden Tool and Tube Works Co., Camden, N. J., Manufacturers of Tube and the most improved Tools for Steam and Gas Fitters and Tube Manufacturers.

Parties in want of Fine Tools or Machinists' Supplies send for price list to Goodnow & Wightman, 23 Cornhill, Boston, Mass.

Allen & Needles, 41 South Water street, Philadelphia, Manufacturers of Allen's Patent Anti-Lamina, for removing and preventing Scale in steam boilers.

Can anybody tell us the price, and where steam saws are to be had for cutting tree logs into cord wood, the saw attached direct to the piston rod? Address Munn & Co., this office.

Wanted—A full set of machinery, with steam engine, for a Planing, Sash, Door, and Blind Mill. Send circulars to O. J. Bollinger, Millwright and Mill Contractor, Glenrock, Pa.

Wanted—A first-class Molder, with capital of one or two thousand dollars. References required. Address Drawer 56, Akron, Ohio.

A cheap Iron Planer wanted, about 7 feet by 33 inches square. Jas. E. Coxeter, Winchester, N. H.

Copper Tubes Wanted.—Manufacturers who can make copper or brass tubes ¼ or ⅝-inch in diameter, and 1-64 in. thick, will please send their address and prices to Dr. J. R. Buchanan, Louisville, Ky.

A Schoenberg & Co., 840 South Front st., Philadelphia, Pa., wish to know where they can obtain machinery for making lead pipes.

That Good-Will case is settled by the Supreme Court of Mass. E. C. Tainter is successor to J. A. Fay & Co., Worcester, Mass. Address as above for first-class Eastern-made wood tools.

Manufacturers of large Kettles for Oil and Soap Manufactories, will please send circular and price list to J. P. Babcock, Westerly, R. I.

Winans' Boiler Powder, 11 Wall st., N. Y., proves reliable in removing or preventing scale—12 years in use. No better reference needed

ALVORD'S ELASTIC HORSE COLLAR.

In the annexed engraving is shown an improvement in horse collars, patented Aug. 28th, 1866 by Clark Alvord, of Westford, Dodge county, Wis. It consists of an elastic coupling at the top of the collar, as shown at A. The first advantage resulting from such coupling is that the collar can be easily put over the horse's head when harnessing, and as easily taken off, no unbuckling to be done. Second, the coupling being elastic and fastened a short distance below the top of the collar, the bearing upon the neck is a spring which keeps the collar up to the lower part of the neck, yet not so rigidly as to choke the horse when drawing.

The top being open renders the collar adjustable, so that the movements of the shoulders of the horse when traveling do not cause the bearing of the collar to twist about upon, and when trotting, pound his neck. Hence no sore necks, as often happens with collars of the usual make.

For further information address the patentee, at Westford, Dodge county, Wis. See advertisement on another page.

THE ANTIQUITY OF MAN.

The New York Lyceum of Natural History were addressed at a late meeting by Prof. J. H. McChesney, of the University of Chicago, formerly United States Consul at Newcastle, Eng., who, just returning from a visit to the different European localities where evidences of great antiquity of the human race have chiefly been found, was enabled from personal investigation to present some new and interesting facts relative to this subject.

After referring to the flint implements found in the drift at Kempston and Biddenham, England, at St. Acheul, near Amiens, France, he spoke at some length of a locality in Italy not so well known as the preceding, but which furnishes almost indisputable proof of the presence of man upon the earth long ages anterior to the six thousand years which has generally been considered as limiting the period of his existence here. The evidence is the recurrence, in the drift stratification on the banks of the river Tiber, of flint arrow heads and implements which could only have been modeled by the hand of man. Now this accumulation of boulders and pebbles forming the drift is derived entirely from the Appenine mountains, and no trace exists in it of the Latin mountains, a chain now lying intermediate between the Tiber and the Appenines, but which is thus proved to be of later origin. Far above the drift is a layer of volcanic tufa derived from the latter chain, and this forms the foundation for towns which existed long before the building of Rome. Dating now from the latter event: from the known rate of disintegration of the rock forming this foundation, an approximate calculation can be made as to the period which has elapsed since the formation of the Latin hills, and it must be admitted that six thousand years is by far too limited a period to ascribe to the time of man's continuance on this mundane sphere.

In the discussion which followed the highly interesting remarks of Prof. McChesney—of which we have given above but the crudest summary—Prof. Hitchcock spoke of several cases which had come under his observation where so-called antiquarian traces might be easily explained away. The President replied that proof in the subject under consideration was cumulative; that while isolated cases might perhaps be explained, when the evidence is found in widely separated regions and under different conditions, it is but reasonable to acknowledge some connection existing between them.

Prof. Seeley called attention to the relation which this subject of man's great antiquity bore to the most important question of the age, *i. e.*, the unity or diversity in origin of the human family. The early relics of the "stone age" are found in both Americas, Europe and Asia, but their rude form proves that they were fashioned by tribes not excelling in either ingenuity or skill, and it may well be questioned whether—supposing we admit the claims for the plateaus of Central Asia as the birth place of the race—they were possessed of sufficient enterprise to traverse Europe, or, on the other hand, to scatter through Asia and reach the New World by the perilous passage of Behring's straits.

FRANKFURTH'S FUNNEL HEAT RADIATOR AND DAMPER.

With all the improvements in the construction of stoves, furnaces and other heating apparatus, much of the heat is wasted by passing off through the chimney. When a rapid draft is desired probably this waste, or a portion of it, is unavoidable, but devices are in use which retard the passing off of the products of combustion and yield a portion of the heat which otherwise escapes. Of the many contrived the engraving accompanying this description represents one of which the patentee says that 1,400 have been sold and not one returned as not having given perfect satisfaction.

Fig. 1.

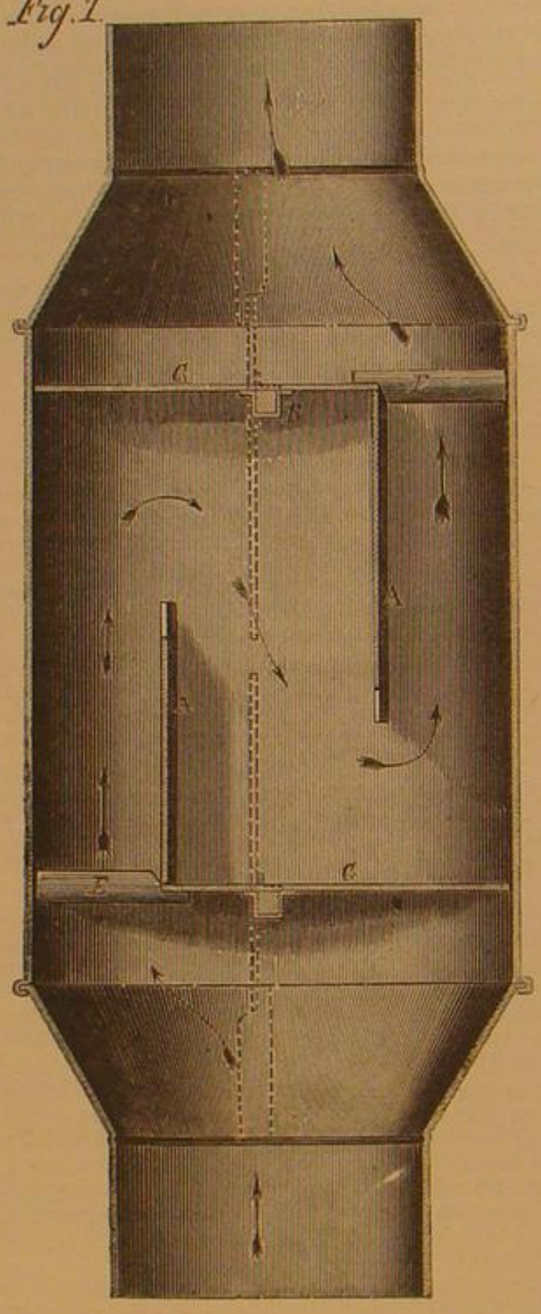
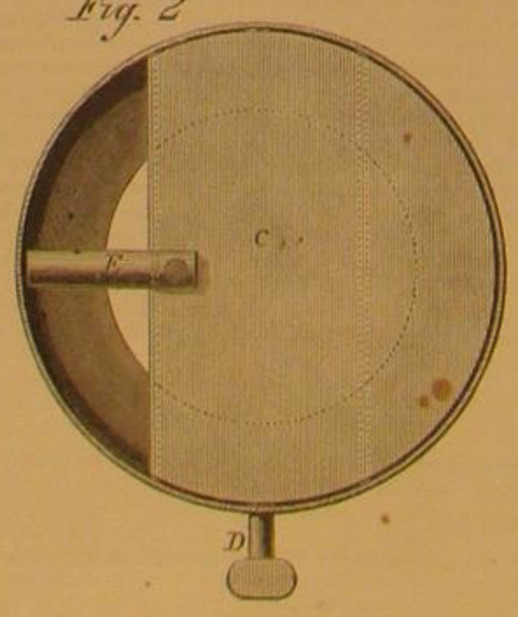


Fig. 1 is a vertical section of the drum containing the radiating partitions and dampers, Fig. 2 is a plan view of one of the dampers closed. The drum may be considered an enlargement of the stove funnel having longitudinal partitions, A, fixed midway between the axis of the drum and its exterior. B are shafts of the dampers, C, turned by the handles—one shown at D, Fig. 2. It will be seen that the dampers are

Fig. 2

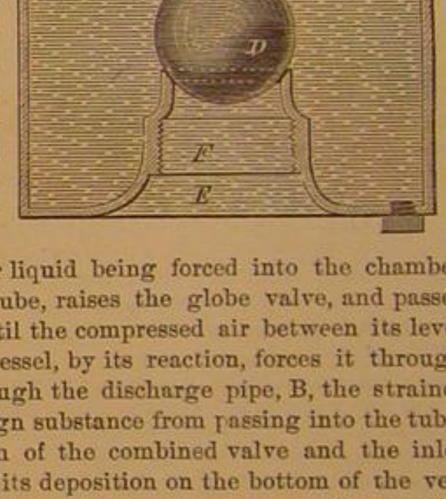


segments of a circle, the uncovered or open portion having attached a weighted bar, E—both figures—as a balance. When the dampers are closed as in Fig. 1, a space between the rim of the damper and the inside of the cylinder is free or open. The dotted lines in Fig. 1 show the position of the dampers when turned to give ample room for the escape of the gases, and those in Fig. 2 show the position of the permanent partitions. The arrows in Fig. 1 give the course of the up-rising gases.

When a fire is started in a stove or furnace to which this device is attached, the dampers, C, are opened to give the fullest draft. When the fire is well under way the dampers are closed and the gaseous products of combustion follow the direction of the arrows, and impinge on the inner surface of the drum, imparting their heat through this medium to the room. This device was patented through the Scientific American Patent Agency. January 24, 1865. All orders or communications relative to it should be addressed to Wm. Frankfurth, 306 Chestnut street Milwaukee, Wis.

HILTON'S IMPROVED AIR CHAMBER FOR PUMPS.

The object of the device exhibited in the engraving is to provide a method of procuring a steady and uniform current, and of straining the water from foreign matters held in solution or sedimentary deposits. The engraving presents a central vertical section of an air chamber showing the arrangement of the parts.



A represents the shell of the air chamber, and B an interior tube attached to the top of the chamber by an air-tight connection, C. The end of the tube is perforated, forming a concave strainer directly over the ball valve, D, which has its seat on the conical chamber, E. The lower tube of the pump is connected to the section of pipe, F. The annular space around the conical chamber, E, is a place of deposit for the sediment, which may be removed at the screw plug.

The water or other liquid being forced into the chamber through the lower tube, raises the globe valve, and passes into the chamber until the compressed air between its level and the top of the vessel, by its reaction, forces it through the strainer out through the discharge pipe, B, the strainer preventing any foreign substance from passing into the tube, and the conical form of the combined valve and the inlet chamber facilitating its deposition on the bottom of the vessel. The concave bottom of the strainer secures the return of the globe valve to its seat after having been raised.

This patent was obtained through the Scientific American Patent agency, November 19, 1867, by Richard H. Hilton, assignor to Mitchell, Allen & Co., who may be addressed relative to the invention, at Newbern, N. C.

Protection of Life in Public Buildings.

A suggestion from the dramatist, Dion Bourcicault, in regard to the protection of life and property from fire in places of public entertainment, which we find in one of our city exchanges, is worthy of notice. He proposes a plan like this:—Above the stage, and co-extensive with it, there is a gridiron floor, from which hangs the pendent scenery. Let the timbers of this floor, which is open work, be laid on their under-face with lines of small iron pipe, forming a gridiron pricked at every inch with holes; let this system be in communication with the water main. Let one lever which turns on the water be against the wall of the stage on the inside, another corresnonding lever contiguous but on the outside, so that the water may be turned on by a person either outside or inside the building. The effect of this operation would be to let fall a continuous and even deluge, more effectual in checking fire than the jet from the hose, because it not only addresses itself to the seat of the fire, but to adjacent material. A similar gridiron process should be introduced underneath the stage; another on the rafters over the auditorium, and a fourth in all available places around the ceiling, so placed that the rain from such would fall or be projected on the wood-work of the boxes and stalls. Each of these systems should have a separate main, so that each could be brought into operation separately; yet the whole might be under the operation of one master main, by turning on which the whole theater, from the back of the gallery to the rear of the stage, could be deluged in a moment.

MESSRS. C. A. STEVENS & Co's., jewelry establishment on Union Square, this city is one of the most elegant and complete houses of the kind in the city. It is the pioneer establishment of that portion of the town, and is well stocked with fine jewels, plate, bronzes, etc. The firm have associated with them Mr. Emile E. Evers, well known from his former connection with Messrs. Ball, Black & Co.

IN annealing hard cast iron or steel oxide of iron is useful. The scales of the forge should be saved for this purpose.

Scientific American.

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RAILROAD ACCIDENTS---IS THERE A REMEDY?

Whether the notion that boiler explosions, shipwrecks, railway collisions, and other moving incidents by fire or flood, are the results of an epidemic, the causes of which are beyond our ken and control, is true or not, it is certain that the past two or three months have been prolific in at least one class of these appalling catastrophes—that of railroad accidents. It would be a useless harrowing-up of the sensibilities of our readers to relate the particulars, which they have probably read in other journals; but it may be well to refer to some of the circumstances attending these lamentable occurrences, with a view to discover some remedy which may be employed to mitigate the horrors, if not to prevent the repetition of such accidents.

The throwing of cars from the rail, and their after precipitation down a steep incline, appears, if we may judge from the accounts of such accidents, to be due to a number of causes, among which we shall not reckon the breakage of axles, etc., except merely to refer to them, as these depend mainly on the carefulness and good judgment of the iron-worker, or are of a character to be detected, by the employés of the road, in season to prevent serious consequences. But according to varying statements in regard to the late accident at Angola, N. Y., on the Lake Shore road, by which about forty persons met a miserable death, the last car of the train was thrown from the track at a "frog," because of a break in the flange of one of the wheels, or because of the spreading of the track, or because of the improper position of the wheels for the track, the car being known as a "compromise" car, adapted or intended to run on tracks varying in width between the rails. Perhaps some of our readers will not understand what a compromise car, or a compromise truck, is. It is simply a truck which is intended to run on a track of either four feet eight inches or of four feet ten inches spread, these being the varying gages of the New York Central and Lake Shore roads. The compromise car wheels are made wider than common car wheels on the tread, and allow, of course, a "play" or lateral motion of three-quarters of an inch. Possibly we may never know the real cause of this accident, which precipitated two passenger cars down a steep embankment, killing half a hundred, and maiming or wounding as many more.

The soundness of car wheels is tested generally by an expert passing along by a train at stations, and tapping the wheels with a hammer, by the sound of which he judges of their condition. Probably experience will enable the operator to detect any flaw or crack in the body of the wheel, but hardly the fact of a piece being broken out of the flange, which portion may be hidden by the rail, so as to be invisible. According to the testimony taken before the coroner's jury, the track at Angola was in good condition, and perhaps the use of the compromise trucks may, after all, have been the real cause of the accident. Either of the conjectured causes are measurably within the power of man to remove; the latter certainly is.

But if the throwing of a car from the track cannot be certainly prevented, the splintering and demolition of the car and the burning of its inmates are preventable. As long ago as 1851, we published, on page 388, a description, with illustrations, of an iron passenger car, contrived by Mr. T. E. Warren, of Troy, N. Y., made either of plain or corrugated wrought-iron. It was elegant in appearance, light, substantial, and safe; but, after struggling for years, and spending his substance to procure its introduction, Mr. Warren became discouraged, left Troy, and, we believe, has since died. The New York and New Haven railroad has adopted for one car on a train a method of heating, entirely safe, and infinitely better every way than that by means of stoves burning wood fuel. It is a single coal stove, provided with a water-back and pipes, a single coil passing under each seat and returning to the leading pipe. By this means a constant circulation of hot water is kept up. A small stove is used, which can be rigidly secured to the car, and no easily-opening door or cover be left to discharge the coals among the passengers, in case the car was thrown down the embankment. In Germany a boiler-car has been attached to a train, with pipes leading through every car. This, as well as a proposition from a correspondent to use steam direct from the locomotive, has objections which will likely prevent its introduction. The plan of the New York and New Haven road appears to be the most feasible we have seen tried or heard suggested.

There would appear to be no adequate reason for adhering to the use of kerosene or other inflammable and explosive fluids for lighting the cars of a train. The horrors of the Angola accident were doubtless enhanced by the ignition of the oil contained in the lamps; and the burning of four ladies —sisters—and one man in a car near Cincinnati, and the destruction of a mail car in Jersey City by the overturning of a kerosene lamp, are fresh in the minds of all. Gas, condensed in receivers attached to each car, and replenished at each end of a route, or at intermediate stations, would prevent the addition of fury to the flames of a burning car. It would seem that the adoption of such obviously effective preventatives might save the passengers of an overturned car from the additional horrors of a death by fire.

It is stated that after the car leaped the track at Angola, and after the signal to "down brakes" was given, the train moved from 1,000 to 2,500 feet with one, and—a part of the distance—two cars off the track before its headway was stopped. All accounts agree that if the train could have been stopped ten seconds sooner, the accident would have been comparatively trifling in its consequences. On pages 78 and 102, Vol. XVII., we gave accounts of trials on the New Jersey Central railroad of a steam brake, invented by Mr. William Loughridge, of Paterson, N. J. By reference to page 102, last volume, it will be seen that the steam brake brought the train to a stand-still from a speed of 50 miles per hour, in a distance of 721 feet, while the same train, at the same speed, required 1,817 feet to be stopped by hand brakes. Many otherwise disastrous accidents might be wholly prevented by the use of such a device. Frequently the danger if ahead, is not descried in time to bring the train to a halt before the locomotive has arrived at the point, especially if the track is slippery, the train on a down grade, or running at full speed.

The Norwalk, Conn., accident, some years ago, occasioned by an open draw at a bridge, has been followed, from time to time, by others, caused by misplaced switches and open draws. The carelessness or inattention of switchmen or draw-tenders seemed to be beyond remedy; but this carelessness is now without excuse, as may be seen by referring to page 277 of Vol. XVI. of the SCIENTIFIC AMERICAN. The magnetic switch signal and alarm there described and illustrated, appears to be effectual in preventing accidents from these causes. It is the invention of Mr. Thomas S. Hall, of Stamford, Conn., and is in daily and hourly use on the New York and New Haven road. At Stamford it has been employed for the past six or eight months at the depot, where there is a constant succession of trains and a frequent use of the sidings, yet it has never failed to exhibit the danger signal and give an alarm whenever the switch was moved from the main track. Its mechanism is so simple as to be almost impossible to get out of order, and its first cost and subsequent expense is trifling. For a description we refer our readers to the article mentioned above; the utility of the device is shown in its successful use where introduced.

From the above it appears evident that it is from no lack of devices, intended to guard against railway accidents, that they are of so frequent occurrence—from no lack of contrivances, the value of which has been determined by repeated experiments—yet the slaughter of human life and the destruction of valuable property still goes on, apparently unchecked. It may be asked: "Why are not these appliances and improvements adopted?" The answer must be made by railroad managers; we are unable to give a reason. It is certain, however, that the inventor has to seek and beg, as a favor, that test of his improvement which should be made as a right, which the safety of the public, if not the interest of the inventor, demands. Inventors of appliances for saving human life on railroads, and preserving railroad property, are too often treated by railroad corporations as swindlers having a design upon the corporation treasury; and even after proving the usefulness and value of their inventions, they are refused the adoption of their improvements and the consequent compensation. Indeed it is rumored that a number of our railroad companies in the New England and other States have combined to contribute a fund, ostensibly to defend themselves against malicious and vexatious prosecutions by inventors claiming improvements in use on the roads, but which is used to embarrass and "worry out" in litigation those whose brains, talents, and time have been employed in this direction.

The only resort appears to be legislation. This only has proved effectual in the use of appliances calculated to deprive railroad travel of some of its dangers. There are some honorable exceptions, two of which are mentioned above, but it is probable that nothing short of legislative enactment will render travel on our railroads free from the constant fear of death or maiming.

THE COMMISSIONERSHIP OF PATENTS.

We learn that Hon. W. D. Bishop, formerly Member of Congress from Connecticut, and also Commissioner of Patents for a while, is likely to be nominated as Commissioner of Patents again. He is now President of the N. Y. and N. H. Railroad, and has had large business experience. He formerly held the office of Commissioner of Patents and his administration was characterized by marked ability. Mr. Bishop's appointment would give general satisfaction. The name of Mr. Alfred B. Ely, was largely mixed up with that position last week, but we believe he has retired from the field. The name of Mr. Fox, of the Interior Department, has been suggested; also, ex-Gov. Farwell, who is now an examiner in the Patent Office. Governor Farwell is able and experienced. We should be glad to see him in the Commissioner's chair.

COMMUNICATION BETWEEN NEW YORK, BROOKLYN AND JERSEY CITY.

We publish in another column accounts, furnished by a correspondent, concerning the construction of sub-aqueous tunnels, with a view of showing the feasibility of establishing this means of communication between New York, Brooklyn and Jersey City. From these accounts it would seem to be no very difficult or expensive work to connect these great cities by a single tunnel which, although of small dimensions, would have an immense carrying capacity for passengers. Indeed through the proposed eight-foot tunnel it is stated that twice as many passengers can be conveyed as are now carried on all the combined Brooklyn ferries, and there would never be any interruption of travel by snow, ice, fog or collision. The proposed tunnel would be about the same in cross section as the Croton aqueduct which is 53½ feet. This great tube is over forty miles long, and was built in five years' time at an expense, including right of way, land, dams, bridges, reservoirs, and other large extraneous expenses, of about sixty dollars per running foot. The actual expense of constructing the tunnel proper did not probably exceed twenty dollars per running foot. We should be glad to receive information upon this point.

The area of the proposed sub-aqueous railroad tunnel as described by our correspondent is sufficient to take in cars of about the same interior accommodations as ordinary railway cars.

It is well known that the beds of the North and East Rivers are of such a nature as to present no serious obstacle to the laying down of tunnels. Undoubtedly the quickest and best way would be to dredge a ditch deep enough to contain the eight-foot tube and sink the same below the bed of the river; the construction and laying being executed on the plans of Trevethick and other distinguished engineers.

Between Brooklyn and New York the sub-aqueous portion of the tunnel needs to be only 2,000 feet in length, and an enterprising corporation might readily put it down and have it in operation in six months' time.

It is surprising that an intelligent legislature like that of the great State of New York should be disposed rather to hinder than to encourage its citizens in the construction of important public works like this. But it is a fact that the last legislature actually rejected the petition of the applicants for a tunnel charter, and granted charters to two companies for the erection of immense bridges between New York and Brooklyn. Only one of these bridges has been closely figured upon, so far as we are informed, and the cost of its construction is ascertained to be seven millions of dollars, and the time required for erection between four and five years.

A tunnel could be laid down and put in operation four years in advance of this bridge, the construction of both being commenced simultaneously. During these four years the stockholders of the tunnel would probably receive back their capital, two or three times over, in the shape of dividends.

The bridge will cost fourteen times more than the tunnel; consequently, in order to pay the same interest on its cost as the tunnel, the bridge must yield to its stockholders an income fourteen times greater than the tunnel.

It seems absurd to expend seven millions on a bridge when a tunnel costing one-fourteenth part of that sum will be able fully to accommodate the public. We learn from credible sources that the bridge project has been suspended for the present, owing to the difficulty of obtaining subscriptions.

BESSEMER STEEL---IS ITS SUPERIORITY ESTABLISHED?

A late number of the *Engineer* in a cautious article concerning Bessemer steel, assumes that although that, or steel of some kind, has been claimed to be superior to iron for ship construction, guns, armor plates, shot, girders, locomotives, and rails, the proof has yet to be produced. "The use of steel for shipbuilding purposes continues to be very limited indeed; steel guns are things of the past, Herr Krupp's doings to the contrary notwithstanding. We have little to hope from steel in the shape of armor plates. Girders, boilers, and locomotives continue, and apparently will continue to be made of iron, though steel has been fairly tried." The article goes on to show that in the use of steel for rails we are without sufficient data to warrant the change from iron rails which is so strongly urged by the advocates of the former; and cites as an instance of the possible unreliability of steel for this purpose the breaking of a Bessemer rail into three pieces, something which could not possibly have occurred to an iron rail under similar circumstances. The *Engineer* believes that the tests already made in regard to the comparative merits of Bessemer steel and iron lack, for the former the convincing proof which time and use only can supply.

So far as Bessemer steel as applied to railroads is concerned we are not prepared to take issue with the *Engineer*. It is certain that Bessemer rails have not been so thoroughly tested either in this country or England as to warrant a wholesale rejection of good iron rails and the adoption of steel by any cautious engineer. Perhaps too much stress has been placed upon the effect continual vibration and concussion exerts upon iron and steel, but it is certainly undeniable that in time they will more or less change the condition of the

material. Too many instances of the change by these causes of a fibrous texture to a crystalline structure are well authenticated to leave any doubt upon the subject. Not only do railway axles made of the toughest wrought iron invariably show a crystalline character when fractured, but even the axles of public carriages, subjected only to the jar of stone paved streets, present a similar appearance when broken. Whether this effect is often produced in iron rails, at least as laid in this country, where we allow "give" or spring and use wooden sleepers, we cannot say; every break we have ever seen appearing to be due to an original defect in the rail or to the inferiority of material. Still every forger knows that it is comparatively easy to make the toughest steel brittle by cold hammering. While an iron rail might retain its fibrous character until so worn on the face as to require replacement, the Bessemer steel rail might, from its superior resistance to wear, even if not from its inferior resistance to the crystallizing process, be in an unsafe condition internally while presenting a fair external appearance.

Under these circumstances it would seem that good management and discretion require that the substitution of steel for iron rails should be at present limited, and they be placed at such points on the road that while they could be exposed to the most thorough trials of frequent and heavy trains they could be examined daily and their condition be constantly known. The superiority of Bessemer steel over wrought iron in tensile strength, weight for weight, as it comes from the manufactory, may not be a matter of doubt; indeed all experiments seem to prove it beyond a peradventure, but the life of Bessemer rails and the changes they may undergo while being used on the road are to be ascertained only by time.

We think, however, that the *Engineer* goes too far in asserting that for other purposes Bessemer steel has failed to meet the expectations of its advocates. According to trials made at Manchester, Woolwich Arsenal, and the statements of such authorities as Fairbairn, Templeton, Scott Russell, and others, Bessemer steel has proved superior to the best cast steel and toughest wrought iron in tensile strength, the Bessemer requiring a breaking weight of 162,970 pounds, while Sheffield cast steel, ranking next in tenacity, broke with 130,000, and Swedish iron with 72,000. Thus it would seem that for permanent structures as bridges, buildings, ships, etc., not subjected to concussion and where lightness is a favorable if not a necessary quality, Bessemer steel deserves a foremost place in engineering material.

LOCOMOTIVE ENGINEERS—THEIR RESPONSIBILITIES AND ESTIMATION.

It may be doubted if any class of mechanics are so inadequately appreciated as locomotive engineers. Few others have responsibilities equal to theirs and none have more arduous and dangerous duties. The terms of their qualifications for the positions they hold are rigidly exacting. Generally they must serve a novitiate in the locomotive building or repair shop, and then a year—perhaps more—in the position of fireman or "greaser" before a machine is entrusted to their care. They are expected to have gained a sufficient practical knowledge of the locomotive engine, not only to run it and keep it in order, but to make at least temporary repairs in an emergency.

It might be supposed, under these circumstances, that their work would be appreciated by the public generally, or at least by their employers; yet it is seldom we hear of any recognition of their services, and presentations of merit by railroad companies to engineers are so few that it is difficult to recall an instance. Yet recorded occurrences of rare heroism on the part of locomotive engineers show that they are a noble class of men, and many cases of heroic self sacrifice have occurred which have never been publicly noticed. Instances of engineers sticking to the foot-board and throttle even in the plain and immediate view of almost certain death are not unknown; choosing rather to achieve a posthumous reputation for courage than to retain a life saved at the expense of honor.

The employment of the locomotive engineer is one of continually recurring perils. He stands as Uriah in the "fore front of the battle;" if there is danger ahead he is the first to see it and must be the first to meet it. If death comes to any it must come probably to him. And frequently he is without any warning as to what danger may be before him, and without signal or guide to avert it. In the darkest nights, when the fog may be "cut with a knife," he must drive his unpitying steed, over tressel work, bridge, and culvert, either of which may have been undermined by torrents or storms or burned by sparks from the locomotive of a preceding train, even if the evil passions of men have not combined to provide the means for a catastrophe. Miles away from the habitations of men, he may have no assurance that kindly hearts will prompt to timely warning. He cannot rest, cannot relax for a moment the vigilance which is the price of safety for himself as well as the hundreds of human lives behind him. Overlooking his fireman, noting the hight of the water in his boiler and the pressure of the steam, keeping his eyes directed ahead and his hand on the throttle valve or reversing lever, he must be continually wide awake and watchful while on the road. Such labor is exhausting; it affects the mental as well as the physical powers.

The jars and jolts of the locomotive are believed to tend greatly to the impairment of the engineer's health. The violence and extent of these shocks can be understood only by those who have ridden the iron horse. The passengers in the upholstered cars conceive but a faint idea of the movements of the locomotive from the easy swinging of the cars. At times the whole machine, with its tuns of moving weight appears to leap from the track; it jerks from side to side of the road as if a sentient organism in spasms, and shakes the engineer and fireman in every fiber of their bodies. With all this the engineer must not allow his attention to be diverted from his duty. He gets to learn the present condition of his machine even by the noise it makes as it echoes through cuts or tunnels or spins hummingly along the open track. If a single thing is wrong his educated ear detects in the darkest night what his obscured sight fails to discover.

The perpetual strain upon the mind—the sense of never mitigated responsibility—and the continual facing of possible death or disaster more or less affects the mental character of the locomotive engineer. He partakes of the character of his machine—of which he becomes insensibly a part—and is sometimes rough, perhaps, in manner, always ready, and blunt in his communications with others. But from his position and the demands of his office he seldom speaks—never converses—when on the engine. Thus he becomes in time taciturn, in manner, although not in reality. This brusqueness and reticence if not a part of his duty becomes a part of his character, and even if time permits, he seldom allows himself to unbend in social life. With such responsibilities as he bears levity soon becomes gravity, and light heartedness, seriousness.

It is not too much to say that the locomotive engineer, rather than the conductor, is the real manager of a train. The latter mingles with the passengers, and being ostensibly what his title imports, he receives the credit for a favorable issue out of a threatened danger, which more properly, in many cases, belongs to that isolated individual, the locomotive engineer.

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office,

FOR THE WEEK ENDING DECEMBER 24, 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
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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
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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.*

72,439.—TRACK-CLEARER.—Ernesto Abbiati (assignor to himself and John N. Longhi), New York city.

I claim, 1st, The application to a track and street cleaner, of oscillating wings, H H, operated by means of crank shafts, E E, to which planetary motion is imparted, substantially as herein shown and described, and for the purpose specified.

2d, The oscillating wings, H, when arranged upon and operating in combination with a revolving disk, D, all made and operating substantially as herein shown and described.

3d, The track cleaner, when consisting of the revolving disk, D, carrying the oscillating wings, H, in combination with the brushes, I I, all made and operating substantially as and for the purpose specified.

72,440.—MORTAR MILL.—Alfred A. Anderson, Galesburg, Ill.

I claim a mortar-mixing machine, consisting of the case, A, provided with a hopper, B, detachable end piece, A', and the gear wheels, b c, arranged to operate a grinding or mixing cylinder placed within the hopper, the whole constructed and mounted on a carriage, substantially as described.

72,441.—CAR COUPLING.—Cyrus P. Bachelder, Franklin, N. H., assignor to himself, Daniel Barnard, and Stephen Kenrick.

I claim the apparatus for raising links, consisting of the cross bar, a, with its handles, a', and brackets, b, in combination with the rods, d, spiral springs, h, and cross piece, c, all operating substantially as and for the purpose described.

72,442.—DEVICE FOR ATTACHING POSTAGE AND REVENUE STAMPS, ETC.—Charles H. Bacon, Springfield, Ohio.

I claim the case, A, having knives, G, with inclined edges projecting from its interior faces, in combination with the follower, B, substantially as and for the purpose set forth.

72,443.—CARPENTERS' PLANE.—L. Bailey, Boston, Mass.

I claim the auxiliary point of impact between the cap and the thin plane iron, at the point or portion thereof where the thin steel tends to buckle under the pressure of the cap upon the projecting edge of the plane iron, substantially in the manner described.

72,444.—EXTENSION LADDER.—Hosea Barns, Somers, Wis.

I claim the hooks, D, attached to the shie pieces, a, of the sections or lengths, B C, when the latter are connected together by the rounds, c, passing through oblong slots, d, in the side pieces, a, and the lower ends of the latter are provided with notches, b, to fit over rounds, e, all arranged in the manner substantially as shown and described.

72,445.—TRUSS.—John Randolph Blake, and John Lewis Jarrell, Dyer Station, Tenn.

We claim, 1st, The pads, when applied to the under strap of a body belt, substantially as and for the purpose described.

2d, The side straps, H, in combination with the above, substantially as described, for the purpose specified.

72,446.—FLY TRAP.—Almeron Bristol, Constantine, Mich.

I claim, 1st, A bell glass or erect glass cylinder, closed at the top, and having the lower edge turned up inside, to form a trough, as described, and for the purpose specified.

2d, And in combination with the bell glass or cylinder described, the standard, provided with a screw and nuts, to adjust the hight of the glass.

72,447.—TOOL-HOLDER FOR SLIDE REST.—Israel F. Brown, New London, Conn.

I claim the notches, d x, in the tool, in connection with the wire, e, or its equivalent, in the V groove, in the gib or key, substantially as and for the purpose set forth.

72,448.—SKATE.—George Brownlee, Princeton, Ind.

I claim, 1st, The foot rest or support, and runner or blade, of a skate, when transversely divided, substantially as and for the purpose described.

2d, A foot rest or support to the skate, when provided with a driving jaw or jaws, substantially as described, for the purpose specified.

3d, The edge or strip applied to the runner or blade of a skate, substantially as and for the purpose described.

72,449.—DOOR SPRING.—Charles Burnham, Philadelphia, Pa.

I claim, 1st, In combination with a rod or torsion door spring, the screw-threaded cam or worm, G, or an equivalent thereof, as described, engaging with the notched burr or wheel, D, on the end of the said torsion rod, for the purpose of graduating the tension thereof, substantially as described.

2d, In combination with the above, the double socket or receiver, E, for supporting the notched wheel, D, substantially as described.

72,450.—GUIDE FOR WATER WHEELS.—Nathan F. Burnham, York, Pa.

I claim the guide constructed with a bevelled surface, as at y, such bevelled surface forming one side of the entire throat, formed by the respective pairs of guides, substantially in the manner and for the purpose described.

72,451.—WASHING MACHINE.—Jacob B. Byers, Geneseo, Ill.

I claim a washing machine, having the stationary inclined corrugated board, C, and the swinging beaters, D, suspended and pivoted within the box, A, with the inclined bottom, B, all arranged as shown and described.

72,452.—MUSKETO AND FLY NET.—Eben O. Carrington, Philadelphia, Pa.

I claim the polygonal bars, c, with end spring sections, in combination with the tapes or strips, e, and fold, f, as and for the purposes specified.

72,453.—BASIN FAUCET.—James Chambers, Boston, Mass.

I claim the combination as well as the arrangement of the two valves, F G, their seats, h i, the passage, k, the valve chambers, b c, the standard, A, and the stem, E, provided with operative screws, o, as specified.

Also the combination as well as the arrangement of the nozzle, B, the standard, A, the stem, E, its operative screws, o, the valves, F G, their seats h i, and chambers, b c and the passage, k.

Also the combination of the tube, e, the flange, f, and the two elastic annuli, h i; also their arrangement with respect to the screw joint, a, of the parts, A C, as described.

Also the combination of one of the valves, F G, with its stem, by means whereby one may be adjusted thereon, with reference to the other, for the purpose of terminating the movement of the nozzle, as described.

72,454.—WATER WHEEL.—Rockwell Chapman, Buchanan, Mich.

I claim a water wheel consisting of a radially projecting hub, B, having the buckets, a, formed therein alternately on opposite sides, each bucket extending half way across the face of B, as shown in Fig. 2, and having the discharge passages formed on the sides by the overlapping plates, l, applied as described.

72,455.—TRAY FOR GAS PURIFIERS.—B. E. Chollar, Leavenworth, Kansas.

I claim, 1st, A purifying tray substantially as shown and described and for the purpose set forth.

2d, The grate bars, a, in combination with the pectinated bars, A, and the binders or clamps, B, substantially as shown and described and for the purpose set forth.

72,456.—DOUBLE CULTIVATOR PLOW.—Philip Coonrod, Keithsburg, Ill.

I claim the cultivator consisting of two separate gangs of plows, G G, each gang constructed of curved iron bars, g g, as described, and adjusted by means of clevis, H, and box, C, both constructed and operating substantially as herein set forth, in combination with axletree, A, constructed as described, boxes, D D, and draft rod, E, substantially as set forth.

72,457.—SHUTTLE.—George Crompton, Worcester, Mass.

I claim, in combination with the bobbin spindle, the spring, f, and strut, k arranged to operate substantially as set forth.

Also the hinge latch plate, l, the spring, s, and the stop pin, t, when combined and arranged together, and relatively to the bobbin spindle, substantially as set forth.

72,458.—STEAM ENGINE GLOBE VALVE.—Alfred Crossley, Brooklyn, N. Y.

I claim, 1st, The chamber, c, in the upper part of the bonnet, E, above the screw thread by which the valve stem is raised and lowered, so that the smooth upper part of the valve stem will not come in contact with the screw thread in the bonnet, substantially as herein described.

2d, The arrangement of the packing, F, bonnet, E, and its recess, c, whereby to exclude water or steam from the screw thread in the interior of the bonnet, substantially as herein shown and described.

72,459.—BURGLAR ALARM.—Benj. F. Cunningham and Jeff. F. Cunningham, Flora, Ill.

We claim the arrangement of lever wire, D, in combination with wire, E, for the purpose herein specified.

72,460.—ARTIFICIAL FUEL.—Aaron M. Daniels, Hartford, Conn., assignor to himself and Benjamin Benett.

I claim a compound for artificial fuel substantially as described.

72,461.—ANIMAL TRAP.—W. H. Davis (assignor to Joseph Harlan), Lexington, Ind.

I claim, 1st, The crank shaft, C, operated by the spring, d, or its equivalent, in combination with the trap door, B, substantially as above set forth and described.

2d, The bars, G, in combination with the trap door, B, substantially as specified.

3d, The trigger, F, substantially as described, in combination with crank shaft, C, and trap door, B, substantially as above set forth and described.

72,462.—HARNESS SNAP.—Wm. F. Davison, Oliver A. Bates, Samuel M. Wilson, and Alva P. Russell, Janesville, Wis.

We claim, 1st, Ring, b, when constructed with a grain or flattened portion to receive and to be operated by spring, c, substantially as and for the purposes described.

2d, Hook, a, ring, b, and spring, c, when all constructed, connected together, and used substantially as and for the purposes described.

72,463.—SCREW DRIVER.—Otis Dean (assignor to Dr. R. W. Young), Richmond, Va.

I claim, 1st, A screw driver capable of being varied in length substantially in the manner set forth.

2d, Also the combination of the notched blade, B, and locking spring, C, constructed and arranged to operate as and for the purpose specified.

72,464.—TOOL FOR OPENING CANS.—Geo. A. Dickson, Woodcock Township, Pa.

I claim the cutting tool, constructed as shown at fig. 3, when the same is in combination with the cylinder, D, and the india-rubber packing, B C C, and the collar, E E, constructed as described, for the purposes set forth.

72,465.—MACHINE FOR BORING ROCKS.—Frederick Bernard Dœring, London, Eng.

I claim, 1st, Constructing engines or machinery for boring or working in rock or other mineral, in which the pistons of the small cylinders are operated by motive fluid, distributed by the main cylinder, without having been previously utilized in the main cylinder, as herein described.

2d, Constructing engines or machinery for boring or working in rocks, or other mineral, in which the main cylinder itself distributes the motive fluid at distinct portions of the stroke to other cylinders, as in the arrangements herein described.

3d, Constructing engines or machinery for boring or working in rock or other mineral, in which the piston of the main cylinder, with the tool, has the required rotary motion imparted to it by a twisted bar, or equivalent, in combination with other parts, as herein described.

72,466.—STAND FOR ROCK-DRILLING ENGINE.—Frederick Bernard Dœring, London, Eng.

I claim, 1st, The combination of parts, substantially as herein described, and shown, in such manner that the bearing pieces for wedges or other fixing arrangements may have more than one point of support, and the carriage be therefore prevented turning round the carrying column, as shown in the drawings annexed.

2d, The combination of parts, in frames or stands, for boring or cutting engines, of a pivoted saddle or bow, with collars, columns and arms, with their clamping arrangements and moving gear for allowing the engine to be moved into any required position, substantially as and for the purpose herein described, and shown in the figures.

3d, The combination, with frames or stands for boring engines, of reservoirs and a tank for water, having the necessary inlets and outlets, substantially as and for the purpose herein described, and shown in figs. 1 and 8.

4th, The combination of parts of frames or stands, to be employed in sinking vertical shafts, substantially as herein described with reference to figs. 6 and 7.

72,467.—HEAD REST.—A. Dunlap, Clyde, Ohio.

I claim the section, A, consisting of the wire frame, C, and cushion, D, as arranged in combination with sections, B B', when constructed with sleeves or sockets, F, and cushions, E and H, in the manner and for the purpose substantially as set forth.

72,468.—LATHE TOOL HOLDER.—Jacob Edson, Boston, Mass.

I claim the arrangement of the clamp-holding projection, a, and the clamp, B, with the shank, A, and one or two cutters, C C', applied thereto, as specified.

Also, the holder shank, A, as made with the auxiliary projection, d, arranged with it and its clamp projection, as specified.

Also, the holder, as made with one or more notched or toothed grooves constructed in its head or front end to receive one or more tools or cutters held against such notches, as explained.

Also, the arrangement and combination of the two separate cutters or tools with the single holder and its clamp, as specified.

Also, the holder, as made with each of its grooves curved longitudinally, as and for the purpose above specified.

Also, the yoke of the clamp, as formed with the cap or cover, to extend over the projection, a, and that part of the screw of such clamp which extends within the projection receiving recess of the clamp.

72,469.—FENCE.—Augustin Ellis and Oliver Albertson, Salem, Ind.

We claim the obliquely projecting bars or bases, D, attached to the panels, A A, substantially in the manner as and for the purpose set forth.

72,470.—ANIMAL TRAP.—Augustin Ellis and Oliver Albertson, Salem, Ind.

We claim, 1st, The combination of the lids, D E, to the bait-box, A, tilting platform, L, wicket door, M, between said bait-box and the chamber, B, lever-stop, N, bar, P, lever, S, rod, T, crank-arms, I, crank-shaft, H, spring, J, and bait-hook and frame, U V, substantially as described for the purpose specified.

2d, The wicket door or doors to the communicating passage, C, provided with a flange piece or strip, or its equivalent, substantially as described for the purpose specified.

72,471.—FRUIT DRYER.—M. W. Florer, Bracken County, Ky.

I claim the box or chest, C, fruit holder, B, and pipe, E, when used in connection with the ordinary farmer's or cooking kettle for generating steam, substantially as and for the purpose described.

72,472.—SEED PLANTER.—Jos. K. Frantz, Goodville, Pa.

I claim, 1st, The plow blades, B2, and covering shares, F2, adjusted by means of the thumb screws, D2, in the beams, E2, and uprights, C2, secured to the carrying beams, Z, and by the lever, I2, attached to the cross rod, H2, at the rear of the machine, as herein described for the purpose specified.

2d, The brush, U, in the hopper, L, adjusted by means of the thumb screw, W, and guide posts, V, as herein described for the purpose specified.

3d, The hand lever, Y, and lever, I2, in combination with the shaft, F, for throwing the pinion, E, in and out of gear with the crown wheel, D, as herein described for the purpose specified.

72,473.—RAIL FENCE.—Ambrose Frayer, Ripley, Ohio

I claim the herein described fence, when constructed and arranged in the manner substantially as described, consisting of the side braces, F, so arranged that the yoke, E, embraces their upper ends, thereby holding them securely in connection with the posts, C, at the same time binding said posts together, whereby the rails are supported and kept in position between said post and upon the sills, B.

72,474.—APPARATUS FOR VENTILATING MILLSTONES.—Williston K. Fuller, Modena, Ill.

I claim the millstone, G, provided with the scroll wing, A, and tube, B, so arranged that the tube will pass down the eye of the stone a certain portion of its length, and through the corner at an angle, so as to open on the face of the stone a short distance from the eye, constructed and operating substantially as herein indicated.

72,475.—CHURN.—J. C. Gaston, Cincinnati, Ohio.

I claim the construction and arrangement of two perforated dasher heads, secured one above the other to the dasher handle, and having an equal number of perforations, and so placed that the perforations in one head shall be opposite the solid part of the other, substantially as and for the purpose described.

Also, in combination with the above, providing the cover with the air tube, c, with a semi-cylindrical shaped cap, e, as and for the purpose set forth.

72,476.—TIRE BENDING AND SHRINKING MACHINE.—Jacob Gettemy, Donegal, Pa.

I claim, 1st, The device for operating the rollers, E E, so that they may be moved in the desired direction, said device consisting of the crank shaft, C, in combination with the connecting rods, e e, sliding frames, D D, and grooves

or guides, f, in frame, A, all made and operating substantially as herein shown and described.

2d, The device set forth in the foregoing claim, in combination with the indicator, I, on shaft, C, the same being made as set forth.

3d, The indicating device, I, in combination with the roller, B, arranged as set forth.

4th, The roller, B, when corrugated as set forth, in combination with the rollers, E E, the latter traveling on inclined planes, substantially as and for the purpose herein shown and described.

72,477.—GATE.—Robert Gridley, Lagrange, N. Y.

I claim, 1st, A self closing gate, when arranged so that it is brought through the slotted post, B, and into an inclined position, when opened, substantially as herein shown and described.

2d, The gate, E, when consisting of horizontal bars, b b, pivoted to pickets, c, and when pivoted to a suspended bar, F, in combination with the shaft, G, having the crank, g, and the handles, f f', all made and operating substantially as herein shown and described.

3d, The above in combination with the locking levers, H H, connected by a rod, i, substantially as herein shown and described.

72,478.—MACHINE FOR FOLDING SHEET METAL.—Leroy A. Gleason, Southington, Conn.

I claim, 1st, The combination of the folding bars, F G, disk, c c', frame, D, rod, R, cam, I, and arms, K, operating as described, for the purpose of making a round or sharp bend, substantially as herein set forth.

2d, The combination of the folding bar, F, hinged arms, K, hinged frame, D, upright rods, e, secured to the plate, E, rod, R, cams, I, and arm, o, all operating as described for the purpose of clamping the metal to be folded, as and for the purpose specified.

72,479.—COTTON CULTIVATOR.—E. H. Goelet and E. B. Goelet, Goldsborough, Tenn.

We claim, 1st, The arrangement of vibrating knives or hoes, g g, between the scrapers, H H, and the sliding plows, J J, in a two wheel machine, substantially as and for the purposes described.

2d, The right and left hand knives, g g, formed on or applied to shanks, e e, secured together and applied to a rock shaft, G, substantially as described.

72,480.—STEREOSCOPE.—Oscar Georke, Brooklyn, N. Y.

I claim, 1st, The picture holder, C, constructed as described, consisting of the end wires, c', in the bars, c3, their upper ends bent to form a horizontal loop for the ends of the pictures, and the central pin, c2, as herein shown and described.

2d, The combination of the octagonal rollers, D E, endless belt, B, picture holder, C, sliding bar, F, guides, G, cord, H, and pin, I, all arranged and operating as herein described for the purpose specified.

3d, The combination of the set or adjusting screws, I, cords, H, sliding bars, F, and flanges or keepers, G, with each other, and with the shaft or cylinder, E, and box, A, substantially as herein shown and described, and for the purpose set forth.

72,481.—FILTER.—Geo. W. W. Goodwyn, New Orleans, La.

I claim the combination of the exterior vessel, A, with the inner vessel, C, provided at its lower end with a filter chamber, E, all constructed and arranged substantially as and for the purpose set forth.

72,482.—CAR COUPLING.—Robert Goole, Abingdon, Ill.

I claim, 1st, The bar, g, upon the shaft, F, provided with the slotted arm, l, fitting over the head of the set screw, J, in the inner end of the pivoted hook, D, in combination with the lever, K, and chain, l, as herein described, for the purposes specified.

2d, The arm, h, in combination with the hooks, d, and shaft, F, as herein described for the purpose specified.

3d, The car coupling constructed as described, consisting of the hooks, D, and links, C, upon each side of the draw heads, B, rock shafts, F, bar, g, arms, h, slotted arm, i, set screw, J, chain, l, and lever, K, all constructed and arranged to operate as herein shown and described.

72,483.—SKATE.—Ferdinand Haase and Wm. Rost, Proviso, Ill.

We claim a skate frame provided with the laterlly adjustable toe clamps, E, the adjustable sliding clip, G, made to embrace the shank, t, and being held in place by the spring, g', engaging in the notches in shank, I, and the heel clip, H, operated by the screw, S, all arranged to operate substantially as shown and described.

72,484.—COMBINED HORSE AND WAGON BRAKE.—G. Haberland, Pontiac, Ill.

I claim, 1st, A horse brake consisting of the front-leg straps, G G, hind-leg straps, I I, and cords or lines, J and J', the latter fitted over pulleys, l, and all combined with the drum, D, arranged in the front part of the wagon, substantially as herein shown and described.

2d, The above, in combination with the wagon brake, f f, connected with the drum by means of a cord or line, h, provided with the lever, I, substantially as herein shown and described.

72,485.—HORSESHOE.—Patrick Hanley, New York city.

I claim the bevel, a, in the horseshoe, the plates, B G, and their connections, substantially as and for the purposes described and set forth.

72,486.—NUT FASTENING.—William Harris, Rush Run, Ohio.

I claim a nut which is provided with a perforated locking cam, substantially in as described.

72,487.—TAPPING NUTS.—H. C. Hart and J. R. Blakeslee (assignors to Hubert C. Hart and Luther T. Moses), Unionville, Conn.

We claim, 1st, The combination of the shaft, c, cam, h, lever, h', and drill spindle, I, substantially as described.

2d, Also, the employment of the tooth wheel, k, rack, k', nut box, m, conductor, m', belts, s s, to introduce the nuts to the action of the tapping tool, i, substantially as and for the purpose described.

3d, Also, the belt shifter, g, constructed substantially as described, in combination with the drill and drill spindle, all arranged and operating substantially as set forth.

4th, Also, the improved machine for tapping nuts, constructed and operating substantially as set forth.

72,488.—METHOD OF LINING HOSE.—Howard Hartley, Pittsburgh, Pa.

I claim the herein-described method of inserting and attaching spiral metallic lining to hose.

72,489.—STEAM GENERATOR.—J. M. Harvey, Buchanan, Va.

I claim the construction and arrangement of the within-described steam generator, in a manner substantially as shown.

72,490.—MACHINE FOR THREADING SCREWS.—Harvey J. Harwood and William H. Mickle (assignors to Harvey J. Harwood and John F. Seymour), Utica, N. Y.

We claim, 1st, The combination of the reciprocating dies, A and B, and guides, k l and m.

2d, Also, the construction of the curved part of the threads on the die that forms the point of the screw of increased pitch, as described.

3d, Also, the channels, v v v, in the dies, A and B, that extend beyond the part of the die that forms the point of the screw.

4th, Also, the general arrangement of the parts whereby the dies are enabled to operate upon two screws during each revolution of the crank, E.

5th, Also, the opening and closing of the guides, k l and m, in the manner and by means substantially as described.

6th, Also, the guides, k and l, and their arms, o and n, arranged in the manner and for the purpose described.

72,491.—TOOL FOR SHARPENING HORSESHOE CALKS.—Nathan Hays, William Duncan, and E. H. Bowen, Vinton, Iowa.

We claim the combination of the lever, A, with the jaw, a, the pivoted dog, B, the forked lever, C, and the rotary cutter, d, constructed, arranged, and operating substantially as and for the purpose described.

72,492.—MACHINE FOR PUNCHING RUBBER INNER SOLES.—Edwin A Hill, Quincy, Mass.

I claim the machine, substantially as described, as composed of the die plate, C, the punches, c, the clearer, F, the centralizers, i, the depressers, m, and their screws, o, constructed, arranged, and combined together, and with a frame, A, and mechanism for giving vertical motions to the punches, centralizers, carrier, and depressers, as specified.

72,493.—DOOR PLATE AND LETTER BOX.—Edward A. Hopkins, Minneapolis, Minn.

I claim, 1st, The construction of an ordinary metallic and glass door plate, with a double frame, A and B, and the arrangement of B within A, so as to form a letter-box lid.

2d, The combination, with B, of the spring, C, and hammer, D, for the purpose of striking the bell, E, as the lid falls, all substantially as and for the purpose set forth.

72,494.—COMBINED TIME AND PERCUSSION FUSE FOR EXPLOSIVE SHELLS.—B. B. Hotchkiss, New York city.

I claim, 1st, The employment, in an explosive projectile, of a quantity of quick-burning material, L, permanently attached and protruded beyond the front and directly exposed to the contact of flame on all sides, in combination with the surrounding borman, C, substantially as and for the purpose herein described.

2d, The magazine, G, of quick powder, arranged in direct contact with the borman, and adapted to be ignited at the proper time thereby, and to increase the force with which flame is thrown into the shell, substantially in the manner herein described.

3d, In the cavity magazine, G, arranged as represented, the use of powder, in one or more large grains, in combination with the contraction, g, smaller than said grains, and arranged to operate therewith and retain the powder but discharge the flame therefrom, substantially in the manner and for the purpose herein set forth.

72,495.—GATE.—H. Hunt, Delavan, Wis.

I claim the arrangement and combination of pulleys, J K, attached to bracket, H, with cords, n and m m, used for operating gate, L, on places, F F, the latter having a curve, Z, substantially as set forth.

72,496.—WELL REFRIGERATOR.—Daniel Hyre, Union, Ohio.

I claim the combination and arrangement, in a well refrigerator, of the several parts, viz., platform, B, with doors, C, frame, A, cupboard, D, roller, E, wheels, K and L, crank, M, cords, n n, pawl, h, and friction block, F, substantially as described and for the purpose set forth.

72,497.—MACHINE FOR BORING POSTHOLES.—Wm. R. Hes, West Rushville, Ohio.

I claim, 1st, The bracket, D, suspended on the journals, f f, in combination with the gear wheels, substantially as described.

2d, The hinged valves or wings, G', in combination with the cutting bits, substantially as shown and described.

72,498.—SAW MILL.—Wm. Inman, Middletown, N. Y.

I claim the securing of jig or muley saws to their slides by means of clamps, B, composed each of a yoke or frame, with an eccentric fitted therein, and attached to the saw slides, substantially as shown and described.

72,499.—DOOR LOCK.—Henry Jackson, New York city.

I claim, 1st, The bolt, B, composed of the two parts, a b, the former, a, having the tumblers, D, attached, and the latter, b, provided with the pin, j, to act against the tumblers in order to force them back, and with them the bolt, substantially as shown and described.

2d, The notches at edges of the tumblers, D, against which the pin, j, bears, in order to lock the tumblers after their slots, i, have been adjusted in line with the stump, c, substantially as shown and described.

3d, The expanding stump, C, in combination with the slide, b, of the bolt, provided with the slot, k, for compressing the stump in order that the slots I, may receive it, substantially as set forth.

72,500.—BLEACHING AND SCOURING HEMP, FLAX, AND OTHER FIBERS.—Léon Jarosson, Lille, France.

I claim, 1st, The apparatus represented in fig. 1, for scouring the hanks of threads by means of dry steam.

2d, The arrangements relating to the whole of the successive cream coloring and bleaching of the threads, as illustrated in figs. 1, 2, 3, 4, 5, 6, 7.

3d, The drier for said threads, represented in figs. 8 and 9.

4th, The drier for fabrics, as represented at figs. 10 and 11.

72,501.—CORN PLANTER.—Hans J. Johnson, St. Peter, Minn.

I claim, 1st, The combination of the bent lever, H, pivoted bar or plate, G, connecting rods, F, rings, E, and toothed clutch wheels, D, with each other and with the frame, A, axle, B, and hubs of the wheels, C, substantially as herein shown and described and for the purpose set forth.

2d, The combination of the pivoted catches, J, levers, K, and bent lever, L, with the toothed clutch wheels, D, frame, A, and suspended bars or plates, M, substantially as herein shown and described and for the purpose set forth.

3d, The dropping spout, N, and bar or plate, M, constructed as described, in combination with each other and with the bent lever, L, substantially as and for the purpose herein set forth.

4th, The sliding frame, R, and adjustable bars, T, in combination with the slide, P, hopper, O, and double incline, m', upon the bar, M, substantially as herein shown and described, and for the purpose set forth.

5th, The combination of the arms, S, with the sliding frame, R, and with the double incline, m', formed upon the bar, M, substantially as herein shown and described, and for the purpose set forth.

6th, The combination of the spring, W, with the dropping spout, N, substantially as herein shown and described and for the purpose set forth.

7th, The combination of the adjustable stops, X, with the dropping spouts, N, substantially as herein shown and described, and for the purpose set forth.

8th, The combination of the bent lever, Y, with the levers, L, for the purpose of raising and holding the dropping device away from the ground, substantially as herein shown and described.

72,502.—LEVER LOCK FOR WAGON BRAKE.—Wm. K. Johnson, Cordova, Ill.

I claim, 1st, The combination of a pivoted self-locking lever, J, and segment E, with the vibrating hand-lever, G, substantially as described.

2d, The fixed segment, E, passing through both the hand-lever, G, and its pivoted spring-locking lever, J, substantially as described.

3d, The stationary frame, F F, in combination with hand lever, G, locking lever, J, spring, b, and a connecting rod, a, constructed and operating substantially as described.

72,503.—HAND TRUCK FOR MOVING BARRELS, ETC.—T. W. Kennedy (assignor to himself and Thatcher Nickerson), Avon, Ill.

I claim the bent lever handles, d d, and the hooks, h h, in combination with the truck, A, constructed and operating substantially as and for the purpose herein described.

72,504.—FARM FENCE.—H. A. Kephart, Fletcher, Ohio.

I claim the bars or buttons, C, pivoted to the stakes, B, and applied to the pannels, A, in the manner substantially as shown and described.

72,505.—BUNG CUTTER.—Josiah Kirby, Cincinnati, Ohio.

I claim, 1st, The chisel or cutter, D, with cylindrical cavity, in combination with the plunger, c, and feeding bar, i, constructed and arranged substantially as described, for the purpose of cutting bung blanks from separate square blocks of wood.

2d, The combination of feeding slide bar, i, feed box, C, guides, o o, and spring o', for feeding successively one of a series or pile of bung blocks forward in exact line with the cutting edge of the chisel of a bung machine, operating substantially as described.

3d, The cutter, D, feeding slide bar, i, and plunger, c, so arranged relatively to each other, as that the cutter or chisel shall, when cutting, have at least two blocks or blanks in line with its cutting edge, and that, at each stroke of the machine, the cutter shall finish cutting one block or blank, and enter and partly cut a second blank, instead of cutting a single blank at each stroke, substantially as and for the purpose hereinbefore described.

4th, The cutter and feeding device of a bung-cutting machine, arranged, substantially as hereinbefore described, as that each block, as it is fed into the machine shall serve as a cutting board for the next preceding block.

The use of the hinged bar, m, in the slot of the sliding feed bar, i, in combination with the vibrating shaft, h', whereby, by raising the bar, m, the motion of the feed bar, i, is suddenly arrested, without stopping the motion of other parts of the machine.

72,506.—CANDLE HOLDER.—Chas. Kirchhof, Newark, N. J.

I claim, as a new article of manufacture, the hook, a b, in combination with rod, d, ball, f, and holder, c, or any equivalent, when constructed and arranged in the manner described, and for the purpose specified.

72,507.—STAIRS.—John Koch, Brookline, Mass.

I claim the combination and arrangement of the plate of cork with the stair step, the whole being as and for the purpose hereinbefore specified.

72,508.—SYRINGE VALVE.—Nathan Lawrence, Taunton, Mass.

I claim the syringe valve, B, when placed within the metallic cylinder, A, with its stem extending into the smaller portion of the cylinder, and prevented from falling out by means of transverse rod, D, or projections, a, as herein shown and described.

72,509.—CARD-GRINDING CYLINDER.—J. O. Lewis, Worcester, Mass.

I claim making the rim or metal part, B, with a series of teeth, a, substantially as shown and described.

72,510.—HEAD BLOCK.—M. C. Lewis, Glasgow, Mo.

I claim the double hand levers, a a', connected separately with the head blocks, B B', by the rods, d d', operating in such a manner that, when the levers are connected together, both head blocks are moved simultaneously, and, when disconnected, each lever moves a different head block, as herein described, for the purpose specified.

72,511.—ROAD SCRAPER.—L. W. T. Lodge, Petersburg, Ky.

I claim the arrangement of the scraper, D, hinged to the broad heel plate, a, the double catch, b, pivoted on the stock, A, and held by the spring, c, and the side springs, d d, pivoted to the beam, B, and the upper corners of the scraper, all combined and operating as herein described.

72,512.—MACHINE FOR ROLLING CLEVIS BLANKS.—Michael Loughran, Pittsburg, Pa.

I claim one or more grooves, c, in the periphery of one of a pair of cylindrical rolls, with one or more notches or depressions, i, in the bottom of each such groove, all of the form substantially as described, in combination with the notched or mortised guides, n, for the purposes above set forth.

72,513.—APPARATUS FOR DIGGING PEAT.—James B. Lyons, Litchfield, Conn.

I claim, 1st, The clasping fork or scoop, H, as constructed, for digging and elevating peat from the bed.

2d, Also, the boom, D, supported on a truck, d, and circular rail, E, for the purpose of raising peat and delivering it, so as to be easily removed for use.

3d, Also, the peat-digging apparatus, as attached to the vertical shaft, in combination with the boom, derrick, rope, or chain, pulleys and windlass, operating substantially as herein specified.

4th, Also, the arrangement and combination of the eccentric cam, k, rod, n, bell crank, m, and handle, l, for controlling the digging and delivering apparatus, substantially as and for the purposes set forth.

72,514.—HARNESS PAD.—John Maclure, Newark, N. J.

I claim, 1st, The main plate, A, constructed substantially as shown and described, for the purposes set forth.

2d, The sub-plate, B, in combination with the plate, A, substantially as and for the purposes described.

3d, The lugs, b and c, on the sub-plate, B, substantially as and for the purposes described.

4th, The double-inclined planes, l, the slot holes and grooves, J, on the main plate, A, substantially as described and for the purposes set forth.

72,515.—MACHINE FOR PRODUCING STEREOTYPE MOLD.—John Mac Nair, New Orleans, La.

I claim, 1st, A series of disks, B, provided with two sets of types, and arranged with cords, d, pins, e, and weights, Q, to operate in connection with an index plate, K, substantially in the manner as and for the purpose set forth.

2d, The method, herein shown and described, of justifying or spacing and correcting the types, J, composing a word or sentence, and clamping the disks, B, as set forth.

3d, Releasing the pins, e, from the perforations in the plate, K, by swinging down said plate, or by any equivalent means, as herein shown and described.

72,516.—WINDOW-SASH LOCK.—Nathan F. Mathewson, Barrington, assignor to himself and Wm. C. Green, Providence, R. I.

I claim, 1st, The combination of the toothed sector and gear, provided with a key socket, or its equivalent, with the radial swing-bolt, applied to a case, as specified.

2d, Also, the combination and arrangement of the spring-dog, g, with the radial swing-bolt, its toothed sector, and the operative gear thereof, as provided with a key socket, or its equivalent, as set forth.

3d, Also, the arrangement of the radial spring-bolt, and its operative mechanism and receiving socket, with the two bars, I k, of the two sashes, in manner as specified.

72,517.—BANJO.—Jerome Mayberger, New York city.

I claim, 1st, The annular drum, B, when provided with a perforated sound board, a, substantially as and for the purpose set forth.

2d, The head, C, when constructed as described, and when provided with supports, g, in combination with the annular drum, B, the same having a perforated sound board, as set forth.

72,518.—POST DRIVER.—Silas McCullough and Alexander Robins, Buffalo, Ohio.

We claim, 1st, A post or pile driver, constructed with longitudinal beams, A A, resting on rockers, C C, which act in conjunction with the slots, d, all constructed and combined substantially as described, and for the purposes set forth.

2d, In a post or pile driver thus constructed, the hinged posts, B B, provided with braces, D D, constructed and operated as described, and for the purposes set forth.

3d, In like combination, the adjustable inclines, h h, as and for the purposes set forth.

72,519.—RAILROAD SWITCH.—S. C. Megill, Newark, N. J.

I claim the construction and arrangement of the bent lever, E, pivoted to the tie, F, its inner arm, a, connected to the bent lever, H, by the jointed rod, G, its outer arm, c, connected to the angular lever, J, by the bent rod, I, and its arm, d, pivoted to the transverse rod, e, bearing the switch rails, C, all operating as described, for the purpose specified.

72,520.—HOT AIR FURNACE.—Geo. F. Merkles, N. Y. city.

I claim, 1st, The combination, in an air-heating furnace, of the plate, G, constructed substantially as described, with the air passages, I I I I I, and annular flue, b, for the purpose as set forth.

2d, The combination, in an air-heating furnace, of the dome, e, air passages, I I I I I, and annular flue, b, with the cylinder, J J, or its equivalent, substantially as and for the purpose set forth.

72,521.—GRAVER.—Ralph S. Mershon, Zanesville, O.

I claim, 1st, A graver, so connected to its handle or holder that its cutting edge can be adjusted substantially as and for the purpose described.

2d, Also, a graver having a short base, a, and continuous face-line, b, substantially as and for the purposes specified.

72,522.—COMPOSITION FOR TEMPERING STEEL SPRINGS.—Wm. A. Meyer, Indianapolis, Ind.

I claim a compound of prussiate of potassa, muriate of ammonia, borax, resin, and crude lubricating coal oil, mixed in proportions as before stated, for the purpose of tempering steel springs.

72,523.—HARVESTER DROPPER.—Jacob Miller, Canton, O.

I claim so uniting the dropper by means of rods and levers to the hand lever, l or h, and to the foot lever, m, as that the driver in his seat, by means of a long lever extending up thereto, may work the dropper by his hand, or by his foot, through a separate connection, or by both together, under an arrangement of parts, substantially as herein described.

72,524.—PUTTING UP BLUEING AND OTHER DYES.—Edward L. Molineux, New York city.

I claim the method of preparing and packing soluble dyes or colors, substantially as herein described, and for the purpose set forth.

72,525.—CORN PLANTER.—R. W. Moran, Chicago, Ill.

I claim, 1st, The drums, F F, applied upon the axle, B, of a two-wheel frame, and provided with hoppers, E E, guards or sprons, G G, and plungers, b b, which latter are applied in the cells, a a, and caused to press the grains of corn into the ground, substantially as described.

2d, Applying both drums, F F, upon the turning axle, B, in such manner that said drums can be stopped or started at pleasure while the machine is being moved along, in combination with devices applied to the cells of said drums, which will automatically force the corn into the ground, substantially as described.

3d, Providing the movable plungers, b b, with levers, c, guides, c, and spring pieces a, substantially in the manner and for the purposes described.

4th, The markers, J, applied to adjustable drums, F, in lines with the seed cells thereof, substantially as described.

72,526.—BREECH-LOADING FIRE-ARM.—Wm. Morgenstern, Hartford, Conn., assignor to himself and Charles Herold.

I claim the double acting rotating and swinging breech-piece, d, hung upon the extractor hinge-piece, e, with the spring, e', arranged and operating substantially as described.

72,527.—RAILROAD TRACK LIFTER.—John Morton, Winchester, Ind.

I claim, 1st, The combination of the levers, A, for raising railroad tracks, with the chain or cord, C, and the mechanism for actuating the same, substantially as set forth.

2d, The arrangement of the mechanism for actuating the track-lifting levers, A, said mechanism consisting of the parts, C, D, E, F, G, and H, substantially as herein described.

3d, The combination of the pedestal, K, post, L, braces, B, and track-lifting levers, A, arranged to operate substantially as and for the purpose set forth.

72,528.—WATCH.—Don J. Mozart, New York city.

I claim, 1st, An escapement for watch or other time or other similar movements, in which are combined a cut-out staff and a cut-out eccentric detent, or their respective equivalents, connected together through a trip lever or other suitable device or devices, when both are constructed and arranged together for operation by the escape wheel, substantially in the manner and for the purpose described.

2d, A cut-out staff, a cut-out eccentric detent, and a trip lever, having one or more side arms, with its working faces curved or circular in shape, or any equivalent therefor, respectively, in combination with the escape wheel of a watch or other time or other similar movements, substantially as described, for the purpose set forth.

72,529.—VALVE FOR STEAM AND OTHER ENGINERY.—George Murray (assignor to himself and J. C. Chapman), Cambridgeport, Mass.

I claim the hollow expansion plug, B, made in two or more parts, with the spring, e, and provided with a direct passage, f, and an additional opening, g, for the entrance of the steam or water when the valve is closed, substantially as and for the purpose described.

72,530.—STEAM GENERATOR.—A. W. Newell, Bradford, Pa.

I claim, 1st, The apertures, F F F, etc., between the sections, for the purpose set forth.

2d, The combination and arrangement of the sections, A A, etc., the lugs, B B, etc., or their equivalents, the steam pipes, C C, etc., provided with expansion joints, D D, etc., or their equivalents, and the apertures or openings, F F, etc., when constructed substantially as and for the purposes described.

72,531.—STEPS FOR SPINDLES.—G. H. Noble, Lowell, Mass.

I claim the spindle, k, with its cap, j, receiving holes, i i, and distributing holes, e e, and case, a, the whole constructed, arranged, and combined substantially as and for the purpose herein specified.

72,532.—SLEIGH.—Harvey D. Palmer and James H. Beard, Leonidas, Mich.

We claim, 1st, The employment of the wheels attached to the arms, E E E E, and working in the slotted braces, C C C C, substantially as shown, for the purposes and uses expressed.

2d, The actuating lever, K, connecting piece, G, and slotted levers, F F, all as shown for the purposes described.

72,533.—MACHINE FOR REMOVING MOLDED FORMS FROM PRESS.—George Patten, Chester, Pa.

I claim, 1st, The adjustable palms, P P, in combination with the [illegible] and vibrating lever plate, D, or their equivalents, automatically operate to grasp a molded form with the pressure requisite for removal, substantially as set forth.

2d, Automatically grasping and releasing molded forms by the action of the conveying mechanism, substantially as set forth.

3d, The combination of the feed-arm with the conveyor and receiver, substantially as set forth.

4th, The plate, F, or its equivalent, constructed and operating substantially as set forth.

72,534.—ICE CREEPER.—Wm. P. Patton (assignor to Wm. A. Middleton), Harrisburg, Pa.

I claim the peculiar combination of a pivoted or folding screw, a, with the disk, A, constructed and operating substantially as herein set forth and for the purpose described.

72,535.—CHURN.—Thomas Payne, Grand Rapids, Mich.

I claim the oblique beaters, H, attached to the rotating shaft, C, in the cream receptacle, substantially in the manner as and for the purpose herein set forth.

72,536.—GATE AND BARN DOOR FASTENING.—W. W. Peck, Cassapolis, Mich.

I claim, 1st, The removable extension handle, F, in combination with the spring latch, D, box, E, and catch, b, substantially as herein described, for the purpose specified.

2d, The box, E, when provided with a tongue, c, the spring, d, and the catch, D, the latter being provided with projections, f, and catch, b, in combination with each other, and with the lever, F, all made and operating substantially as herein shown and described.

72,537.—ROTARY STEAM ENGINE.—Rufus D. Pettit, Baldwinsville, N. Y.

I claim the combination of the cylinder, A, exhausts, K K k k, inductions, L L l l, abutments, E E, disk, B, and sliding pistons, F, with actuating steam chambers and conduits, G H h, valves, I, and packing rings, M M', all constructed, arranged, and operating substantially as and for the purpose specified.

72,538.—CARRIAGE WHEEL.—John Raddin, Lynn, Mass.

I claim, in the construction of carriage wheels, making the felly or rim thereof of wrought metal tube, the outer surface of which is flattened and surfaced by a tire, substantially as and for the purposes set forth.

Also, in combination with such tubular felly, the elastic cushions, arranged to operate substantially as described.

72,539.—CANE AND THERMOMETER COMBINED.—James L. Reber, Philadelphia, Pa.

I claim the combination of a thermometer, with a walking cane, substantially as described, for the purpose specified.

72,540.—HORSE HAY FORK.—Cullin W. Reed, Chagrin Falls, Ohio.

I claim the tines, B and C, bars, A, latch, D, and cords, E and F, when the same are combined and arranged substantially as described, and for the purpose set forth.

72,541.—ARTIFICIAL TEETH.—William Reynolds, Columbia, S. C.

I claim, 1st, The bar, a, formed of gold or other suitable metal, apapted for the prevention of fractures in the anterior and lateral portions of the plates, and as an attachment for the teeth, substantially as described.

2d, The thinned extension, b, of the backing, of form and mode of adaptation to the bar, as herein described and shown.

72,542.—LANTERN.—Joseph H. Richardson, Philadelphia, Pa.

I claim, 1st, The perforated cap, C, in combination with a lamp, F, fitted within or upon the base, A, of a lantern, substantially as and for the purpose specified.

2d, Also, The double walls, a a, when filled in with suitable material to form an air-tight joint, in combination with the globe or chimney, B, and ring, c, encircling the base of the same, substantially as herein shown and described.

3d, Also, the tube, G, and plate, e, in combination with globe, B, and an air-tight joint around the lamp, F, substantially as and for the purpose set forth.

72,543.—WEATHER STRIP.—Horace A. Robinson, Cleveland, Ohio.

I claim the combination of the strips, B and C, united by the rubber strip, c, running the entire length of the strips, B and C, the spring, f, and the rubber strip, g, all constructed in the manner as and for the purpose set forth.

72,544.—EARTH CONVEYER.—Niram Russell, Harrison, O.

I claim, 1st, The arrangement of the jointed frame, A A', B B', C C', endless carrier, I, and pivoted flap, I' as herein described, and for the purposes set forth.

2d, In combination with the above parts, the adjustable bar, H, and adjustable carrier, K, as and for the purpose set forth.

72,545.—GAS BURNER.—John Scholl, London, England.

I claim the application and use to and in gas burners, substantially as hereinbefore shown and described, of a narrow and thin strip of platinum, for the purpose set forth.

72,546.—PROCESS OF MANUFACTURING HATS.—Thomas Sealy, Newark, N. J.

I claim the process of manufacturing an inlaid hat by inserting the colored pattern yarn transversely through the hat body of a different color, previous to the completion of the felting, and then felting the said body, and finishing it without dyeing it, substantially as hereinbefore set forth.

72,547.—MACHINE FOR BENDING HOOKS.—R. B. Sears, Providence, R. I.

I claim, 1st, The arrangement of the crank shaft, I, arms, h, shaft, H, cranks, g, shaft, e, and gear wheels, I and j, all made and operating so as to impart a double oscillating motion to the cam, G, substantially as set forth.

2d, Making the die or inside former, D, of two parts, substantially as and for the purpose herein shown and described.

3d, In combination with the above, the die, D, made in two parts, and the follower, E, all constructed, arranged, and operating substantially as described and represented.

4th, Also, the combination of the cavity, f, die, D, pin, e, and follower, E, as and for the purpose described.

5th, Also, the combination of the follower, E, crank-shaft, F, and pin, e, substantially as described and represented.

72,548.—VALVE STOPPER FOR JARS, BOTTLES, ETC.—Samuel F. Shadbolt, Huntington, N. Y.

I claim a valve stopple for bottles, composed of rubber, or its equivalent, attached to a shaft, substantially as described, and for the purpose set forth.

72,549.—GATE.—John Shartle, Lima, Ind.

I claim the bar, or rail, F', pivoted at one end to a gate, and at the other hung to a gate post, A, in combination with the windlass drum, I, hung to the gate, and connected to said rail, F' by the cord, H, substantially as above set forth and described.

72,550.—MACHINE FOR MAKING HORSE SHOE NAILS.—Adrian Shaw, Westford, Mass.

I claim the side hammers, N, connecting rod, P, and slide bars, Q, in combination with each other, and with the cams, M, levers, R L, and springs, T, substantially as and for the purpose specified.

72,551.—SAWING MACHINE FOR BARREL HOOPS.—George H. Shearer, Bay City, Mich.

I claim the metallic frame, F, constructed as described, provided with the journal boxes, a b, one above the other, holding the arbor, G, above or below the board to be sawed, and also provided with the open bearings upon each side of the arbor, G, for the removable shafts, I K, all arranged as described for the purpose specified.

72,552.—POTATO-DIGGER.—Thomas W. Shepard, Hennepin, Ill.

I claim, 1st, The plow, E, when constructed with the horizontal sharp edge, the convex upper surface, the bars, e e e, and the supporting rods, F F, the main portion of the plow consisting of a steel plate of the crescent form shown and described, when all the parts of said plow are constructed, combined and arranged substantially as and for the purpose set forth.

2d, The device, consisting of the arms, N N, teeth, n n, cross bar, O, or its equivalent, and chain, P, for the purposes above set forth.

3d, The method of regulating and adjusting the plow, E, as above described, by combining the plow, the rear axle, the swinging reach, G, and the lever, substantially in the manner set forth.

72,553.—METHOD OF FORMING DESIGNS UPON METALS, IVORY, ETC.—Thomas Skinner, Pittsburg, Pa.

I claim the herein-described method of preparing the design upon the article to be operated on, preparatory to the etching process, by the means of transfers, substantially as set forth.

72,554.—STEAM SAFETY VALVE.—James Slater, Philadelphia, Pa.

I claim a valve or indicator, constructed and arranged in its parts, substantially as and for the purpose described.

72,555.—AXLE FOR WAGONS.—Alfred E. Smith, Bronxville, N. Y.

I claim the D-shaped washer, J, in combination with the screw cap, H, and diaphragm, F, made and operating substantially as hereinbefore set forth.

72,556.—SEED-PLANTER AND CULTIVATOR.—Milo R. Snodgrass, Jamestown, Ohio.

I claim, 1st, The grooves, c, in the upper surface of the slide, F, in combination with the holes, b, in said slide, and the holes, a, in the plate, E, all arranged substantially as and for the purpose set forth.

2d, The chambers, d, on the plates, to receive the cut-off brushes, e, in combination with the holes, b, in slide, F, and the holes, a, in plate, E, for the purpose specified.

3d, The valves, J, in the spouts I, when operated from the slide, F, substantially in the manner as and for the purpose set forth.

4th, The adjustable beams, M', arranged so as to be operated through the medium of the crank shaft, P, and lever, R, when said parts are used in connection with the upright, T, provided with catches or projections, k k, all arranged substantially as and for the purpose specified.

5th, The adjustable beams, M' M', applied to the frame, A, and operated through the medium of the treadle, U, and pendent rods, u u, all arranged substantially as and for the purpose specified.

6th, The adjustable axles, V V, of the wheels, B B, arranged substantially as and for the purpose specified.

72,557.—BUILDING BLOCK.—J. S. Stewart, Homer, N. Y.

I claim a building block constructed with corrugated side and vertical and horizontal openings, substantially as and for the purpose described.

72,558.—INSTRUMENT FOR DYEING THE HAIR.—Lucius S. Stimson (assignor to himself and Jerome B. Melvin), Lowell, Mass.

I claim coating or covering the teeth of a comb, or the bristles or the wires of a bristle or a wire brush, with coloring matter as described, that the hair may be dyed or permanently colored by using said prepared comb or brush, substantially as specified.

72,559.—GAS FIXTURE.—William Mont Storm, N. Y. city.

I claim the sliding "hood" and rod, e, in combination with the burner, and operating simultaneously with the cock, the whole acting substantially in the manner and for the purposes set forth.

72,560.—CULTIVATOR.—Charles E. Storrs, William E. Keyes, and David W. Jones, Grandville, Mich.

We claim, 1st, The scoop-shaped plows, D, for cultivators, substantially as and for the purpose shown and described.

2d, A scoop-shaped cultivator plow, D, secured to and forming part of a colter or cutting edge, C', substantially as and for the purpose shown and described.

3d, The plows, D, in combination with the V-shaped frame, substantially as and for the purposes shown and described.

72,561.—MACHINE FOR FOLDING TINNED PLATES.—O. W. Stow, Plantsville, Conn.

I claim, 1st, The slide, L, in combination with the folding bar, D, cams, E, bed, F, and adjustable bearings, C, operating as described, whereby the bar, in the progress of its revolution, may be raised or moved to form an open or close lock or fold, substantially as described, for the purpose specified.

2d, The cams, J E, pin, K, and folding bar, D, in combination with the arms I, slide, L, bed, F, and fixed bearing, H, all operating as described, whereby the metal plate, Gx, is held securely in position while being folded, substantially as described, for the purpose specified.

72,562.—FOLDING TABLE.—Joseph Sutter, New York city.

I claim a table in which the bottoms of the X-folding legs are sufficiently spread to support the table when folded, and the upper ends of said legs are connected to the bed of the table in the manner specified.

Also, a folding table with the marble top cemented into a recess in the wooden bed, as and for the purposes specified.

72,563.—MODE OF REMOVING BURRS FROM WOOL.—William Sykes, Newton Lower Falls, Mass.

I claim the immediate dyeing of the wool after the same is taken from the acidulous solution, and either previous to or after the drying of the wool, substantially as set forth.

72,564.—APPARATUS FOR CONTROLLING THE MOTION OF TRAVELING WEBS IN PAPER MACHINES, ETC.—F. Thiry, Huy, Belgium, assignor to Warner Miller, Herkimer, N. Y.

I claim the rule, D, provided with the plates, F F, and connected to the levers, E E', in connection with the screw, K, double toothed wheel, J, curved lever, I, lever, H, and crank, G, on one of the journals of the conducting roller, A, all arranged to operate in the manner substantially as and for the purpose herein set forth.

72,565.—HOSE COUPLING.—Nathan Thompson, Brooklyn, N. Y.

I claim the combination of a locking piece pivoted upon the member of a coupling, with a guard or protector attached to or making part of the other member thereof, the combination being substantially as described.

72,566.—PIPE COUPLING.—Nathan Thompson, Brooklyn, N. Y.

I claim in combination with two flanges making part of a coupling, ears, and a locking piece which can be disconnected from and connected to the said lugs or ears, the construction of the parts being substantially such as specified.

Also in combination with two flanges making part of a coupling, and a locking piece capable of removal and replacement, a socket attached to one of the flanges and substantially surrounding the other, as described, the combination being substantially such as hereinbefore set forth.

72,567.—HORSE HAY FORK.—L. N. Tinkham, Sylvania, Pa.

I claim the combination of the lever, G, or its substantial equivalent, with the slide, C, connecting bar, D, and tines, B, substantially as herein shown and described and for the purpose set forth.

72,568.—PLOW.—William Titus, Brooklyn, N. Y.

I claim, 1st, The malleable iron mold board, b, and share, S, in one piece.

2d, Also the grooves, 1, 2, 3, 4, in the adjustable colter, c, and the adjustable gage wheel, d, substantially as described and for the purpose set forth.

72,569.—COPY HOLDER.—H. A. Tremper, Hammonton, N. J.

I claim, 1st, The use of two rollers, A A, and the arrangement for securing the copy to them, consisting of the bars, B B, the ferrules, C C, and the movable ferrules, D D, all combined and arranged substantially as described and for the purposes set forth.

2d, The spring guide, G, with the slotted projections, H H, substantially as described and for the purposes set forth.

3d, Also the method of arresting the motion of the rollers by means of the movable end piece or roller support, J, and the screw and thumb nut, K, substantially as described and for the purpose set forth.

4th, Also providing the rod, L, with both a clamp arm or rod, O, and a stand, for the purpose of supporting the copy holder under different conditions, as set forth.

72,570.—REFLECTOR.—Wm. Ulrich (assignor to himself, C. M. Theberath, and J. H. Theberath), Newark, N. J.

I claim, 1st, The revolving and folding reflector made and operating substantially as herein shown and described.

2d, Hinging a reflector, A, to a bar, B, which carries a ring, sleeve, or clamp, by means of which it can be secured to a burner or lamp, substantially as set forth.

3d, Providing a revolving and folding reflector with a handle, d, substantially as set forth.

72,571.—COOKING STOVE.—Chas. Van de Mark, Phelps, N. Y.

I claim the partition plate, G, between the fire chamber, A, and heating chamber, B, provided, with one or more upper and one or more under valves h h and i i, substantially as and for the purpose herein specified.

Also the boiler-hole plate or plates, D, and inclosing side plate or plates, E, arranged in combination with partition valves, h i, so that the heat may be directed against the bottom part of a boiler or boilers, i, only, or both against the bottom and around the sides thereof, substantially as and for the purposes herein specified.

72,572.—BEEHIVE.—A. C. Varela, Washington, D. C.

I claim, 1st, The arrangement of the two similar cubic boxes, A and B, one inserted partly into the other in a direction parallel to the diagonals of a cube, and suspended in such manner that only one of their corners points upward, substantially in the manner shown and set forth.

2d, The arrangement of a weather-proof cap, d, of metal or any other suitable material, to cover the aperture, e, that admits the bees into the upper or honey box, as shown and described.

72,573.—MACHINE FOR MAKING PEAT FUEL.—Gustavus Wiesenborn, New York city.

I claim, 1st, The construction of the frames of the machine solid or in two parts, so as to join them at or about the center of the shaft, and cast or bolt the lower half, A2, to the bed plate, and to make the upper frames, A A, and lower frames, A2 A2, of wrought iron, or make the upper alone of wrought iron, substantially the same as described.

2d, Also the surrounding steam, hot air, or vacuum chambers, V V, of the pressing cylinder, A5, to use one as a hot air chamber, and the other as a vacuum chamber, or both as a vacuum or steam chamber for oily or water vapors, in combination or separately with the perforated pressing cylinders, substantially the same as herein set forth.

3d, Also the combination of one, two, or more receivers, A12, with the horizontal feeders, E3 E3, and vacuum and feeding chambers, A10 A19 and A9 A9, the same as herein described.

4th, Also the direct application of an eccentric, with or without a loose ring on its circumference, acting directly, or with an intermediate movable or stationary steel or composition plate upon the pressing plungers, C15 and C14, and cross head C4 C4, substantially the same as herein described.

5th, Also the application of the cross heads, C4 C4, to operate in opposite directions, connected by four braces, or moving independent of each other, substantially the same as herein set forth.

6th, Also the arrangement for giving an independent motion to the pressing plungers C14 and D6, by which to move either the hollow or solid plunger C14, or the pressing plunger with the cross head, once, twice, or more strokes while the main eccentric makes one revolution, for the purpose of feeding the pressing box with peat dust, substantially the same as described.

7th, Also the perforated or grooved pressing boxes, with tapered holes, gradually enlarged toward the outside, for the purpose as herein set forth.

8th, Also the construction of the pressing boxes, A3 A3, in such a manner that the same are bolted from the inside or outside to the side of the frames A and A2, or to the bed plate, substantially the same as described.

9th, Also the adjusting and regulating of the supply of peat dust by means of adjusting the blades, F4 F4, in combination with the spur wheels, F3 F3, and lever, F, substantially as described.

10th, Also dividing the motion of the main eccentric, with the pressing box or chamber for horizontal or upright action, so that a portion of the motion may be transferred through the medium of two eccentrics or cams on the main shaft, at the outside of the frames, for the purpose of saving power and receiving larger blocks, substantially the same as described.

11th, Also the combined upright or horizontal action of the eccentric, C1, without an intermediate connecting link or rod, operating the pressing plungers, substantially the same as herein set forth.

12th, Also the process of compressing dry pulverized peat under a full or partial vacuum, arranged in such a manner as herein set forth.

13th, Also the process of feeding wet pulverized peat, and drying it, while passing through the pressing cylinders of the press through its own pressure, in pressing and drawing the water from it through the medium of an air pump connected with the pipes, A8 A8, so that the blocks are perfectly dry when discharged from the press, substantially the same as described.

14th, Also connecting an oil vessel with the vacuum chamber of the press, substantially the same as herein described.

15th, Also, for an upright machine, in placing the main eccentric or eccentrics on the top or bottom, between two frames, with one, two, or more plungers, substantially the same as set forth.

72,574.—SEWING MACHINE.—Wm. Weitling, New York city.

I claim, 1st, The combination of a hook-pointed lever with the thread carrier, piercing needle, and shuttle of a sewing machine, and operating substantially as and for the purposes described.

2d, The application to sewing machines of a thread winding apparatus, constructed and operated as described.

3d, Giving motion to the thread leading lever of a winding apparatus attached to a sewing machine, by making the rim of the driving wheel cam shaped, to operate said lever, substantially in the manner and for the purposes set forth.

4th, In combination with the thread winding device herein described, the adjustable guide pulley, V, for adjusting the tension of the cord, r, by which the thread winding apparatus is operated, substantially in the manner herein described.

72,575.—CASTER.—Joseph White, Providence, R. I.

I claim as a new article of manufacture a furniture caster consisting of the grooved plates, B C, spindle, A, balls, a, arms, a', wheel, w, and nut, n, all constructed, arranged, and operating as and for the purpose described.

72,576.—CHURN.—Leman Wiard and Wm. H. Nelson, Spring Township, Pa.

We claim the two dashers, D C', constructed and operated as described, when the same are in the aforesaid combination, for the purposes set forth.

72,577.—JACK.—Thomas Wiles, Indianapolis, Ind.

I claim the combination of the box, A, with the lever, B, fulcrum, C, jack, D, and check, E, applied to a lever jack.

72,578.—MACHINE FOR MAKING PLUG TOBACCO.—J. E. Withers, Toronto, Canada West.

I claim, 1st, The flange rollers, E E E, revolving in the same direction, in combination with the rollers, G G G, in manner substantially as and for the purposes described.

2d, The inclined knife, K, removing the tobacco or other substance from, and in combination with the troughs, F, to the platform, H, or other place of deposit, substantially as described.

3d, The flange rollers, E E E, revolving in the same direction, in combination with the wheel, N, revolving in a transverse direction, substantially as and for the purposes described.

4th, The flange rollers, E E E, revolving in the same direction, in combination with the rollers, M M, revolving in a reverse direction, in manner and for the purposes substantially as herein shown and described.

72,579.—MANUFACTURE OF IRON AND STEEL.—Henry K. York, Cardiff, Great Britain.

I claim a new mode of decarbonizing cast iron, the making of cast steel by the mixing of particles of cast iron decarbonized with certain proportions of a compound consisting of iron, carbon, and manganese, such compound being found in white cast, iron, known by the name of "Spiegeleisen;" or by the mixing of particles of cast iron, decarbonized, as before described, with the same cast iron not decarbonized, or other cast iron containing carbon, in the manner hereinbefore set forth.

72,580.—COAL STOVE.—Federal C. Adams and Joseph Peckover, Cincinnati, Ohio.

We claim, 1st, The air heating chamber, G G, at the base of the stove surrounding the ash box, but not communicating therewith, with the openings, H, for admitting fresh air, as described.

2d, The pipe or chamber, A, admitting, air, through the fuel to the cap, C, in combination with a concentrating plate, D, at the top of the fire box, substantially as described.

3d, One or more flues, F F F, for conducting air from the base chamber to a point just below the plate, D, as shown and described.

4th, The adjustable concentrating plate, D D', with the sliding doors, E E', substantially as described

5th, The chamber formed by plates, I and L, and conical pots, K and M, and forming a descending flue for the purpose of conducting air downward to the top of the fire basket, substantially as described.

6th, The adjustable diaphragm, L, in combination with the bottom of the conical pot, K, substantially as described.

7th, The flue, Q, in combination with the plate or diaphragm, T, substantially as described.

8th, The feeding pipes, R R or S, in combination with flue, Q, substantially as described.

9th, The plate, V, with the openings at the front and back, substantially as and for the purpose described.

10th, The plate, V, with the opening in front only, in combination with square or circular coal stoves, substantially as described.

11th, The plate, V, in combination with the regulating dampers, Z1 Z2, substantially as and for the purposes described.

72,581.—BOX FOR GAGING SHINGLES.—John Wesley Alesworth, Santa Cruz, Cal.

I claim a gaging box for shingles, constructed with the sides, B, with their graduating steps, b b b' b', together with the movable box, D, and bar, F, substantially as and for the purpose described.

72,582.—HAND SAW.—John F. Allen, New York city.

I claim turning a portion of the blade of a band saw to form an angle with the other portion of the blade of said saw, in the manner and for the purpose substantially as described.

72,583.—DRYING APPARATUS.—R. N. Allen, Pittsford, Vt.

I claim, 1st, The cylinder, A, with an annular chamber revolving upon tubular journals so arranged that the said journals and annular chamber shall form an avenue for the passage of waste heat from the flue of the fireplace to the chimney, and at the same time utilize said heat in its transit, substantially as and for the purpose set forth.

2d, The revolving cylinder, A, having an interior chamber, H, and hollow journals, B B', in combination with the flue of the boiler and stack, arranged and operating for the purpose substantially as set forth.

3d, The apron, L, rollers, K, in combination with the cylinder, A, arranged to receive the waste heat through one journal and discharge the same through the other into the chimney or stack, substantially as and for the purpose set forth.

72,584.—CAR AXLE.—Joseph Anthony, Greenbush, N. Y.

I claim an axle with an enlarged boss and shoulder, substantially as and for the purpose set forth.

72,585.—APPARATUS FOR WASHING SHEEP SKINS.—E. H. Ashcroft, Lynn, Mass.

I claim an apparatus for washing sheep skins with the wool on, constructed and operated in the manner substantially as shown and described.

72,586.—FLASK FOR FORMING CORES.—Emmet R. Austin, Norwalk, Ct.

I claim the combination of the hinged flask, A and A, with the pipes, E E, and adjustable steady pins, D D, all constructed and arranged substantially as described.

72,587.—MILLSTONE.—Wm. Bahme, New Media, Pa.

I claim, 1st, The stone, H, adapted and employed to sink or grind out the central portion of millstones, substantially as and for the purposes set forth.

2d, The shaft, G g, and driving apparatus, D E F, in the described combination with the stone, H, for the purpose specified.

3d, The upright shaft, I, constructed as described, in combination with the spindle, C, and stone, H, substantially as and for the purpose specified.

72,588.—CHURN.—Henry B. Barber, Scott, N. Y.

I claim the arrangement of the dasher staffs, C C, and their arms, with the oscillating lever, F, arm, J, shaft, H, with its inclined wheel, I, and the bevel wheels, a and K, substantially as and for the purpose set forth.

72,589.—LANTERN.—Henry Beebe, Hudson, N. J.

I claim, 1st, The metallic top, E*, furnished with openings, b', and lined with reticulated material, c, in combination with the glass body, C, substantially as and for the purpose specified.

2d, The base, D, of the body, C, constructed with the annular shield, E, and openings, a', in combination with the reticulated top plate, b, and the openings, a, of the sides of the burner, substantially as and for the purpose specified.

3d, The combination of the metallic perforated top, E*, furnished with a reticulated lining, c, the glass body, C, and the base, D, formed with openings, a', and furnished with the annular shield, E, substantially as and for the purpose specified.

72,590.—MATERIALS FOR PUMP PISTONS, ENGINES, ETC.—Dana Bickford, Boston, Mass.

I claim manufacturing of these different articles in the various ways described and set forth, also the strengthening in the ways and for the different purposes described.

72,591.—BRACING THE SOUNDING BOARDS OF GUITARS.—Jos. E. Bini, Mount Vernon, N. Y., assignor to James E. Jouett and Charles H. Cushman.

I claim the braces of the sound board of a guitar, arranged, constructed and connected substantially as described and for the purpose specified.

72,592.—WASHING MACHINE.—W. E. Bird, West Bridgewater, Mass.

I claim, 1st, The combination of the clamps, B, the joint, D, and lever, H substantially as described, and for the purpose set forth.

2d, The adjustable shield, M, in combination with the handle, R, and lever H, substantially as described and for the purpose set forth.

72,593.—BALANCE.—Ira Bisbee, Richmond, Mo.

I claim, 1st, A scale consisting of the eccentric disk, C, having graduations on both sides, registering with each other, the equipoise, E, firmly secured thereto, and the suspended basins or plates, D, substantially as represented and described.

2d, The disk, C, having graduations on both sides, registering with each other, whereby they can be viewed simultaneously, as represented and described.

3d, A scale having the following characteristics, viz., graduations for troy, apothecaries', and avoirdupois weights, for letters and for American and foreign coins, substantially as represented and described.

72,594.—HORSESHOE.—Thomas B. Bishop, Baltimore, Md.

I claim the fastening of the leather, cut in suitable manner, C D, between the two shoes, A B, by means of rivets, and the fastening of the shoe thus made on to the horse's hoof by means of the straps, b b', and c c, substantially in the manner and for the purpose set forth.

72,595.—STEAM GAGE.—Morris Botticher, Newark, N. J.

I claim the arrangement of the adjustable screw, J, with cap, F, of the gage substantially as herein described.

72,596.—MANUFACTURE OF PLOW HANDLES.—T. E. C. Brinley, Louisville, Ky.

I claim the mode of manufacturing the handles of plows, of different lengths and irregular curvatures, by the use of the table, A, gage-block, C, and pins, D, so as to secure the proper alignment of the brace holes, substantially as set forth.

72,597.—ATTACHING DOORKNOBS TO SPINDLES.—Chas. B. Bristol, New Haven, Conn.

I claim the use of the inclined plane, c, when formed on the corner of the spindle, E, in combination with the binding screw, b, and the neck, C, of the knob, A, and the whole is constructed and made to secure the knob, A, in its desired position without making holes in or putting washers on the spindle substantially as herein described and set forth.

72,598.—CULTIVATOR.—J. E. Brooks, Gooding's Grove, Ill.

I claim, 1st, The arrangement of rods, U, with the frame of the machine and the plow beams, E E, substantially in the manner and for the purposes set forth.

2d, Also, the arrangement of the draft cord, b, sheaves, a a, and pivoted hangers, C C, so as to operate substantially as and for the purposes described.

3d, Also, the combination and arrangement of the plow beams, E, rods, d e, lever, L, cord, K, rod, J, and lever, I, substantially as and for the purposes specified.

4th, Also, the combination of the suspended plow beams, E, rods, U, and levers, W, arranged and operating as and for the purposes shown and set forth.

5th, Also, the peculiar arrangement of and mode of attaching the bow, V, to the rear part of the plow beams, herein shown and specified.

72,599.—HARVESTER RAKE.—Robert D. Brown, Covington, Ind.

I claim, 1st, The combination of the toggle-frame pulley and guide rod, upon the end of the main axle, for keeping the driving and reel pulleys in line, when the reel post is arranged upon the drag bar, and remote from and in a different plane from that of the axle, and thus preventing the belt from being thrown off, or from slipping or binding, whilst the platform and driving wheels accommodate themselves to the inequalities of the ground over which they are passing, as described.

2d, Also, in combination with a rake, moving on the rod, n, by the endless belt, z, the projection rearward of said rake, as shown at 7, and the slots, 4, 10, and shoulder, 13, for the purpose of guiding, holding, and turning the rake by the means of the ways herein described and represented.

3d, Also, in combination with the projection on the rake plate or hinge, and its shoulder, 13, the spring way or guide, 14, for holding up, guiding and controlling the rake just before its projection takes the straight groove or way, 15, and until the button on the belt moves around to cause it to return for the next gavel, substantially as described.

72,600.—BOLT FOR SHUTTER.—P. Burke, Philadelphia, Pa.

I claim a bolt, having its two separating parts, A A', provided with the slides, B B', and the sockets, C C', constructed and arranged to operate together substantially as set forth and described for the purpose specified.

72,601.—COATING AND METALLIZING FABRICS.—Rufina Noggerath, Paris, France.

I claim the new process, as described, of hardening, ornamenting, metallizing, or galvanizing fabrics, and other materials, so as to produce, by the various operations herein described, and especially claimed, articles having the appearance, or being really completely transformed into open-work metal.

The same articles, which may be only diversified in colors, and left unmetallized, as being especially applicable to various purposes, such as articles of dress, furniture, to hangings, tapestry, to artistic objects, etc.

Likewise, ornamenting, metallizing papers, plaster, and other articles, by the same processes as described.

72,602.—CARRIAGE SEAT.—Edwin Chamberlin, Lansingburg, N. Y.

I claim securing an extra bottom, C, with all the top irons attached thereto, to the seat bottom, B, by means of the double or single bars, c c', furnished with the keys, k k, or their equivalents, and operated either from the upper or lower side of the seat, and working into the hook catches, a a, or their equivalents, which hook catches are permanently attached to either the extra bottom, C, or the bottom, B, and the whole in combination, substantially as and for the purpose set forth and described.

72,603.—HINGE FOR WINDOW SHUTTERS.—Pascal P. Child, (assignor to S. B. Fox Manufacturing Co.,) St. Louis, Mo.

I claim the lip, A', upon the other half of the hinge, A B, projecting over or under the flange, b', as the case may be, in such manner as to come in contact with and act as a stop for the flange, b', when the blind is inadvertently raised, as shown and described.

72,604.—BREAST PUMP.—James Cole, Brooklyn, N. Y.

I claim a breast pump, constructed substantially as described.

72,605.—BED BOTTOM.—Homer Cook and Chas. E. Simmons, Waukegan, Ill.

We claim the combination of the short bars, C C C C, with the horizontal bar, D, for the purpose of equalizing the pressure upon the upper frame, so that all parts of it shall settle alike. Also, the application of two sets of these bars to the same end or side of the bed bottom, to stay the upper frame and prevent all swaying, all constructed, combined, and applied substantially as and for the purposes described.

72,606.—LABELLING BOTTLE CORKS.—Frederick W. Copcutt, New York city.

I claim the combination of the metallic label, c, with the holding clamp, B, bottle, A, and cork, C, substantially as and for the purpose specified.

72,607.—AUTOMATICALLY-OPERATED SEWING MACHINE.—Gustavus Cuppers, New York city.

I claim, 1st, The method, herein described, of operating sewing machines and other machinery, automatically, by means of a spring or springs composed of one or more bands of vulcanized rubber, combined with the driving shaft of the mechanism for operating said machinery, substantially in such manner that the contractile power of said rubber spring or springs, when stretched and wound upon the driving shaft, shall cause the rotation of said shaft, as and for the purposes set forth.

2d, The combination with the main or driving shaft, A, of the rubber spring band or belt and spirally grooved conical barrel, upon which said band is wound, substantially as and for the purposes set forth.

3d, The combination with the main shaft and the ratchet wheel, s', of the barrel, G', and pawl for engaging with said ratchet, under the arrangement and for operation as set forth.

4th, The combination of the lever, E, and the spring pawl which it carries, with the ratchet wheel, b, and stop or projections formed in rear of said wheel, substantially in the manner and for the purposes set forth.

5th, The combination of the driving shaft and its conical barrel with the lever, pawl, and ratchet wheel, and gearing for effecting the revolution of said shaft, under the arrangement and for operation as set forth.

6th, The combination of the rubber band, applied to its conical barrel as described, of the pulleys or wheels upon which said band is stretched, mounted on the frame of the machine, substantially as and for the purposes set forth.

7th, The combination with the driving shaft, revolved by means of a rubber spring band or belt, as described, of the shaft, F, and gearing, through the medium of which the said shaft is caused to rotate, arranged and operating as herein specified.

8th, The combination with the wheel for actuating the sewing or other machine, of the friction brake, constructed and applied to said wheel in the manner as set forth.

72,608.—MECHANICAL MOVEMENT.—Caleb M. Currey, Pontiac, Mich.

I claim the combination and arrangement of the crank shaft, B, lever, F, and connecting rod, G, with their described accessories, C D E, as and for the purposes set forth.

72,609.—BLIND CATCH.—Joseph Currier, Portland, Me.

I claim the combination of the lever, k, connected with the stud, 2, as described and employed, as and for the purposes set forth.

72,610.—COAL STOVE.—Alfred Dart, Carbondale, Pa.

I claim the central cone, I, when provided with the wings, i i, and attached to the grate, substantially as and for the purpose specified.

72,611.—BRIDGE GIRDER.—Joseph Davenport, Massillon, O.

I claim, 1st, The arch, composed of the string pieces, A and B, shoes, h h, tension bolts, a a, main braces, c c, and counter braces, d d, the several parts being arranged in the manner and for the purpose herein specified.

2d, The hollow cylindrical tubes for braces in the construction of a truss, when said braces are so arranged as to take only a compressive strain, and cannot be subjected to a tensile strain, substantially as herein shown.

3d, The peculiar arrangement and combination of the arch shoes, E, chord, C, lower string piece, B, angle iron, F, bolts, m and f, upper string piece, A, and bolts, e, the whole being arranged as shown, and for the purpose specified.

72,612.—PLANETARIUM.—John Davis, Allegheny city, Pa.

I claim, 1st, Representing the axial motion of the planets and the orbital motions of the satellites by imparting motion to gearing placed on the outer ends of arms radiating from a series of concentric shafts, said gearing consisting of wheels, 1 and 2, and a series of concentric disks, 1 2 3, and 4, rotated by a single pinion, 3, constructed and arranged substantially as described.

2d, Pivoting the earth, E, at one pole, so that by its own weight or gravity its axis will be constantly inclined at the desired angle to the plane of its orbit, substantially as herein described, and for the purpose set forth.

72,613.—PROCESS OF FUMIGATION FOR DESTROYING INSECTS ON ROSE VINES AND OTHER PLANTS.—John Deane, Conneaut, Ohio.

I claim the mode of destroying insects by fumigation with the smoke evolv

ed by burning a mixture compounded substantially as set forth, in proximity to hop or grape vines.

72,614.—PAINT.—William J. Dodge (assignor to himself, James L. Humphrey, and Daniel D. Smith), Syracuse, N. Y.

I claim the improved paint, prepared or compounded substantially as herein specified, and for the purpose set forth.

72,615.—WEIGHING SCALE.—Laben Eddy, Taunton, Mass.

I claim the combination as well as the arrangement of one or two weighted arms, F G, and a curved arch or limb, B, with the diametric lever, C, and the scale pan, E, or its equivalent, supported thereon, substantially as set forth, and this, whether the limb be affixed to the diametric lever, or to the stand thereof, as explained.

Also, the combination and arrangement of the twine-holder, L, with the stand or case, A, and the weighing mechanism thereof, as specified.

72,616.—LIGHTING AND EXTINGUISHING GAS.—Moses G. Farmer, Salem, Mass.

I claim the combination of a straight, electro-magnetic bar, with its pole situated between the poles of two bent or U-shaped permanent magnets, which permanent magnets may be either simple or compound.

Also, for use in combination with the gas burner of a street gas lamp, a box or gas chamber, containing an electric spark-generating mechanism, and mechanism as described, for opening with the current in one direction, and closing with the current in the opposite direction, a valve, said box containing gas, and being arranged to be located at or near to the burner, and in a circuit, substantially as set forth.

Also, giving motion to gas valves, or other mechanism, by means of the above-described combination of electro and permanent magnets, whether the arrangement be such that the permanent magnets, or the electro-magnetic bar be moved by the reversal of the current.

Also, the arrangement of the burner, the igniting points or wires, the gas valve, the primary and secondary coils, and the electro and permanent magnets, substantially as shown and described.

72,617.—VARNISH PAINT.—W. B. Finch (assignor to himself, Thomas S. Ferguson, and N. B. Boyden), Chicago, Ill.

I claim a paint, composed of indi:-rubber, linseed oil, rosin, gum shellac, and benzole.

72,618.—PLANING MACHINE.—Benaiah Fitts, Newark, N. J.

I claim the arms, s and i, when constructed to support the gear wheel, h, and arranged to operate with wheels, e and f, substantially in the manner and for the purposes described.

72,619.—PLANING MACHINE.—Benaiah Fitts, Newark, N. J.

I claim forming recesses, E E, in frame, a, and extending the line, h, far enough, and for the purpose of transferring the vertical cylinders, e and f, beyond lines drawn from the ends of the cylinder, c, perpendicular to its axis, substantially as shown and described.

72,620.—PUMP.—G. R. Forsyth, Pemberton, Ohio.

I claim the combination of the bellows with the pump, substantially as and for the purpose set forth.

72,621.—INK FOR PAPER RULING.—Lewis Francis, New York city, assignor to W. O. Hickok, Harrisburg, Pa.

I claim making machine ruling ink substantially as herein described.

72,622.—CULTIVATOR.—J. T. Frankeberger, Hensly, Ill.

I claim, 1st, The combination of the beams, G G, when hinged at their front ends to the bar, A, substantially in the manner set forth.

2d, The beams, F G, when combined with the standards, H, the handles, R, and bars, F and A, the whole constructed and operating substantially as herein described.

72,623.—HARROW.—J. T. Frankeberger, Hensly, Ill.

I claim the harrow, A, the supplemental harrow, D, and the handle, J, the whole combined and operating substantially as herein specified.

72,624.—HAY SPREADER.—C. R. Frink, Norwich, N. Y.

I claim, 1st, The driving wheel rim, A, the friction wheels, B B B, in connection with the spokes, C C C, when applied to and for the purpose described.

2d, The coiled fork tines, A, cross head, b, set screws, e e, in connection with rods, D D, substantially as and for the purposes set forth.

72,625.—PROCESS FOR MANUFACTURING ALBUMEN.—Jean Michel Fuchs, New York city.

I claim the process substantially as herein described of manufacturing or extracting albumen from blood

72,626.—AMALGAMATOR FOR ORES OF GOLD AND SILVER.—Willard M. Fuller, Chicago, Ill.

I claim, 1st, The application of a siphon to an amalgamator for producing a continuous current through the mercury, substantially as specified.

2d, The siphon or pipe, D, in combination with the cylinder, A, substantially as and for the purposes specified.

3d, The shaft, E, in combination with two or more plates, F and G, substantially as specified.

4th, The combination and arrangement of the shaft, E, collar, H, cone, G', and mouth, O, or end of pipe, C, substantially as described.

5th, The pipe, L, when attached to the pipe, D, substantially as and for the purposes described.

6th, The tub, B, pipe, C, and cylinder, A, in combination with the pipe, D, substantially as specified.

72,627.—PHOTOGRAPHIC CAMERA.—Franklin B. Gage, St. Johnsbury, Vt.

I claim in combination with a camera, either one or two shutters or cut-offs, made movable or adjustable up and down therein, substantially as and for the purpose or purposes as specified.

Also the construction of each of the cut-offs, viz., so as to be capable of being either contracted or expanded in length, substantially as specified.

Also the combination and arrangement of the indicator and divided limb, or the equivalents thereof, with the camera and each of the cut-offs, as set forth.

Also the combination of the friction apparatus, or its equivalent, with the camera and each cut-off, or with the same and the indicator and its limb, or their equivalents.

72,628.—VOLTAIC PILE.—Alfred C. Garratt, Boston, Mass.

I claim as my invention the improved voltaic pile or battery composed of the two different metals, in the form of bars, arranged with a strip of cloth between each two pairs of them, and with a space between the bars of each pair, such bars being connected at their ends as set forth, the whole being held in place by a frame, substantially as described.

Also in a battery of such kind, the arrangement and combination of metallic pins or tacks, n, and solder, e, with the two zinc and brass or copper bars, b z, the whole being as specified.

72,629.—BOOK FOR BOOKKEEPING.—J. H. Gleim, St. Louis, Mo.

I claim, 1st, The combination of the alternate cash journals, 1 and 2, paged respectively with odd and even numbers, substantially as and for the purposes set forth.

2d, The combination of the balance column, 6, with columns, 1, 2, 3, substantially as and for the purposes set forth.

3d, The combination and arrangement of columns, 7 and 8, with columns, 1 and 6, substantially as and for the purpose set forth.

4th, The combination and arrangement of the ledger column, 9, with columns, 1 and 3, substantially as and for the purposes set forth.

72,630.—TASSEL CLAMP FOR WINDOW CURTAINS.—Joseph Gottlieb, Boston, Mass.

I claim the clasp made as described, viz., with the clamp wire bent and arranged and combined with the two jaws in manner as explained.

72,631.—MEDICAL VACUUM APPARATUS.—John G. Hadfield, Cincinnati, Ohio.

I claim, 1st, A medical vacuum chamber, A, having the elevated neck, I, with face opening, i, and an open rear, closed by a door, C, and fastening devices, substantially as set forth.

2d, The chair, L, capable of being swung out or into the case, in the manner and for the purpose set forth.

3d, Such a chair, when adjustable in hight upon its axis, substantially as set forth.

4th, In combination with the element of claim first, the parts, D E F F' G G' H H', or their equivalents, by which the door is made to bear with an equal and air tight pressure at every part.

5th, In the described combination, the adjustable foot rest, N, and notched post, P, as set forth.

6th, In this connection, the arrangement of the manifold, S, two or more faucets, T T', and coupling neck, S', provided with an outwardly opening valve, s, as and for the purpose set forth.

7th, The limb receptacles, U u, when combined with the adjustable hand rest X X' x Y.

72,632.—STRINGING BOW DRILL STOCK.—D. Frank Hartford, Boston, Mass.

I claim combining and arranging the four strings, H H' H'' H''', with the pulleys, A B, when said pulleys work substantially as described, and for the purpose set forth.

72,633.—WOOD SCREW.—Hayward A. Harvey, Orange, N. J.

I claim a screw, constructed in the ordinary manner, with the exception that the thread is cut deeper on the under side than on the upper, substantially as and for the purpose set forth.

72,634.—WOODEN CHAIR-SEAT.—Levi Heywood (assignor to Heywood Brothers and Company), Gardner, Mass.

I claim a wooden chair seat, provided with a strip, a, whose grain crosses that of the seat itself, substantially as and for the purpose set forth.

72,635.—SOCKET FOR REVOLVING CHAIR.—Levi Heywood (assignor to Heywood Brothers and Company), Gardner, Mass.

I claim the within described socket, B, for receiving the upper ends of the legs of chairs, substantially as set forth.

72,636.—APPARATUS FOR GRINDING AND POLISHING CYLINDRICAL CONCAVE SURFACES.—Wm. C. Hicks, New York city.

I claim the method of finishing up concave surfaces, substantially as hereinbefore escribed, that is to say, by means of rotary tools running in contact with the surface being operated upon, while the said tools and surface are moved (by any suitable mechanism) relatively to each other, in the manner set forth.

72,637.—MANUFACTURE OF MATCHES.—Edward J. Hill, Milwaukee, Wis.

I claim, 1st, The discovery of the quality or property of the mass or paste usually employed to produce ignition in matches, tapers, lamp, cigar, or gas lighters, which permits the same to be cut without friction or percussion, especially when spread in thin sheets of suitable material, after the same has become dry.

2d, The use of twine, or yarn, or thread, or equivalents, in the manufacture of friction or percussion matches.

3d, The peculiar manner of placing the twine, yarn, or thread for dipping, as herein described.

4th, The particular combinations to produce the results respectively herein described, or in any other substantially the same, as shown by each of the specimens accompanying this specification.

5th, The putting up and packing matches, tapers and lighters, in friction wrappers, cases, or holders, or otherwise, so as to unite the match, taper, or lighter with the case or wrapper, making the same go hand in hand with each other in the various combinations herewith presented, and all permutations thereof.

6th, The application of varnish after dipping, as herein described, or otherwise.

7th, Also, paper for matches, as herein specified, in the combinations set forth.

8th, The protection of the pasted ends of the matches, tapers or lighters, in manner and form, by folded paper or other suitable material, as in this application described.

72,638.—SCYTHE.—Charles M. Hodges, Mansfield, Mass., assignor to himself, Wm. O. Capron and Nathaniel Whitmore.

I claim the combination as well as the arrangement of the back piece, C, with the blade, A, and the cap piece, B, arranged and applied with respect to each other as set forth.

72,639.—MACHINE FOR SAWING BARREL HEADING.—Calvin J. Holman, Chicago, Ill.

Ilclaim, 1st, The combination of the adjustable bed, F, planing cylinder, G, and saw, S, constructed and arranged to operate substantially as and for the purposes specified.

2d, The combination of the bed, F, planing cylinder, G, carriage, C, and saw, S, constructed and arranged to operate in the manner and for the purposes set forth.

72,640.—STAVE MACHINE.—Wm. E. Hopkins, Parkman, O.

I claim the adjustable feed or saw table, for regulating the degree of curvature of the staves to conform to the diameter of the cask or vessel for which they are to be used, in combination with the narrow endless belt saw, arranged and operating as described.

72,641.—STEM WINDING WATCHES.—Edwin B. Horn, Boston, Mass.

I claim, 1st, Attaching to and placing within the ring-gear, B, the main spring of a watch, said ring-gear being recessed into the face-plate, and being made to wind up the main spring by means of a small pinion attached to a winding stem.

2d, The ratchet wheel, E, and pawl, F, in combination with the ring-gear, B, when the said ring-gear is used for winding up the main-spring, the whole being made substantially as described, and for the purpose set forth.

3d, The combination and arrangement of the levers, L L' L'', the pinions, P' P'', and the ring-gear, B, substantially as described, and for the purpose set forth.

72,642.—LAP-SEAM GUIDE FOR SEWING MACHINES.—Otis W. Horr, Chicopee, Mass.

I claim a lap seam guide for sewing machines composed of two pairs of guiding plates said plates being arranged with reference to each other and also ridged, grooved and provided with stops, t and o, and the ear piece, v, all constructed and operating substantially as and in the manner herein set forth.

72,643.—GAS REGULATOR.—H. G. Hubert, New York city.

I claim, 1st, The use of a metallic diaphragm.

2d, The combination of the diaphragm, G, link, F, lever, L, and valve, V, arranged substantially in the manner set forth.

3d, Making the fulcrum of the lever, L, adjustable from outside the instrument by means of a screw, D, arranged as described, or any mode substantially the same.

4th, The use of a lever for multiplying the sensitiveness of a gas regulator by increasing the throw of the valve thereof.

72,644.—HARVESTER RAKE.—W. B. Johns, Cumberland, Md.

I claim, 1st, The bevel gear, E, centrally placed on the main axle and when used directly for driving the cutters and the rake both, substantially as described.

2d, Also in combination with the cutters and reel for laying the grain upon the platform or grain table a rake revolving at right angles to the forward movement of the machine for raking off and delivering the grain in gavels at the side of the machine, as set forth and described.

72,645.—REVOLVING OVEN.—John A. Kinkele, Sacramento City, Cal.

I claim, 1st, The oven constructed as described consisting of the inner wall, B, placed between the outer case, A', having cold-air openings, a, and the oven, C, all supported by an annular plate upon the foundation, A, the hot and cold annular air chambers, H H', communicating with the common flue, J', the revolving hearth, E, of the oven supported upon the plate, E', by a pivot and operated by means of the gear wheel, L, as herein described for the purpose specified.

2d, The rotary hearth, E, when constructed of tile or fire brick, in combination with the oven, C, concentric wall, B, and casing, A', as herein described for the purpose specified.

72,646.—TABLE.—George Kuhlman, New York city.

I claim the application to tables of the arrangement of the cords, g g, etc., pulleys, h h, etc., and spring catches, shown by Fig. 4, all used for extending vertically and supporting when extended the leaves, i and k, as hereinbefore described.

72,647.—CLOTH WASHING, RINSING AND SQUEEZING MACHINE.—James Lee, Jr., Charlestown, Mass.

I claim, 1st, The combination of the rollers, E and B, the rack, D, rollers, F F, the tub or tank, A, with the heavy roller, G, all arranged and operating as and for the purpose specified.

2d, The combination of the rollers, E and F, with the heavy roller, G, all arranged and operating substantially as described.

72,648.—STAVE MACHINE.—Dixon Lewers (assignors to Ferguson & Lewers), Louisville, Ky.

I claim the stave pusher or driver, B, when operated by the wheel, D, head, E, revolving slotted arm, F, shaft, I', arm, G, and pitman, I, or their equivalents, substantially as and for the purpose set forth.

72,649.—MACHINE FOR CHANNELING ROCKS, ETC.—R. W. Love and Albert Ball, Windsor, Vt.

We claim, 1st, In a rock-channeling machine constructed substantially as described the wheels, O and N, on the shaft, S, operating in connection with the wheels or gears which rotate or revolve the drills or cutters, substantially as shown and set forth.

2d, In a rock-channeling machine having rotating cutters the devices for stopping and also for reversing the feed apparatus either automatically or by hand, substantially as described and for the purpose set forth.

3d, In combination with the yoke and drills the anti-friction rollers, constructed and applied as set forth.

4th, Also the devices for moving and fixing the carriage or machine when constructed with stops for giving limited and regulated motion to the carriage, substantially as set forth.

72,650.—STEAM ENGINE GLOBE VALVE.—J. B. Lowell, Baltimore, Md.

I claim the combination of the hand wheel constructed with the clutch, v, and the square opening as described with the sleeve, e, and valve stem, C, the latter being constructed as set forth and all the parts operating together substantially in the manner and for the purpose specified.

72,651.—BEEHIVE.—J. J. Lower, Tennessee, Ill.

I claim, 1st, The moth chamber, A, with its entrances, a, breeding spiles, a', door, a'', and perforated plate, a''', substantially as described.

2d, The movable sashes, b'', with projections, b''', and pins, b'''', when combined with rods, b', sockets, y, and holes x, substantially as described.

72,652.—GUARD FOR CIRCULAR SAWS.—John Madden, Cleveland, Ohio.

I claim the herein-described adjustable circular guard, F, so arranged in relation to the saw, B, that the said guard and saw shall turn on one common center and in the same plane so that the said guard will cover or expose more or less of the saw teeth upon one side only of the saw, substantially as and for the purpose specified.

72,653.—LAND ROLLER.—S. B. Mann, Indianapolis, Ind.

I claim the combination and arrangement of the hollow cylindrical rollers, G G', with the metallic balls, H H H, as and for the purpose specified.

72,654.—TOOL HOLDER.—J. P. Manton, Providence, R. I.

I claim the combination in a tool holder of the wedge clamp, D, with the flexible jaws, b b', arranged to co-operate in gripping an independent cutting tool, C, substantially as herein described.

72,655.—NAIL DRAWER.—Samuel Marden, Newton, Mass.

I claim a cam, c, acting as a fulcrum to a lever, d, and as a lever to a jaw, b, substantially as described.

72,656.—STAMP WETTING AND PEN CLEANING INSTRUMENT.—Thomas P. Marshall, Trenton, N. J.

I claim, 1st, The two rollers, h and h', combined with a trough, D, substantantially as described.

2d, The rollers, h and h', on spindles caused to turn in a frame having an opening, x, through which an envelope or other article can be introduced to the said rollers, as set forth.

3d, The said spindles, d and d', each having a cylinder made of sponge, cloth or other absorbent material the cylinders being free from contact with each other and the lower cylinder being arranged to revolve in a trough containing water, all substantially as set forth.

72,657.—GATE.—C. F. Mawley, Woodbridge, N. J.

I claim, 1st, The combination of the gates, G, arms, c, pivoted rods, D, when constructed as shown and arranged so as to operate by the platforms, A A', substantially in the manner and for the purpose set forth.

2d, The platforms, A A', when pivoted at their inner edges under the gates, G G, and operating the gates, substantially in the manner and for the purposes specified.

3d, The hinged plank, F, when attached to the outer edge of the platforms and operating substantially in the manner and for the purposes specified.

4th, The combination of the latch, I, springs, i i', platforms, A A', and gates, G G, substantially as and for the purpose set forth.

5th, The movable prop, M, or its equivalent, in combination with the platform, A A, when so constructed and arranged that when thrown out of position it will allow the platform, A A, to descend.

6th, The combination of the lever, L, prop, M, rod, O, and bar, D, operating in the manner and for the purposes specified.

72,658.—COMPOSITION FOR OILING WOOL.—James McCabe, Lewiston, Me.

I claim, as a substitute for oil in preparing wool for carding and spinning, a composition made up of the ingredients, substantially as described.

72,659.—LAMP BURNER.—William McCaine (assignor to himself, David McCaine and Daniel McCaine), Groton, Mass.

I claim my improved air deflector as made with its parts, b b, arranged above the rest of the ring and with respect to the tube, a, so as when in use to contract the flame widthwise at its base, as set forth.

72,660.—PRINTING PRESS.—J. W. McDonald, Osgood, Ind.

I claim the slides, L L, the sleeve, N N', and strips, l l, with the inking roller, O, combined and operating substantially as set forth with the platen, F.

72,661.—MILL SPINDLE.—J. H. McMinn, Logansport, Ind. (Theodore J. McMinn, administrator.)

I claim the mode of gradually starting or stopping millstones, substantially as set forth, by means of the following combination of parts, viz.: the spindle, a, cone, F, pinion, e, ring, g, tempering lever, h, clutch, c, and lever, d.

72,662.—SCHOOL DESK.—H. S. McRae, Muncie, Ind.

I claim the book holder located in the back part of the lid of the desk, constructed, arranged and operated as herein recited.

72,663.—MODE OF SECURING FELLEYS.—M. J. Mellyn, Roxbury, Mass.

I claim the metallic plate, B, having a bolt, C, and ribs, a a, when constructed and used in the manner and for the purposes set forth.

72,664.—CAR COUPLING.—W. J. Millar, McKeesport, Pa.

I claim two coupling bars attached by bolts one to each of two opposite draw heads, each coupling bar having an arrow-shaped head and hook in combination with the hopper-shaped or conical bull nose, b, and pins or bolts over which the hooks slide and couple, for the purpose of forming a self-connecting and disconnecting car coupling, substantially in the manner hereinbefore set forth.

72,665.—CAR COUPLING.—Simeon Mills, Madison, Wis.

I claim the bar, I, jointed at x, so that it can be turned down and out of the way of door, L, and provided with a notch and an eye or hook when used in combination with an open-spring catch, J, and the hooked and pivoted coupling, C, as and for the purposes set forth.

72,666.—FASTENING FOR CARRIAGE CURTAINS.—Thomas A. Mitchell, Washington, D. C.

I claim the elastic strap, A, in combination with the metal tip, B, when the latter is provided with a buttonhole, substantially as described.

72,667.—HINGED FISHING ROD.—J. H. Montrose, N. Y. city.

I claim a sectional fishing pole having the several sections, A B C, etc., permanently connected by hinged joints, constructed and arranged relatively to the sections and to each other, substantially as and so as to fold in the manner herein described.

72,668.—ROCKING CHAIR.—C. J. Nelson, Rockford, Ill.

I claim the spring shoes, a a, in combination with the chair, A, substantially as described.

72,669.—MACHINE FOR BENDING METALS.—John Noland, Philadelphia, Pa.

I claim the former, A, on the edge of which are two curves, the reverse of but meeting each other, in combination with the levers, C and F, carrying rollers, or their equivalents, and so hung that the said rollers can be moved that of one lever in the arc of a circle concentric with that of one curve and the other in the arc of a circle concentric with that of the other curve on the edge of the frame, all as set forth for the purpose specified.

72,670.—CONSTRUCTION OF CHECKERS.—Henry Nott, New York city.

I claim, 1st, The flange or rim, B, around the upper edge of the checker, as and for the purpose set forth.

2d, The checker made in the form of an inverted truncated cone, substantially as and for the purpose set forth.

72,671.—DRAG HOOK.—James Parish (assignor to himself and Joseph Creote), Chicago, Ill.

I claim, 1st, The rollers, D D, in combination with the stock, A, constructed substantially as and for the purposes specified.

2d, The combination of the guards or floats, C C, with the flukes, B B, constructed substantially as and for the purposes set forth.

3d, The combination and arrangement of the stock, A, flattened flukes, B, and buoy line shackle, e, with the floats, C C, substantially as and for the purposes specified.

4th, A grapnel or drag hook, constructed substantially as and for the purposes specified.

72,672.—FIRE ALARM.—I. T. Pease, Thompsonville, Conn.

I claim, 1st, The curved expansion bar, B, composed of two metals of different rates of expansion by heat and the adjustable screw, S, when constructed and arranged substantially as herein described for the purpose of a fire alarm.

2d, The combination of the bar, B, the screw, S, the alarm movement, G, the lever, J, the levers, K and I, or their equivalents, substantially as herein described.

72,673.—CHURN.—John Pelsor, Brooklyn, Ill.

I claim, 1st, The staffs, E E, furnished with dasher boards, g, so constructed that the lower half of the boards on one staff will pass the upper half of the board, g, on the other without impinging.

2d, The box, A, the top, B, the staffs, E E, the arms, C, and pulleys, m and n, the whole combined, constructed and operating substantially as described.

72,674.—SHEEP SHEARING TABLE.—Oliver Perry and Clark Perry, Ortonville, Mich.

We claim the sill or bar, G, and strap, H, used upon the table, B', substantially as and for the purpose set forth.

72,675.—THRASHING MACHINE.—M. E. Phillips, Lena, Ill., assignor to himself and George Wetzel.

I claim, 1st, The combination as described with the thrashing cylinder, D, and stationary slats, e, of the rotating rakes, E, having their shafts connected at each end with the same gear wheels which drive the thrashing cylinder.

2d, The combination substantially in the manner described of the thrashing cylinder, D, the parallel slats, e, the rotating rakes, E, the longitudinally-vibrating screen, F, and the shaking shoe, H, with the fan, K, for the purpose set forth.

3d, The combination as described of the thrashing cylinder, D, with the hulling cylinder, M, whereby both are driven at each end from the same gear wheels.

4th, The combination as described of the spiral rasped surface beaters of the hulling cylinder, M, with the yielding concave, m.

5th, The combination of the closed fan case, k, with the adjustable regulating valve, s, controlled by the spring detent, s2, as set forth.

6th, The combination substantially as described of the thrashing cylinder, D, the rotating rakes, E, the vibrating screen, F, the shaking shoe, H, and the hulling cylinder, M, whereby they are all driven by the same counter shaft.

7th, The combination with the hulling cylinder, M, of the vibrating screen, F, and elevator, I, all arranged and operating as described.

8th, The combination with the hulling cylinder, M, of the elevator, O, the shaking shoe, H, the fan, K, and the revolving screen, J, all arranged and operating as described.

72,676.—OPERATING FEED WHEELS IN SEWING MACHINES.—G. W. Powers, Boston, Mass.

I claim the combination of the lever, friction pawl, and entering wedge or pin together and with the feed wheel and rocker plate, when the whole are constructed and arranged to operate substantially as set forth.

72,677.—BRUSH AND MOP HEAD.—T. T. Prosser, Chicago, Ill.

I claim, 1st, The combination of the movable ferrule with the pins in the handle of the mop, all as for the purposes set forth.

2d, The combination with the handle of a brush and mop holder of a ferrule provided with screw threads upon its interior surface and with lugs on the outside, all as for the purposes set forth.

3d, The combination of the ferrule, b b, provided with lugs, c c, and the lever, d d, all as for the purposes set forth.

4th, The lever beam, d d, with movable fulcrum serving to hold the brush at one end and also to operate the wire that holds the mop, all as for the purposes set forth.

72,678.—HARVESTER.—Abraham Quick, W. S. Opie and A. J. Farrand, Raritan, N. J.

We claim, 1st, The combination substantially in the manner described of a finger beam with the main frame of a harvester by means of three joints, h h', and i, arranged in the same vertical plane, or nearly so, when two of said joints have a vertical and the third an axial movement on their pivots for the purpose of allowing the cutting apparatus both a vertical and an axial movement.

2d, The combination with a harvester of an odometer, arranged and operating substantially as and for the purpose described.

3d, The chain carrier arranged on the drag bar, as described.

72,679.—RAILWAY CARRIAGE.—B. L. Randall, Roxbury, Mass.

I claim, 1st, The combination as well as the arrangement of the levers, E E, and the springs, I, with the platform and truck frame.

2d, Also the combination as well as the arrangement of the levers, E F, the springs, I, and the springs, G, with the platform and truck frame.

3d, Also the combination as well as the arrangement of the levers, E F the springs, I, and the springs, H, with the platform and truck frame.

4th, Also the combination as well as the arrangement of the levers, E F and the springs, I G H, with the platform and the truck frame.

72,680.—WATER WHEEL.—James Raney, New Castle, Pa.

I claim the buckets, B B, slightly curved and having bottoms which taper in width and thickness as shown and described when connected between the plate and circular metallic rim, E, all constructed and used as and for the purposes specified.

72,681.—HAY PRESS.—A. C. Richard, Point Lookout, Tenn.

I claim the combination of the platen, e, the bars, g1 and g2, the links, h and k, or their equivalents, the toothed rack, j, and levers, m, all arranged and operating substantially as set forth.

72,682.—CHURN.—John Risher, Delaware, Ohio.

I claim the dasher, B, with its arms, C C C, constructed as herein described and used in the box, A, in the manner and for the purposes described.

72,683.—LAMP.—C. W. Russell and Neil Clifford, N. Y. city.

I claim the deflector, B, when its cap, a, supported upon metal strip, b, is surrounded by the supplemental glass cylinder, c, having a contracted top and resting upon the burner, A, between the rows of perforations, d h, said cylinder being also surrounded by the base, e, of the chimney, C, as herein described for the purpose specified.

72,684.—PEN AND PENCIL CASE.—R. H. Ryne (assignor to W. S. Hicks), New York city.

I claim a combined pen and pencil case consisting of the case, A' and the reversible pen holder, C, having a screw pencil point, a, arranged therein substantially as shown and described.

72,685.—CLOTH PLAITING MACHINE.—J. F. Sachse, Philadelphia, Pa.

I claim an adjustable blade, C, arranged to operate in combination with an adjustable bar, b, substantially as and for the purpose described.

72,686.—BELT SHIPPER FOR MULES.—W. H. Saltmarsh, Waltham, Mass.

I claim the combination and arrangement of the swinging bar, M, with the link, N, the rod, D E', and the shipper, E F, substantially as described and for the purpose set forth.

72,687.—SOLAR AND TRANSIT INSTRUMENT.—Wm. Schmolz, San Francisco, Cal.

I claim the hour-circle, N, fastened upon the base, P' A', with a solar apparatus attached upon the axis, P, in combination with a surveyor's transit, substantially as described and for the purposes set forth.

72,688.—MACHINE FOR MAKING RINGS.—William Serviss, Sidney, Ohio.

I claim, 1st, The interchangeable mandrels formed with a hole near one end, in combination with the shaft furnished with a crank, substantially as and for the purpose specified.

2d, The arrangement of the mandrel upon the shaft, C, with reference to the anvil, B, furnished with grooves, a, in its upper surface, substantially as and for the purpose specified.

3d, The supplemental flat-faced anvils, A* B* C*, arranged in relation with the main anvil, B, and the mandrel on the shaft, C, substantially as and for the purpose specified.

72,689.—STEAM GENERATOR.—Geo. V. Sheffield, Worcester, Mass.

I claim, 1st, The combination, with the boiler or steam generator and fire-chamber, of a fire-injector and steam superheater, under the arrangement described, whereby the flame and heated gases shall be taken from the fire-chamber, and forced or driven, under pressure, into the boiler or steam generator, substantially as herein shown and set forth.

2d, The combination, with the cylinder, F, and fire-chamber G, of the

hamber, c, piston, H, fire-pipes, I and f, substantially as and for the purposes set forth.

72,690.—BELT-FASTENING.—George V. Sheffield and Byron Whitcomb, Worcester, Mass.

I claim, 1st, A belt-fastening, constructed substantially as shown and described.

2d, Making one half or a part of the shanks of the hooks, a, longer than the others, for the purposes stated.

72,691.—CLEANING COTTON.—Thomas Shapard, Haywood county, Tenn.

I claim the lint-room, as above described, made of slats, allowing the dust and dirt to escape, in lieu of the ordinary close lint-room, which does not allow the dust and dirt to escape.

72,692.—SASH LOCK.—Amos M. Smith, Chicago, Ill.

I claim, 1st, The combination of the lifter, L, jaws, D, and levers, E, arranged and operating substantially as and for the purposes specified.

2d, In combination with the above, the arrangement of the bolt, H, operating as shown and described.

3d, The arrangement of the springs, h h in combination with said levers, E, and bolt, H, substantially as and operating as set forth.

72,693.—FENCE.—D. N. Smith, Salem, and E. F. Olds, Lyon, Mich.

We claim the continuous rider, G, as arranged, in combination with the braces, E, stakes, C, and rails, B, in the manner as and for the purpose set forth.

72,694.—HEATING POTTERY OVENS AND OTHER LIKE FURNACES.—Henry Speeler, Trenton, N. J.

I claim a steam-pipe, in combination with a "fire-mouth," for heating pottery ovens, kilns, and for other like ovens, substantially as described.

72,695.—PARASOL.—Cornelius St. John, Charlestown, Mass.

I claim, as a new or improved article of manufacture, and as my invention, the sun-shade, as composed of the stick, A, the corrugated paper body, B, and the metallic expander, C, made and arranged substantially in manner and so as to operate as described.

Also, the expander, C, made as explained, that is, of a single piece of wire, first bent in a circle, and next downward from the circle, at an acute angle to its plane, and afterwards in a helix, the whole being as shown in the drawings.

72,696.—GRAIN-SEPARATOR.—F. Swift, Hudson, Mich., assignor to himself and Horace Wilson.

I claim, 1st, The fan-shaft, C, provided with two sets of wings, secured on in different positions, and with a pulley between them, as and for the purpose set forth.

2d, In combination with the fan, as herein constructed, the shaft, J, band, H, pulleys, D K, screens, G I, with springs, L L, and bar, N, all constructed, arranged and operating substantially as specified.

72,697.—GASOLINE LOCOMOTIVE HEAD-LIGHT.—J. B. Terry, Hartford, Conn.

I claim, 1st, A locomotive head-light or lantern, consisting of the combination of a vessel to hold the gasoline or other similar hydrocarbon liquid with an internal or external heater to vaporize such liquid for the direct production therefrom of illuminating gas, as set forth.

2d, The combination, with a hydrocarbon liquid-holding vessel, provided with one or more burners, of an internal coil or surrounding jacket, admitting steam from the locomotive boiler to heat the liquid within the vessel, as shown and described.

3d, The combination, with the hydrocarbon vessel, of an elastic diaphragm and stopper or valve, operating in connection with the steam-admission pipe, substantially as described, so as to regulate the flow of steam and pressure in the vessel, as set forth.

4th, In an apparatus, substantially as described, the combination, with the hydrocarbon vessel, of wood shavings, or their equivalent, to prevent the swash or agitation of the liquid within the vessel, substantially as and for the purposes set forth.

72,698.—SPIRIT METER.—Isaac P. Tice, New York city.

I claim, 1st, A measuring-can, so constructed and operating as that, after the measuring-chamber has been filled with fluid, a surplus will so load the can as to cause it to tilt, and empty its contents, in such a manner as that the measured quantity or volume, and the surplus or unmeasured quantity, will be discharged into different receivers, substantially as specified.

2d, The combination of a measuring-can and weighing-can or cans, separate and distinct from each other, so that the several operations of these devices will give the specific gravity of the fluid by weight and measure.

3d, In a spirit-meter, the use of a plurality of weighing and measuring-cans, arranged and operating in such manner as that a fixed quantity of spirit, apart from the aggregate passing through the meter, is measured and weighed for determining the proof, essentially as herein set forth.

4th, In combination with a measuring-can, an extra or separate weighing-can, for weighing the surplus or overflow not passed through the measuring-can, substantially as specified.

5th, The combination, with a primary receiver, A, of an overflow-pipe, or its equivalent, arranged to conduct the surplus supply from said receiver to the surplus weighing-can, or receiver connected therewith, essentially as herein set forth.

72,699.—SPIRIT METER.—Isaac P. Tice, New York city.

I claim, 1st, A measuring-can, provided with a discharging siphon or siphons, operating or having flow through them established by the tilting of the can, substantially as specified.

2d, A diaphragm measuring-can, forming distinct measuring and surplus chambers, in combination with siphonic discharge pipes, essentially as shown and described.

3d, A diaphragm measuring-can, operating substantially as described, in combination with a weighing-can or device for ascertaining the proof by weight and quantity, as specified.

4th, Providing the measuring-can and weighing-can, or either, with air-dash pots or cushioning devices, essentially as herein set forth.

5th, The combination of the floats, F F', and catches, H H', or the equivalents of these devices, and tilting-hopper, with a measuring can, having a siphonic discharge, substantially as specified.

72,700.—SPIRIT METER.—Isaac P. Tice, New York city.

I claim, 1st, The combination, in a spirit meter, of a weighing-can and can for determining volume, receiving in a given time or times an equal or proportionate supply with the weighing-can, for ascertaining the specific gravity of the fluid.

2d, The combination of a float or piston with the can-determining volume for a given weight, to actuate in any suitable manner a registering device, substantially as specified.

3d, Controlling the filling and discharge of the can, which determines volume for a given weight, by the action of the weighing-can, essentially as herein set forth.

4th, In combination with the devices for determining specific gravities, the hopper, A, divided as at b, and furnished with separate discharge pipes, D and E, substantially as specified.

5th, The combination of a weighing-can or device, volume-determining cylinder or can, H, with its piston, I, valve, L, operated by the weighing-can and gear, g J, essentially as described.

72,701.—SPIRIT METER.—Isaac P. Tice, New York city.

I claim, 1st, The combination, with a spirit meter, or weighing and measuring-cans thereof, of a thermo-compensating device or attachment, operating automatically to control the quantity of the spirit weighed, or weighed and measured, in its passage through the meter, substantially as specified.

2d, Regulating, in an automatic manner, the action or discharge from the weighing-can of a spirit meter, by the varying specific gravity of the fluid, essentially as herein set forth.

3d, The combination, in a spirit meter, of devices automatically operating, by the varying densities and temperature of the fluid passing through the meter, to regulate the action of the weighing-can, substantially as specified.

4th, The combination of the toe, l, on the weighing-can shaft, and rods, k k, with a device operated by the temperature of the spirit, for adjustment of weight on said rods, to regulate the action of the weighing-can, substantially as specified.

5th, The toggle-joint, I, rods, k k, and toe, l, in combination with a float, operated by the specific gravity of the spirit, essentially as and for the purpose herein set forth.

72,702.—SPIRIT METER.—Isaac P. Tice, New York city.

I claim registering the specific gravity or strength of the spirit passing through the meter by means of weighing cans, so arranged and operating as that the overflow or surplus of the one can is weighed and recorded by the second, while the main contents of such first can are diverted from passing through the second or lower can, substantially as specified.

72,703.—COMBINED PLANTER AND CULTIVATOR.—John Vaughn, College Grove, Tenn.

I claim, 1st, The triangular frame, t, bearing the small ploughs, p p, when used in connection with a cotton-cultivator, substantially in the manner and for the purposes set forth.

2d, The combination of the draw-beam, A, wings, B B, ploughs, p p P, opening plough, S, frame, F, wheels, D D', shaft, C, seed-box, i, conductor, b, and covering plough, d, substantially as shown and described.

3d, The covering-plough, d, when hung loosely between two guides, g g, so as to have a free vertical, but no lateral motion, substantially as described.

4th, The frame, F, when constructed with hooks, h h, which operate, in connection with eyes, e e, to hold the frame to the wings, B B, when used in connection with a cotton-planter and cultivator, substantially in the manner and for the purposes specified.

72,704.—EXTENSION BED-LOUNGE.—Charles F. Vollmer, Harrisburg, Pa.

I claim, 1st, An improved extension-lounge, formed by the combination of the following parts: An ordinary top, consisting of a seat, a, arm-rest, c, and back, b, firmly secured to each other; the extension, D, the extension armrest or pillow, G, the base, B, having bottom, a', and the automatic closing and opening legs, F, all as herein described.

2d, The combination of top, a b c, base, b, extension, D, legs, f, and pillow, G, substantially as and for the purpose described.

72,705.—MACHINE FOR MAKING PAPER COLLARS.—Oscar F. Washburn, Bridgewater, Vt.

I claim, 1st, A collar-formed die for cutting out a collar, when provided with an embossing device situated within the cutting edge of the die, substantially as described.

2d, A collar-formed die for cutting out a collar, when provided with an embossing device and an indentation for folding a collar, substantially as described.

3d, A collar-formed die for cutting out collars, when provided with an embossing device and indentations for button holing, substantially as described.

4th, A collar-formed die for cutting out a collar, when provided with an indentation or crease for folding, substantially as described.

5th, A movable platen, in combination with a collar-formed die, having inside its cutting edge an embossing device, substantially as described.

6th, A movable platen provided with cutters, in combination with a collar-formed die, having an embossing device and indentations for button-holing, all operating together substantially as described.

7th, A collar-formed die, having an embossing device, a crease for folding, and indentations for button-holing, in combination with a movable platen provided with cutters, and with a folding-knife, substantially as described.

8th, A roller-feeding mechanism, and a collar-cutting and embossing mechanism, substantially such as described, in combination.

9th, A roller-feeding mechanism, and a collar-cutting and embossing and a button-holing mechanism, such as described, in combination.

10th, A roller-feeding mechanism, a collar-cutting and embossing, a button-holing and a folding mechanism, substantially such as described in combination.

11th, A roller-feeding mechanism, a collar-cutting and folding mechanism, substantially such as described, in combination.

12th, The combination of geared feeding-rollers, E, with toothed arm, J, and lever, O, constructed and operating as and for the purpose described.

13th, The combination of shaft, F, eccentrics, K M, rods, L M2, movable platen, I, slide, N, and folding-knife, H, substantially as and for the purpose described.

14th, The machine herein described, when constructed, combined, and operating to cut, emboss, button-hole, and crease a collar to be folded at a single operation or revolution of the main shaft, all as set forth.

72,706.—SPOON BLANK.—Le Roy S. White, Waterbury, Conn.

I claim the spoon blanks, of such form and so cut or stamped out of the bar or plate without intervening scrap, substantially as specified.

72,707.—STEAM ENGINE SLIDE VALVE.—Charles Whittier, Roxbury, Mass., assignor to "Union Steam Valve Company."

I claim the arrangement of the balance slide valves, in relation to the steam chest and cylinder, as and for the purpose set forth.

72,708.—SLED BRAKE.—J. W. Wight, Chicago, Ill.

I claim the brakes, C, in combination with a sled, A, when constructed and operating substantially as and for the purposes herein described.

72,709.—BREAD CUTTER.—G. D. Williams, Chicopee, Mass.

I claim the device consisting of the shelf, A, guide-frame, C, knife, B, and adjustable bar, F, combined and arranged substantially as and for the purpose shown.

72,710.—ABDOMINAL SUPPORTER.—Wm. M. Young, M. D., Trempealeau county, Wis.

I claim the form or shape of the abdominal plate, and the form and construction of the body band.

REISSUES.

36,503, dated September 23, 1862; reissue 2,819.—SKATE.—Phineas Smith, New York city, assignee of Oliver G. Brady.

I claim, 1st, In skates, the side clamps, J J, arranged near the toe of the skate, and the tightening means, L, adapted to draw the same forcibly together, all combined and arranged as and for the purposes herein set forth.

2d, Also, in skates, the set screws, k k, arranged as specified, in combination with the tightening means, L, and side clamps, J J, so as not only to allow the side clamps to be drawn forcibly together, to seize the boot, but also to allow the foot to be adjusted, either centrally upon the skate, or to any extent one side or the other, to suit the wearer, and be held firmly against shaking in any position, all as and for the purposes herein set forth.

3d, Also, the arrangement of the shank-piece, D, and heel-plate, B, with the shank of the boot, runner, A, and adjustable tightening hook, E, as herein shown and described.

68,398, dated September 3, 1867; reissue 2,820.—OVER-SHOE.—Henry G. Tyer, Andover, Mass.

I claim a boot or shoe constructed with an elastic gore or gores of vulcanizable material, when the said gore is inserted into the shoe before vulcanization, and during the process of construction, and the whole completed by the vulcanization, substantially as set forth.

NOTE.—FIFTY-SEVEN patents in the above list were solicited through the Scientific American Patent Agency.

PENDING APPLICATIONS FOR REISSUES.

Application has been made to the Commissioner of Patents for the Reissue of the following Patents, with new claims as subjoined. Parties who desire to oppose the grant of any of these reissues should immediately address MUNN & Co., *37 Park Row, N. Y.*

61,250.—MACHINE FOR SCOURING LEATHER.—Jas. Terwilliger, and others, assignees of Ira W. Prey and Edward Fitzhewry, Portland, Oregon. Dated Jan. 15, 1867. Application for reissue received and filed Sept. 13, 1867.

1st, A mechanism by which by which dually-arranged sets of rubbers or scrapers, L, in a machine for finishing leather, may alternately be brought into action by the reciprocating motion of a crank, substantially in the manner set forth.

2d, In combination with the crank, N, and pitman, N', we claim the frame, A, pivoted, substantially in a manner and for the purpose set forth.

3d, The combination of the hinged arms, H, with or without the arms I, with the spring, K, the parts being constructed and arranged for use, substantially as set forth.

4th, The spring, K, pivoted cross-pieces, K', and levers, O, in combination with hinged arms, H I, substantially as set forth and for the purpose set forth.

5th, In combination with table, G, we claim the roller, E, adjustably suspended by the rods, E, and cross bar, P, substantially as and for the purpose set forth.

6th, We also claim the combination of a reciprocating tool carriage to operate, and provided with leather and hide scouring, or finishing, or dressing tools, as described, with a movable table, tablet, or platform, so supported as to be capable of being moved in any direction in one plane underneath such tool carriage and its tools, the same being to enable any and all parts of the upper surface of a side of leather, when on such table, tablet, or platform, to be readily brought into a position, or into positions, to be acted on by scouring or finishing tools, while with their carriage they may be in movement, as specified.

43,483.—WASHING MACHINE.—William M. Doty, New York city. Dated July 12, 1864. Application for reissue received and filed Dec. 18, 1867.

1st, The combination with the corrugated washing board and swinging brackets to which it is attached, of a lever or levers, to operate the same under the arrangement, substantially as herein described, so that the said board may be oscillated horizontally, or back and forth, by a vibratory up and down movement of the levers.

2d, The combination of the oscillating washboard and swinging brackets with a removable hand lever or levers, operating in the manner substantially as herein shown and described.

3d, The formation, in swinging brackets, to which the corrugated washboard is attached, of sockets, or the mechanical equivalents thereof, for the ready insertion and removal of the operating lever, substantially as and for the purposes herein shown and described.

4th, The combination with an oscillatory washboard and stationary wash tub, of a hook and eye, or the mechanical equivalent thereof, for rendering the said washboard stationary within the tub at the pleasure of the operator.

☞ NOTE.—*The above claims for Reissue are now pending before the Patent Office and will not be officially passed upon until the expiration of 30 days from the date of filing the application. All persons who desire to oppose the grant of any of these claims should make immediate application.* MUNN & CO., *Solicitors of Patents, 37 Park Row, N. Y.*

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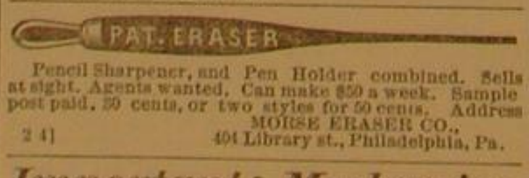

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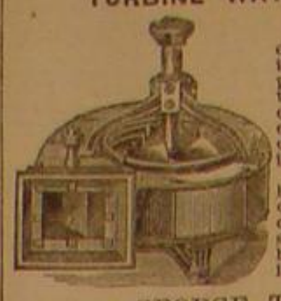

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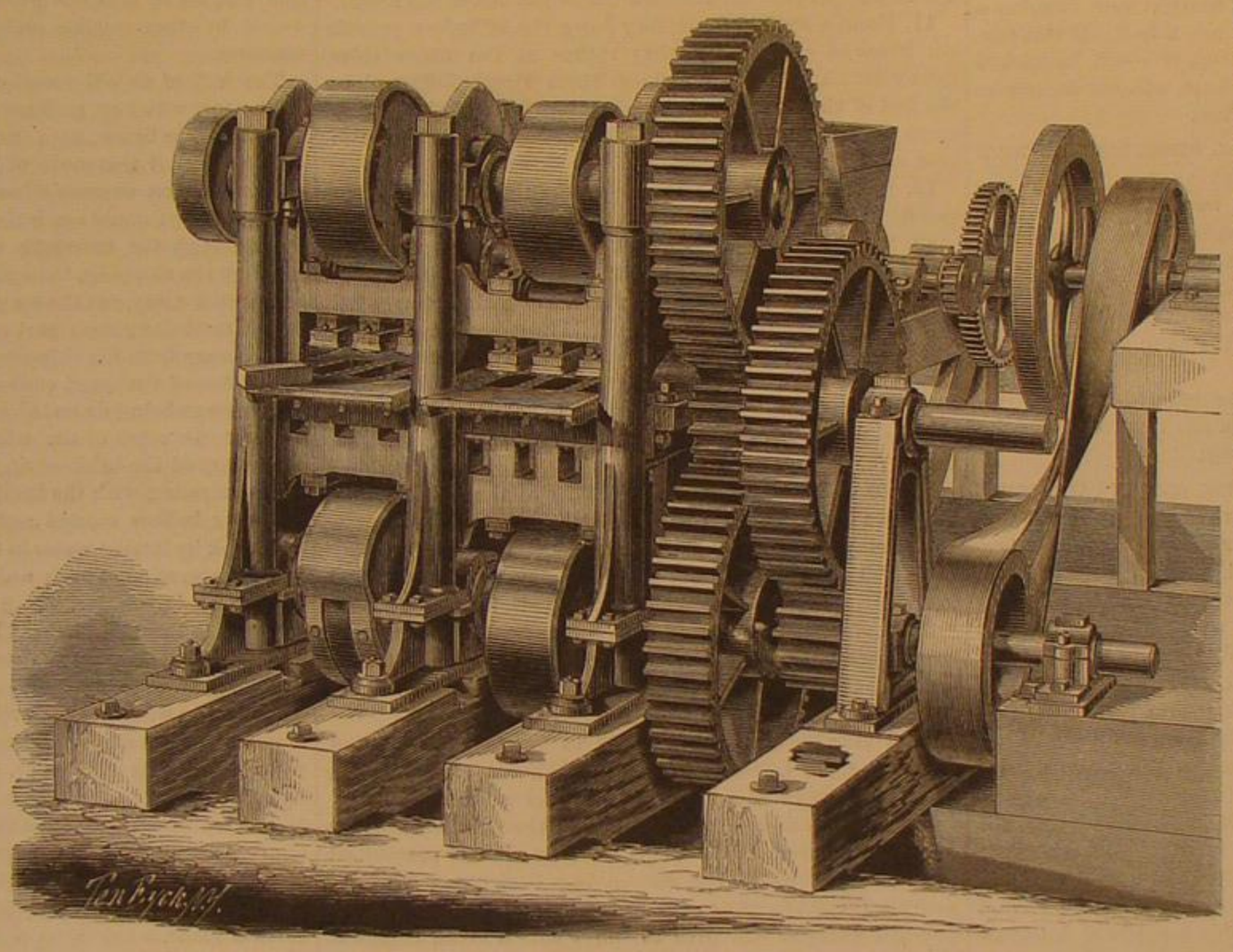
Vol. XVIII.--No. 3. [NEW SERIES.] NEW YORK, JANUARY 18, 1868. $3 per Annum. [IN ADVANCE.]

Improved Machine For Pressing Bricks.

One of the obstacles in the way of forming and burning bricks so that they shall possess a perfectly smooth surface with well-defined edges is the presence of atmospheric air in the clay, which in burning expands and finds its way through the material to the surface, producing blow holes and cracks. The machine represented in the accompanying engraving is constructed with a special view to overcome these obstacles to the production of a perfect article. It is invented by a practical brick maker of over thirty years experience, and the result of fifteen years experiments. It was patented through the Scientific American Patent Agency, May 14, 1867.

The machine is wholly of iron, with the exception of the foundation on which it rests. The uprights which support the machinery are hollow cast-iron columns held in position by means of wrought-iron bolts passing through them, and strongly braced by flanges acting as buttresses between the base and columns. There are two heavy shafts, one directly over the other, driven by means of pinions and gears as seen in the engraving. Two sets of molds, of three bricks each, are used, working alternately, the main pressure coming on three bricks only, at one time, the machine making six bricks at each revolution of the shafts. Each shaft drives a series of plungers worked by cams, the peripheries of which force the plungers against the clay in the molds, and grooves extending around the cams following the contour of the face, draw the plungers back from contact with the clay. The upper plungers are formed with convex faces and the lower ones with level faces. The upper portion of the molds is beveled or flaring, so that this part is wider than the remainder. In operation the upper plungers are forced by their cams down upon the clay in the molds, the lower plungers remaining stationary and forming a bed for the compressed material. The lower plungers then rise against the clay, the upper ones also rising, until the clay has reached that portion of the molds where the bevel of their sides begin, when the upper plungers again descend with a gradual movement, the clay being subjected to pressure on both top and bottom, the convex surfaces of the upper plungers acting upon the central portion of the clay so that the air in the clay will be forced outward, where the flaring sides of the molds allow it to escape.



CROFOOT BRICK MACHINE.

There is a device, working automatically, which carries the clay from the hopper to the molds, which is not shown in the engraving. It works in harmony with the plungers, as all the connections of the machine are perfectly absolute, their being neither spring, weight or other adventitious or unreliable device employed. The clay is taken from the bank and without any seasoning or preparation passed through the pulverizer, thence directly to the molds. All the bricks are face and front bricks equal to the best Philadelphia facing bricks. The inventor in a letter says:—"We have burned a kiln of brick made by the machine and every one who sees them is surprised that so smooth, solid, and nice a brick can be made from so coarse a material as the Chicago clay; they not having a crack or even a check, and resembling in their finish enameled ware. The bricks are taken directly from the machine to the kiln, as when they leave the machine they are perfectly hard."

Orders and other communications relative to the machine should be addressed to the Crofoot Brick Machine Co., 229 Lake street, Chicago, Ill.

The American Tube Well.

Probably no invention of the present day is causing among scientific men so much attention as is this exceedingly simple and yet most efficient apparatus for obtaining, in almost all situations, pure water at a small outlay. It consists of nothing more than an iron tube perforated with holes at the lower end, and shod with a steel point, which enables it readily to penetrate the hardest soil. This tube is driven into the ground vertically by means of repeated blows given by a hollow monkey working on the tube as a guide. These blows are received upon a strong clamp firmly gripping the tube near the ground, the clamp being from time to time raised as the tube descends into the earth. The process of driving is continued until it is ascertained, by means of a plumb lowered into the tube, that a water bearing stratum has been reached. A pump is then attached to the tube, and the water obtained; at first the water pumped up comes thick and dirty, but after a while it comes clearer and clearer until that is perfectly pure which remains. It is evident that, apart from the simplicity of the tube-well system, its great advantage is in the purity of the water obtained. In no ordinary dug well is it possible to prevent surface water and land drainage from mixing with the purer water springing from the bottom; indeed, it is very questionable if in any case an open well is more than a cesspool in which the drainage from all the surrounding soil is collected. The unhealthy character of many localities may fairly be traced to the deleterious nature of the water supply arising from this cause, and it must always be a matter of vital importance to obtain water cut off from these impurities, and if possible drawn direct from the natural source. This the patent tube-well system most completely effects, for the tube driven into the ground seals up the well from all surface drainage; indeed, if the sinkers come to water inferior in quality or quantity, they may drive through that into a lower and better stratum, and completely exclude the upper water; and then, as they pump, the smaller particles of soil pass through the perforations into the well and are drawn up, leaving behind a bed of gravel and small stones, which forms a natural reservoir and filter to each well, and insure the purity of the water subsequently pumped up. This invention is known and appreciated by the Americans, who, in 1860, employed it in the Northern army to supply their troops with water all through the campaigns. It is of more recent introduction into this country, but is already beginning to be adopted by all those who value the purity of water. The government, after testing it practically at Aldershot, have sent a special brigade and a number of wells with the Abyssinian expedition. The Emperor of the French has had several wells sunk under his own personal supervision, with most decided success, both at Buchy and near Paris, and has ordered a number for the use of the army and school of agriculture.—*London Mechanics' Magazine.*

Improvements in Automatic Telegraphy.

Since the 11th September, 1867, the directors of the telegraphic lines have made use, in the service between Paris and Lyons, of a new system of rapid transmission invented by MM. Chaudassaignes and Lambrigot, telegraph clerks. This telegraph acts automatically, transmitting the dispatches between the two towns at the rate of 120 or 180 dispatches per hour by a single conducting wire, a velocity three times as great as that obtained by other systems, and capable of being augmented proportionately to the diameter of the wire. The transmissions are made by a band of metallic paper on which the signals composing the dispatch are traced in insulating ink. The reproduction is obtained on a band of unsized paper, the center portion of which is impregnated with a chemical liquor necessary for the formation of the characters existing on the metallic band. In order to obtain regularity of execution in the different operations, such as the composition, transmission, and reception, they pass through several hands according to the requirements.

One instrument in communication with the line is composed of—1. A clock-work movement. 2. A double roller which sets at work either the metallic or the chemically prepared paper. 3. A ringing apparatus for calling the attention of the correspondent. 4. A "Morse" manipulator of ordinary construction for the exchange of the conventional signs necessary for setting in movement or stopping the rollers. The clock-work movement is set at work by a weight easily wound up by means of a pedal; it serves to maintain the rollers in movement. Near the roller round which the metallic band passes, is a point which represents the extremity of a conducting wire. The roller communicates with the electric pile. When the band is drawn into movement by the rotation of the roller, the point is placed sometimes on one of the metallic parts of the band, and sometimes on the written parts of the dispatch where the isolating ink is, so that the conducting wire marks the message by the alternate passage, and breaking of the current. Near the roller, on which is coiled the unsized paper, is placed a cup filled with a solution of nitrate of ammonia and ferrocyanide of potassium. In the middle of this cup is a small roller which dips into the liquid in its lower portion, and the upper portion of which rises a little higher than the edges of the basin and supports the band of unsized paper which, drawn by the rotation of the two rollers, turns the small dipping roller and becomes impregnated with the solution.

A point of iron representing, like that of the metallic band, the extremity of the conducting wire, leans, slightly inclined, resting by its own weight upon the damp paper band, and is in communication with the earth. The voltaic current decomposes the wet portion, and leaves a colored deposit which represents the signals of the dispatch. The working of this apparatus is entirely mechanical. The transmission and the reception of the dispatches take place automatically; one clerk superintends the machine. In order to compose the dispatches into conventional signals on the metallic band, another instrument, called the compositor, is employed, similar to that of Morse, the signals of which are employed. The band of metallic paper unrolling itself is raised by a lever so as to touch a thick roller covered with a resinous preparation in fusion, which cools suddenly as soon as it is applied to the metallic band. One clerk can prepare alone 35 to 40 dispatches per hour; the telegraphic staff acquainted with the Morse apparatus can, without any study, compose dispatches. For the service between Paris and Lyons three compositors suffice completely for the transmissions. The dispatches reproduced on a band of chemically prepared paper are handed over to other clerks, who translate them for the printed dispatches distributed to the public.

The result is that two composing clerks, two translating clerks, and a superintendent of the machines of reception and transmission, do as much work by aid of a single conducting wire as six clerks with three wires by the ordinary telegraphic system. A composing apparatus furnished with electro-magnets has been established on a line from London to Paris. When the employé in London wishes to transmit a telegram to Paris for the Lyons line, the only line in which this rapid service is installed, he manipulates as for the ordinary transmissions of the Morse apparatus; the letters or conventional signs are printed on a metallic band, and a few seconds afterwards are transmitted to the chemically prepared paper. Thus we have before us a great improvement in modern telegraphy. Up to the 11th September last the service of the Lyons line was carried on by aid of two or three Hughes' apparatus; each apparatus occupies two clerks and three batteries. By the new system five clerks do all the service with one line only. The new system works admirably and without a single hitch, and we can affirm that the invention of MM. Chaudassaignes and Lambrigot is destined to render great service to the telegraphic service. The econ-

omy of installation, and the saving effected in the number of clerks, the maintenance, wear and tear, etc., are marvellous.—*Chemical News.*

Correspondence.

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

SUB-AQUEOUS AND OTHER TUNNELS.

[Continued from page 18.]

PLAN FOR A COMBINED WOOD, CEMENT AND CAST IRON TUNNEL.

This projector presented plans for four different sizes of tunnels, with variations of the form in each, from which the company was to choose. One plan was for a tunnel having a mean diameter of about 11 feet. The sides were to be on a curve of 12 feet diameter, the bottom on a curve of 10 feet, and the top 7 feet diameter. Another was to be 16 feet in diameter, and another 9 feet, both having varying curves. Lastly, a plain tube of 9 feet diameter was shown. The material and method of construction was the same for all.

The body of each tunnel was to be composed of segmental plates of cast iron, with projecting flanges at their four edges, turned outward, by which flanges the plates were to be fastened together with nuts and screws.

Outside the cast iron tunnel thus formed, a body of cement or hard-rammed clay, five or six inches thick, was to be laid, and the whole was to be inclosed in a casing of wooden planks.

The method of laying was to excavate under the bed of the river. For this purpose, where there were quick-sands, a shield was proposed having a face of upright bars, forming a grating, with separations of an inch and a half. It was supposed that the sand in front of the shield could be picked down into the tunnel through the bars, without danger to the workmen from too sudden an influx.

PLAN FOR A WROUGHT IRON TUNNEL, STRENGTHENED WITH CAST IRON RIBS.

This project was for a tunnel 27 feet in diameter. The cast iron ribs were to be one foot apart, three inches broad and four and a half inches thick, scarfed at each end, the scarfs two feet long and overlapping each other, fastened with seven bolts passing through the scarfs and through the wrought iron tunnel plates. Each rib was to be composed of sixteen pieces.

The wrought iron plates were to be rebated at the edges, two and a half feet long, the joints of one row to be opposite the middle of the plates next adjoining.

PLANS FOR DOUBLE TUNNELS, IN BRICK, ALSO IN CAST IRON.

These were projected by W. Murdoch, of Paisley. One plan was for a double tunnel in brick—that is to say, tunnels, one upon the other, of elliptical form, 27 inches thick. Another plan was for a two-story tunnel made of flanged plates of cast iron, secured together with bolts, the joints of the plates calked with lead. The division consisted of an iron floor, secured to the sides, which were straight, the bottom flat and the roof arched. Another form for the division or floor consisted in having shelves cast on the sides of the iron plates, which supported a floor in the form of a brick arch.

Another plan was for two brick tunnels, side by side, the roof supported centrally on arches. In a similar cast iron tunnel the roof was to be centrally supported on pillars. Another plan was to make a single tunnel for the greater part of the distance with short double tunnels at intervals of 200 or 300 yards, for the passage of teams.

PLAN FOR A SMALL BRICK TUNNEL, AND PECULIAR METHOD OF LAYING IT IN THE RIVER.

We come now to a novel plan for laying down a brick tunnel, which was proposed by Charles Wyatt and John Isaac Hawkins. This plan attracted great attention, and seems to have been at one time the favorite choice of the Thames Archway Company. Some of the parties interested in the company went so far as to lay down an actual section of this tunnel in the Thames river, for the purpose of publicly demonstrating the practicability and cheapness of the plan. It is a tunnel of about the same size as this that is now proposed to be laid under the river between New York and Brooklyn. We shall first describe the method and then give some account of the laying of the experimental section:

Width of the Thames river at high water,	847 feet.
Ditto at low water,	649 feet.
Greatest depth at high water	38 feet 7 inches.
Ditto at low water	16 feet 9 inches.

It is proposed to make a brick tunnel, of a cylindrical form, 10 feet 9 inches in diameter outside, and 8 feet 6 inches inside, leaving 13½ inches, or one brick and a half, for the thickness of the wall. The tunnel to be built in lengths of 50 feet each, and floated over the required situation, where they are to be sunk into a trench prepared for their reception, and afterwards covered over with earth even with the bottom of the river.

The particulars of the operation are detailed as follows:

1. In a dock communicating at pleasure with the river, build a cylinder with bricks laid in Roman cement, 50 feet in length.

2. Let the ends of the cylinder be formed into steps and other projections, to keep it even with the other cylinders to which it is to be joined.

3. Close the opening at each end with an hemispherical wall, and in the upper part of the cylinder, about 6 or 7 feet from one end, fix a cast iron tube, of 6 inches bore, having a conical plug ground into it. To the lower end of this tube screw or bolt another tube, 8 feet 3 inches long, and on the upper end screw or bolt a pump, of rather larger diameter, reaching at least 46 feet perpendicularly above the cylinder.

4. At 6 or 7 feet from the other end of the cylinder, insert a piece of iron, into which screw a mast, standing parallel with and reaching the same height as the pump, being also of the same diameter. Both these must be supported by braces, screwed into pieces of iron fixed in the brickwork. The axes of the pump, mast, and cylinder, must be all in the same vertical plane.

5. At the distance of 12½ feet from the ends, let into the upper part of the brickwork two iron hooks, strong enough to suspend, in water, the cylinder with its appendages. These hooks may be supported by iron hoops inclosing the cylinder.

6. Fix a cock in one end of the cylinder, near the bottom, having a lever worked by a connecting rod 40 feet long.

7. A man hole, secured by a strong iron plate, should be left at the top of the cylinder, in case it may be found necessary to examine the inside.

8. Put inside the cylinder, for ballast, paving-stones enough to form a pavement 5½ feet wide, and a sufficient quantity of pig or other iron, to make it float with the masts upright.

9. Admit water into the dock to float the cylinder; shift the ballast till it floats upright; secure the manhole, and force the cylinder under water, where it should be kept for some time. When the work proves to be water-tight, take down the pump and masts, with their braces, observing to mark them so that they may be put up again in the same situations.

10. While the cylinder is under preparation, dig, in the deepest part of the river, and in the line where the tunnel is to be laid, a trench deep enough for the cylinder to lie in, with its upper part about 6 feet below the bed of the river.

11. Form a scaffold for letting down the cylinders, provide six bases of cast iron, having spikes at the under sides, somewhat like a harrow, to keep them from sliding along the bed of the river; each base having three sockets, to receive as many balls, armed with ferrules, into which common scaffold poles are fixed.

12. Lash together the three poles so that they stand perpendicular to the plane of the base.

13. Fix, by means of the poles, three of the bases in a line on each side, near the edge of the trench, 16 feet apart.

14. Lay, across a barge, a platform, containing two windlasses, of the double-barreled kind, 25 feet asunder, each 10 feet long; the larger diameter 2 feet, and the smaller 20 inches; moor the barge over the trench, untie the three poles belonging to each base, and tie them to those of the adjoining bases and to the platform, so that they form supports and braces for it.

15. To counteract the specific levity of the scaffold, load the bases with pigs of iron, let down by ropes, the ends of which may be made fast to the scaffold.

16. Put a rope of at least 2 inches diameter on each wind lass, to suspend the cylinder by, and a pulley on each rope.

17. A steel spring should be laid under each axis of the windlasses, to indicate, by the degree of flexure, what force is at any time exerted on the ropes, by which means it will be easy to guard against overstraining them.

18. The cylinder may be guided in any lateral direction, by small ropes fastened to the scaffold, and acting on the suspending ropes at a distance below the windlasses.

19. Thus much being prepared, tow the cylinder over its destined situation, within the scaffolding; attach the pulleys of the windlasses to the suspending hooks, and erect the pump and mast in their places; turn the cock so as to let in as much water as will give to the whole a small degree of specific gravity more than water; ease it down gradually by the windlasses, until it arrive at its proper place, which will be known by the tops of the pump and masts being in a line with fixed points on the shore.

20. Throw in earth to surround the cylinder, and when it is properly bedded let in water equal to the weight of the pump, masts and braces, and after drawing the pump buckets, and forcing the conical plug into its place, the whole of these may be taken away, after which the cylinder may be covered with earth taken from the next excavation, even with the bottom of the river, except the ends, which must be guarded till the next lengths are down.

21. Remove the scaffolding to a new situation for putting down the next length, which will be proceeded with in the same manner as the first, taking care that the ends of the cylinders be made to fit each other and brought into contact; but should this not be perfectly effected, the surrounding earth will form a sufficient barrier to the water, until it can be stopped from the inside.

LAYING THE SECTIONS.

A brief statement of the progress of an experiment made for the purpose of ascertaining the practicability of constructing cylinders of brick-work, and of depositing them through the water, on a given spot in the bed of the River Thames, at Rotherhithe, with a view to the formation of a tunnel for foot passengers under the river, from shore to shore. This experiment was begun in October, 1810, and finished in June, 1811, by John I. Hawkins, engineer:

Two cylinders, 25 feet long, 11 feet 3 inches external, and 9 feet internal diameter, were built of bricks laid in Roman cement; the ends of these cylinders were closed with spherical bulk heads of the same materials; a hole 20 inches in diameter secured by an iron plate was left in each bulk head, and in the top of the cylinder; a pipe was fixed in the top of each cylinder, reaching nearly to the bottom, and a pump 25 feet long fitted to the upper end of it; an air pipe was also made to screw over a hole left for the purpose; a cock of 3 inches bore was placed in one end of each cylinder; masts for sight poles, 22 feet long and graduated, were erected on the ends of the cylinders, and braced from the sides.

These cylinders were built in a barge, and launched into the water by sinking the barge; they floated about two feet out of water.

An excavation was made in the bed of the river near to low water mark, by the means commonly used for taking up ballast.

A stage was erected over the excavation, consisting of a platform 28 feet by 12, supported on six upright legs, and kept steady by twelve very oblique braces, formed of scaffold poles and spars from five to nine inches diameter; these poles and spars were pointed and loaded with iron to overcome their buoyancy, and sunk into the ground by the weight of the platform, which was 33 feet above the bottom of the excavation and always out of the water at high tides; on the platform were two windlasses of the double-barreled kind.

The stage, which by reason of its numerous braces might have borne a great shock, was nevertheless defended from the shipping by two hexagonal sets of floating booms, one set within the other, but so detached that the outer booms might be torn away by ships running against them without injuring the inner; each boom consisted of three Quebec spars of about 12 inches diameter, lashed together, and from 35 to 45 feet in length; the inner booms were held by four anchors with single chains, and two anchors with double chains, the anchors being from about 500 to 700 weight each; the outer tier of booms was fastened to the inner by slight ropes.

In case the anchors should yield, the booms were hindered from pressing against the stage by six piles from 10 to 14 inches in diameter, and 45 feet long, pointed and loaded with iron, and forced into the ground by their own weight; and braced by other smaller oblique piles from 6 to 9 inches in diameter.

The hull of an old vessel of 160 tuns was moored above the booms, with two anchors ahead and one astern; and a 70-tun lighter below, with two anchors.

The object of this mode of defense was to check, by a succession and an accumulation of resistance, the force of any vessel, before it could reach the stage, and it proved effectual; for although the outworks were much and repeatedly injured by the shipping, the anchors being often dragged and booms torn away, yet the stage remained nearly four months in the most dangerous part of the river, without sustaining any damage from the shipping, except the breaking off four or five feet of the small ends of two scaffold poles.

The stage being defended, one of the cylinders was floated under it, the ropes of the windlasses fastened to two hooks on the top of the brick-work, the pump fixed upon the pipe communicating with the inside, the air pipe screwed on, the masts or indices erected and braced, and, at high water it was sunk by letting water in through the cock, and deposited in the excavation at such a depth that the upper part might be seen at low water, where it was kept suspended while gravel was thrown down and rammed under the bottom to support it. The rammers were fifty feet long, and a little heavier than water.

The stage was then removed 25 feet nearer the shore, the legs and braces singly, by means of an anchor-boat, and the platform with its windlasses, &c., all together at high water, upon four large buoys; after which the second cylinder was suspended from the windlasses in the same manner as the first. At high water the cylinder was let down to its proper depth, and moved laterally by means of ropes, until the ends of both cylinders were in contact, and their axes in the same vertical plane, a half hoop of iron which projected over the end of this cylinder rested on the top of the one before laid down, but the inshore or south end was higher by three inches than was intended.

These facts were ascertained by the tops of the four masts on the ends of the cylinders, which were at that time three feet out of water.

In this situation gravel was thrown down and rammed under the middle and north end of the cylinder; two strong poles, pointed and shod with iron, were driven down by the east side of the cylinder, and their tops secured to the platform, to prevent the cylinders being removed by the strength of the ensuing ebb tide, before a sufficient bank of earth could be thrown down to keep it stationary.

The excavation had been made deep enough, but the inshore end of the cylinder grounding on the bank at low water the day before the operation of adjusting took place, brought so much earth down to the bottom as to prevent that end of the cylinder being lowered again as deep as it should have been by three inches; this earth might have been removed again in two or three tides, as it had been before, but under the apprehension of being ordered by the port committee to take the works out of the river, I determined to conclude the experiment without regard to that three inches, since the only inconvenience was, a space of one inch and a half between the ends of the cylinders at the lower side, although they were in contact at the upper; and no doubt was entertained of keeping the water from passing through this space in any quantity that should hinder the calking of the joint from the inside.

At the succeeding low water, the cylinders were found to be exactly in the situation indicated by the masts at high water, after which the joint was covered with a mixture of mud and gravel, but owing to the want of a sufficient bank of earth at the sides, it laid but a few inches thick on the top, and this sliding off at low water, wanted that compactness which was necessary completely to stanch the joint; the influx of water, however, through the joint, was scarcely eleven gallons a minute, when the water in the river stood three feet higher than that within the cylinders.

These were the principal features of the experiment. The

only thing met with worthy the name of difficulty, was the defending of the stage against shipping.

In proceeding with a tunnel, I would propose to adopt the modes pursued in the experiment, with scarcely any other exception than the defense; which must be more efficient and less extended, and one that can be removed and pitched again at the same time with, and while surrounding the stage.

To be continued.

For the Scientific American.

Slack Water Navigation.

Since the general introduction of railroads, inland water transportation has occupied a position of secondary importance, being mostly confined to the larger and easily navigated rivers. The Erie canal, and one or two others alone, exist in a flourishing condition, the remainder having been converted into road beds for railways, or lapsed into utter disuse through the competition or the intrigues of railroad "rings."

The construction of canals, as a means of transportation, has wholly ceased in this country; and the more rapid, but expensive conveyance of the railway train has caused canal travel to be remembered as among the things that were.

The damming of unnavigable streams, and thereby obtaining what is generally termed "slack water navigation," is nearly as old as history itself; and though it is practiced extensively in other countries, it seems to have been almost wholly overlooked by a people proverbial for turning everything to the very best account.

This neglect is, in a great measure, due to the mania for building railroads, which has for a number of years past absorbed the attention and capital of the American people, without yielding a return at all proportionate to the outlay.

In most of the well-inhabited sections the unnavigable streams are dammed for water power; and frequently at such short intervals, that the water is backed up from one dam to another, being thereby deepened sufficiently to float heavily laden barges, or even small steamboats. All that is required to make these streams navigable for many miles is the construction of locks at each dam, and perhaps some dredging or cleaning out of the channel in certain places: or the interpolation of a few additional dams at points where those previously constructed are too remote from each other to back up the water to the proper depth.

The expense of such improvements being disproportionately small, in comparison with the benefits resulting, the stock representing the investment would possess a stable character, which would always maintain it at least at par; a condition by no means common to the majority of railway stocks.

Something over a year ago the project of converting Rock River, in Illinois, into a slack water stream, was seriously entertained by the inhabitants of the counties along its banks, and measures were taken to forward the enterprise. A memorial to Congress resulted in a preliminary survey, ordered by the Government; and the general estimates obtained exhibited the fact that the outlay requisite to render the river practicably navigable, from Green Bay, on Lake Michigan, to the Mississippi River, at Rock Island, was quite small, as there were but few additional dams required; those already constructed for water power purposes being sufficiently approximated throughout the most part of its course. The cutting of a few miles of canal, to connect the river with Green Bay, and some dredging and deepening of the channel at a few points, was all the work that was requisite, beyond the construction of the locks and the dams above mentioned.

The employment of barges and steam towboats is contemplated on this river, and its improvement is undertaken chiefly for freighting purposes; but there will doubtless be sufficient travel to employ a few light, swift steamboats, a mode of conveyance nearly as fast, and considerably safer, than many of the western railway trains.

When this enterprise is completed, the rapid development of the country lying along the stream will probably have the effect to direct public attention to this *old* feature of internal improvement, and induce the similar utilization of other streams.

The public, when its attention is directed to this important subject, will behold the means of placing themselves within cheap and easy access of the central markets. It is not at all essential that the streams be large or deep to obtain sufficient depth of channel for barges, or small steamboats; as a few feet of water would amply suffice to float vessels of the requisite tonnage for inland trade. Steam propulsion being perfectly admissable (there being no artificial banks to be washed as with canals) the cost of transportation would be so lowered as to permit the carrying of all available freights; and the employment of fast steam packets would provide a means of travel more pleasant and quite as rapid as the accommodation trains on many railroads.

The West, South, and Southwest, and some portions of New York and the Middle States, are watered by streams, equally susceptible of slack water improvement, as Rock River, before mentioned; and now that the experience of years has fully demonstrated that railroads do not invariably conduce to the prosperity of the section of country through which they simply pass, it is to be hoped this important means of progress will no longer be ignored.

In Canada, slack water navigation has proved highly advantageous; and the Chinese, though generally supposed to be a slothful and groveling nation, have utilized their minor streams in this manner, wherever it was possible, so that millions of tons of freight annually pass to and fro, in many parts of the celestial empire, through a network of broad natural canals, obtained for the most part by backing up small streams with rude but substantial dams. Their smaller boats are open batteaux, called *sam pans*, which are drawn from the lower to the upper levels, by means of an inclined plane connecting the two. The bow of the *sam pan* enters upon the lower part of the incline, and the bight of a stout hawser is brought by two vertical windlasses or capstans to take the strain upon the stern. The capstans are turned by man power, which, in that country, is cheaper than horse power; and the freighted vessel thus actuated up the slippery plane, enters with a splash into the upper level. In the larger canals locks are employed, but the amount of freight that passes up and down any one of these inclines, in a day, would probably astonish a Vermont railroad superintendent.

There is hardly a State in the Union in which there is not at least one stream capable of slack water improvement, which, if so improved, would greatly enhance the general prosperity of the State, besides increasing the value of the lands lying immediately adjacent.

A Theory of Artesian Wells.

MESSRS. EDITORS:—I think an explanation to your correspondent's inquiries regarding artesian wells may be given upon the geological theory of subterraneous currents, a subject that has received much attention during the past ten years, by all of our best geologists. When springs of water make their appearance at the surface, it is plain to be seen that it is not from the slow process of percolation, through porous rock, but that it comes, directly and without much obstruction, from some parent stream, hundreds of feet may be, beneath the impress of man's foot. Again, how common it is for streams of considerable magnitude to sink or be absorbed in the earth, to rise again many miles from their place of exit; while in some more rare cases they sink, and by the process of percolation, large caverns are filled, although hundreds of miles may intervene between the source and place of reception; and long, and tortuous, and dark, may be its travel, still the all-pervading law of attraction commands each aqueous particle to find its level, and on it moves until the great law of nature is fulfilled.

That subterraneous currents and caverns should exist in a formation such as that described by Mr. Rumley, where compact transition or mountain limestone (called by Mr. Rumley coarse sand or gravel, and as hard as baked pottery) is the prevailing rock, is but in accordance with the fundamental theory governing the secondary and tertiary formation. Probably there has been a large cavern between the secondary and tertiary formation in extent commensurate with the area of that given by your correspondent as the "Artesian Well region," which has been the reservoir of an underground current of water which carried with it a sedimentary substance of white sand, and a deposit taking place, the cavern became filled with what your correspondent calls water sand.

But, says your correspondent, Why does a deposit take place in the current? Why not follow the water course for all time? Because of the attraction of gravity on the sand being too great for the force applied to remove it; or its specific gravity being too great to be removed by the force applied, while the water is seeking its level, and the cave becoming filled; which may be a basin, the bottom of which being fifty feet below the sinus that conveys the water to it, while the same may be three hundred feet above the inlet to the cave, while the outlet is higher than the point of entrance, and by percolation at that; so that the residuum would remain at rest in the cave, but while a sufficient force is applied in accordance with the laws of hydrostatics, the water continues to move on. But, it will be asked, if there is an outlet as well as an inlet to the cavern, where does the pressure come from that makes the water pass through an artificial opening? The source of supply is greater than the capacity for distribution. Consequently, when the artesian borer passes his auger into the cavern, there is sufficient pressure to cause a spontaneous flow of water to take place, and which will continue to flow until a multitude of openings are made, so that the exit of water will equal or excel the supply; or until some internal commotion of the earth will take place, and turn the water in some other channel.

The subject of subterraneous currents is receiving much attention from American geologists, when connected with caverns; and a somewhat singular instance is recorded in Taylor's Geology, when a well was sunk by an eight inch auger to the depth of two hundred feet, when a torrent of water came rushing to the surface, bringing with it small fish three and four inches long, while the nearest stream of surface water was from ten to twelve miles from the well.

Caverns become very interesting when we find hidden in their dark recesses skeletons, and bones of large mammiferous animals, which have been hidden from the light of the sun, perhaps for hundreds of years; and we go a step further in our examinations, and find the bones and skulls of human beings, mixed with those of quadrupeds which have long ceased to exist. And as we advance from place to place with our investigations, and pass through the bone caverns of Germany, where lay covered with clay large piles of bone and teeth of carnivorous animals, we are naturally led to ask in what manner, and in what epoch, these bones of animals and skulls of human beings were deposited; and in our anxious desire for the answer, our minds are often carried beyond the pale of mental jurisdiction, and reason ceases to be our guide.

E. H. PARDEE, M. D.

San Francisco, Cal.

Tides and their Causes.

MESSRS. EDITORS:—Under the above heading, on page 408, Vol. XVII., a Lancaster correspondent propounds what he terms a "more rational theory for the phenomenon of the daily tides," than the antiquated notion of lunar influences. At the threshold of the discussion he tells us, that "the water on the surface is, by centrifugal force" (mark ye, centrifugal force), "made to roll around the earth, the same as the water is made to move around the grindstone when in motion." Now, we know that the word "centrifugal" means flying from the center, and that, if not countervailed by the centripetal force of gravitation, the centrifugal force would cause the water on the surface of the earth (and the grindstone, too) to fly off in a tangent to the periphery of the curve; instead of causing it, in compliance with your correspondent's notion, "to roll around the earth." But what that motion has to do with the further development of his views is not clearly apparent.

The admitted fact of the diurnal revolution of the earth, with an equatorial velocity of about a thousand miles per hour, is referred to as the proximate cause which, aided, and in its effects modified by the intervention of Capes Horn and Good Hope, produces the phenomenon of the water rolling around the earth, with the "oscilations to and fro, gurgitation and regurgitation," etc. "These gurgitations," he says, "swell the water"—meaning, as the context implies, raise the tides. Admitting all this to be "just so" where are we? Why, on the crest of the wave. He has got the tide up, but does he show us, satisfactorily, how and when he gets it down again?

The force impressed upon its surface waters by the diurnal revolution of the earth is not a variable but a constant force. But its effects are greatly modified by the proverbial variableness of the winds, as regards both their courses and their intensity, from the comparative uniformity of the "trades," etc., to the violent and erratic forces of the hurricane. Now, if I correctly apprehend the views of your correspondent, he ascribes the ebb and flood of the tides, almost exclusively, to the forces treated of in this paragraph. But he is bound to go a step further, namely, to educe from these uncertain and variable causes that precise and definite periodicity in the alternations of ebb and flood, which we all know they do actually exhibit. But this, I confidently assert, he cannot do. Whereas the moon theorist, knowing the fact that the ebb and flood, when not disturbed by storms, etc., time their alterations in rigid accordance with the regularly changing position of the moon in relation to the earth, deduces from this fact, with infallible exactness, not only the hour but the minute and second of their recurrence. And these predictions are not only carried through year after year, but may, with equal exactitude, be extended throughout the ages. Now, until your correspondent shows us that his "more rational theory" can accomplish all this, I for one must persist in my fealty to "the man in the moon," and vehemently protest against deposing him from the regency which the dwellers on this sublunar sphere have so long and so pertinaciously accorded to him.

L. M.

Germantown, Pa.

"Harmony" of the Churches.

MESSRS. EDITORS:—I notice, in your No. of Dec. 7th, an editorial article on "Sound;" and it is a subject that, I think, requires further "utterance." In the new and growing towns and cities of the United States, and especially in the West, numerous churches are being erected, each of which must have a bell when completed. Now the question should arise in the minds of each one of the bell-wethers of these churches—when the money is raised for the purpose of procuring one—at what *tone* shall our bell be pitched to harmonize best with those already within hearing, and which are liable to be rung at the same time. This is a point upon which the majority of bell-wethers are profoundly ignorant; and as it is simply a matter of science, the SCIENTIFIC AMERICAN should be able to give the proper information.

I happen to live in a small western city, where the churches all happen to be on one street, and not far apart. There seems to be a traditionary idea that all church bells should be pitched somewhere about the keys of A to C.

Our churches each have bells, and they ring simultaneously; and the harmony they represent is about like that between the churches themselves—kinder mixed, and not at all pleasing. Fortunately one of our leading bells must be replaced with another. Now the question arises, to what keys shall Calvinism, and Armenianism, and Baptistism, and Episcopalianism, and Catholicism, be respectively tuned, in order that the sinner will not "stop his ears" when he hears the simultaneous gospel invitation on a sabbath morning. Please give us some "scientific" light on this subject, and thereby gratify the ears of your half million readers.

Lyons, Iowa. C. B.

[We regard the subject of our correspondent's communication as of more importance than the levity of his style would seem to imply. All who have ears to hear, whether they understand the principles of musical science or not, are often painfully aware of the discomfort of "sweet bells jangled," and wished for a reform. Bells can be founded of any required tone, and where one society cannot afford a chime, several uniting could procure a peal; and when the towers and steeples gave out their voices on a Sunday, harmony instead of discord would be heard. The principal obstacle to this result would be the unequal burdens it would place upon the different societies, as the deeper the tone of a bell the heavier and more costly the bell must be. A union of the churches on this point, however, would remove this objection.—EDS.

Musical Vibrations.

MESSRS. EDITORS:—As answer to Mr. H. W. C., of Newark (see page 387, Vol. XVII.), it may serve that the musical tone produced by squeaking or chattering of lathe tools, or any other contrivance, is actually used to determine the velocity of vibrations, rotations, etc. When the tone produced corre-

sponds with C, the lowest tone of the violincello, it gives 64 vibrations in a second, an octave higher, 128, another octave higher, corresponding with the lowest tone of the flute, 256; again, one octave higher, corresponding with the highest C of the tenor voice, 512, and another octave higher, being about the highest C of a soprano voice, 1,024 vibrations in a second. The slowest vibrations the ear can distinguish as a tone are those of which the number in a second is 16; they are produced by a large organ pipe, 32 feet long. V.

Heat Shadows--A Question in Natural Philosophy.

MESSRS. EDITORS:—There are among the readers of your paper large numbers of thinking, philosophic minds, and I must thank some one or more of them to give me a solution of the following problem:

The action of heat in producing vibrations of air about a metallic surface, as often seen in a common stove, is well known and has been observed by every person. An ordinary Russia iron stove standing in my office upon a floor covered with oilcloth of a color or shade which rendered the whole thing apparent, and in a proper position when the sun shone upon it, showed the vibrations of heated air as shadows on the floor; in other words, the light of the sun falling upon the stove produced not only the shadow of the stove on the floor, but also of the heated air, as it rose and vibrated about the sides and the pipe. The whole thing was too plain to admit of a mistake, and besides that, it has been observed a number of times, and I suppose, of course, it can be demonstrated at any time by actual experiment.

Now the question is, What was this the shadow of? You may produce vibrations of air by any method or means which can be conceived of, but you cannot get the sun to make shadows of your vibrations.

It is not, perhaps, a question of much moment in science or philosophy, but rather one of those phases of nature which arouse the curiosity and ask for a solution to gratify the mental powers of man. GEO. A. SHUFELDT, JR.

Chicago, Ill.

[Our correspondent is evidently in error in supposing that the vibrating shadow he noticed was the shadow of the heated or vibrating air. No shadow is a well defined image of the substance. All shadows shade off at the edges and produce an indistinct outline. Air is as transparent as any substance with which we are acquainted. The reflection and refraction of light produce some very curious optical effects, due wholly to the different mediums through which the image of the shadowed object is projected. If the medium is in a state of transition from dense to denser, or *vice versa*, the shadow will partake of these changes.

The laboratory of our chemical editor is opposite the assay office of the United States Treasury in this city. A tall chimney rises from the building and sometimes casts its shadow through the windows of the laboratory across the floor. An intense heat is kept up in the furnaces below, which culminates at or near the chimney top. While the lower part of the chimney projects a well defined shadow, the upper portion, where the heated gases escape, gives a tremulous shadow, making the outlines of the chimney, or the upper part, indistinct.

Now this may be accounted for on two hypotheses: either on the different mediums through which the sun's light is passed, owing to the changing conditions of the atmosphere caused by the variations of temperature; or by the rays passing through glass, which is never perfectly transparent and never mechanically perfect. The latter is probably the cause of our correspondent's air shadow.—EDS.

Solution of the Triangle Problem.

MESSRS. EDITORS:—In your paper for January 4, 1868, I notice under one of the headings, "Solution of Plane Triangles;" the writer states that he has sought for this solution for some fifteen or twenty years; signed Justus F. Hoyt, New Canaan, Conn. Among my very early investigations of trigonometry, in a little book called "Flint's Survey," published in the city of Hartford, in the state of Connecticut, in the year 1825, by Oliver D. Cooke & Co., on page 35, case 6, I found the long looked-for problem so clearly worked out by arithmetic, and in so simple a manner, as now to puzzle me for a reason why it has been overlooked. The proposition is: As the sum of the base or longest side is to the sum of the other two sides so is the difference of those sides to the difference of the segment made by a perpendicular let fall from the angle opposite the longest side.

CHARLES S. CLOSE, City Surveyor.

Philadelphia, Pa.

[Our correspondent's idea will be sufficiently clear without the presentation of his diagram or examples.—EDS.

A. D. B., of Connecticut, says, on the same subject:—I would like to call attention to an article in the SCIENTIFIC AMERICAN, of January 4th, entitled "Solution of Plane Triangles." The writer states that "he gives a solution which has never been in print, and which he has sought for some fifteen or twenty years, and thinks that in all probability it will be, sooner or later, introduced into the common school arithmetic." I am unaware of the extent of his researches on the subject, but if he will refer to Euclid, Legendre, or any elementary work on geometry, he will find his problem stated and proved in a much more elegant manner, and much more "worthy to stand next to the forty-seventh problem of Euclid," than his own demonstration. In regard to its ever appearing in the "common school arithmetic," I think he will most likely hunt fifteen or twenty years longer with no better result.

In Prop. XII., Book IV., of Legendre's Geometry, it is proved that, in any triangle, the square of a side opposite an acute angle is equivalent to the sum of the squares of the base and the other side, diminished by twice the rectangle contained by the base and the distance from the vertex of the acute angle to the foot of the perpendicular let fall from the vertex of the opposite angle on the base, or on the base produced.

Answer to the Questions on the Day Line Matter.

MESSRS. EDITORS:—In reply to questions proposed by Mr. Thayer, page 387 of Vol. XVII., I state:—

1st, A man will, when going west round the globe with the sun, on Monday noon, pass suddenly from Monday noon to Tuesday noon when passing the meridian 180° west of Greenwich or 106° west of New York.

2d, When it is Monday noon in New York it is Tuesday morning, 42 minutes past midnight, in Pekin; and when it is Monday noon in San Francisco, Cal., it is Tuesday forenoon in Japan.

3d, When it is Monday noon in New York it will be Monday afternoon for all places less than 180° east, and Monday forenoon for all places less than 106° west; for the rest of the earth it will be Tuesday morning.

4th, The point when it is Monday on the entire globe is when it is 12, noon, at Greenwich; twelve hours later, when the sun is 180° west of Greenwich, it will be Monday afternoon on the western hemisphere and Tuesday forenoon in the eastern hemisphere for all places less than 180° east of Greenwich.

5th, There is a meridian on the globe where the days begin and end, and as mentioned above, the one generally adopted is 180° west from Greenwich, in the Pacific ocean. However, it has been suggested that this line would be better placed 10° more east, as then it would not cross the Asiatic continent, but pass through Behring's strait.

6th, The cause that has fixed this point is that the Atlantic coast of Europe during the time of all the great geographical discoveries, was the focus of travel and commerce, consequently the American as well as the Asiatic continents count their days with Europe. Therefore Sunday noon on the Atlantic coast of Europe is Sunday for all the world; a few hours later eastern Asia leaves its Sunday and gets Monday morning. The beginning of this day will progress over the earth 180° behind the Sunday noon; and the portion of the earth enjoying Sunday will grow smaller all the time till the sun has reached again the meridian of Europe's Atlantic coast when the last remnant of the Sunday has disappeared in the Pacific ocean, and made place for early Monday morning.

At present the islands in the Pacific in proximity to this so-called day line are only inhabited by savages who do not care whether it is Monday or Tuesday, but after civilization shall have penetrated there, a difference in counting the days must spring up between them, it is true not as great as that between the Gregorian style and the Julian (still followed in Russia), but which cannot as easily be rectified, namely, those who count their days with Asia will always be a day ahead of those who follow America. At present vessels sailing west and doubling Cape Horn for New Zealand are, when arriving there, a day behind in their reckoning, as the settlers in this new colony follow with Australia the reckoning brought from England around Cape Good Hope by vessels sailing east.

P. H. VAN DER WEYDE, M. D.

Condensation in Marine Engines.

MESSRS. EDITORS:—In the article on "Surface Condensation," in the "SCIENTIFIC AMERICAN," No. 25, Vol. XVII., it says "the water blown off is 120°." This should have been, the temperature of the feed-water is 120°, I think, which, by the bye, is rather a high temperature, and if surface condensation does not bring it lower than that, it is not very economical. Being an old steamboat engineer, for the benefit of the inexperienced allow me to say, that as the boiling point of water rises 1° for each addition of 2·6 per cent of salt, the water drawn from boiler and boiled in the open air will show a temperature as many degrees above 212° as 2·6 is contained in the percentage of salt in the water. Thus—if it boils at 216°, then 216°—212°×2.6=10.4 per cent in the boiler. A little practice will enable the intelligent engineer to know exactly the amount of salt in the boiler, by the degree to which a hydrometer or a salinometer is immersed.

I would also call attention to the great utility of completely draining the condenser by the air pump. In the *Amphion* frigate, that was sold to the Confederates, and became the *Rappahannock*, there were always 10 cubic feet of water left in the condenser, in consequence of which 20 inches was a good vacuum, for the temperature of the condensing water was that of the union of these ten feet with the amount required from the sea. She was a standing reproach to any engineer. On the contrary, the *Wildfire*, at Sheerness, had her condenser well drained, and the barometer stood at 28½ to 29 in. Having had occasion to take her slides out, after being refaced by the workmen from Woolwich, I would observe, that to get the slides tight it is only necessary to use discretion in taking off the bearing places with a second cut file; for when cold, the slides, and other articles working in a high temperature, may be as true as possible, but when heated become leaky or too tight. From this cause, too, the inaction of safety valves arises very often, the spindle or other appurtenance has been too nicely fitted in the shop, and by expansion when heated sets fast. Trifling as this may appear, it has in more than one instance led to a boiler explosion.

Many things conspire to cause foaming in a boiler, but some of your readers may find it useful to know that some vessels will steam easier—i. e., less fluctuation—and foaming be avoided by increasing the steam space, or working the water in boiler as low as possible. An engineer must allow nothing to be mysterious about his engines, but be as restless as a mother till she finds out what is the matter with her child. If the boiler gives out, and *he knows* a block of wood applied there will enable him to continue his voyage safely, let him apply it, and laugh at his detractors at the end of the voyage. An engineer should at all times know the greatest amount of water he can pump out of his ship in an emergency, and, indeed, more of everything in this department than the captain or any one else in the ship.

Having seen a boiler, by careful blowing off and working at 216°, kept for four years without a scale thicker than a cent, I have not the highest opinion of the economy of surface condensation. Some of your readers may be amused to hear that I have seen scale twelve and eighteen inches thick, the result of negligence in not blowing off. N. C.

Nashville, Tenn.

New Glacial Theory.

MESSRS. EDITORS:—It is with extreme anxiety and delight that weekly, for these many years, have I studied and poured over the scientific contents of your highly interesting and valuable journal, and often have I indulged in the ambitious desire of becoming an occasional contributor, but my wish has hitherto been entirely in vain: nor would I now attempt to ask for a place for this article in your pages, were it not that I am ignorant of the scientific gentleman's address, who on page 370, Vol. XVII., contributed an article on the Glacial Epoch. To him I more especially address the few following remarks. With true becoming grace and modesty, this gentleman inquires, "If the cause assigned by Mr. Reed (page 341, the precession of the equinoxes) be sufficient to produce the Glacial Epochs," as is represented or held forth by that gentleman? I, as an individual, think not, and like Mr. Morley, I question if such cause could produce such a result? I am inclined to support Mr. M., because he has not only put the question, but has at the same time advanced much valuable and substantial evidence to the contrary. If you would be pleased to indulge me thus far, and if Mr. M. would be pleased to give the few following remarks his consideration and study for a few moments, I feel satisfied that not only he, but also all the scientific world, will find, at least, a truer, if not the absolutely true cause, of all the glacial epochs that ever the earth saw, or ever will see. I copy from the "Hepburn Theory" (a small book on Mechanical Astronomy, I am endeavoring to prepare for the press) as follows:

Unfortunately for science and the astronomic world, too much reliance and dependence has been placed in the supposition of Newton and in the theory of La Place; Newton supposed that the combined attraction of the sun and moon acts less powerfully upon the poles of the earth than upon her equator, resulting in the production of a westward gyratory wabble of the poles, and of course of the whole earth. He went further; he concluded that this westward wabble (so called) of the poles, was the true cause of precession. He was entirely wrong; the combined attraction of the sun and moon produces mutation only, nothing more. If the westward wabble of the poles produces precession, how could Newton in his day, or how can his Newtonian disciples in the present day, account for the westward motion of the sun? If the westward wabble of the poles produces an apparent eastward motion of the stars, why is it that such motion in the poles does not at the same time produce an eastward apparent motion of the sun? I say, if the westward "wabbling" motion of the poles was the cause of precession, those poles, in passing by the stars, would as surely and as truly pass by the sun; and I challenge the Newtonian school to show it otherwise. The true and only cause of precession, rather recession of the equinoxes, is nothing more nor less than the westward motion of the sun. The sun moves west in its orbit, by which motion he carries the earth and all the other planets along and around with him, by virtue of which motion the stars appear to move gradually eastward, not only to the inhabitants of the earth, but also to the inhabitants of all the other planets, while at the same time the sun virtually moves westward round the earth and all the solar train; so that recession is not at all peculiar to the earth, but is alike common to all the solar host. That is, I say, the true and only cause of recession, and I challenge the entire astronomic world to advance one single word tending to its refutation? Who will undertake to do so?

Again, La Place's theory was, "that the equator of the earth never did, and never could coincide with the plane of the ecliptic," but that the earth, as it were, rocks or rolls to and fro, within certain very narrow limits, say two or two and a half degrees, and that the earth shall therefore constantly remain but little out or in of her present angle, of about 23½° to the ecliptic plane." In all geological research, there has not been a single discovery made that would in the least tend to favor such a rocking idea, but the Hepburn Theory renders a very different opinion, and fully accounts for all the Glacial Epochs. It proceeds by saying, It is well known that the equator of the earth is at present, and has for these many hundreds of years, been coming more and more into coincidence with the plane of the ecliptic, and the rate of this motion, as rendered from the data of those past centuries, gives an average motion per century of about fifty-eight seconds of a degree per century. Supposing this motion to be constant and continuous, as no doubt it is, it will complete an entire revolution in something like two and a half millions of years. Assuming this to be the exact time, the equator will coincide with the ecliptic in about 145,000 years. In about 625,000 more, or in about 770,000 years from now, the poles of the earth will lie in the ecliptic plane. The poles will then be the most extremely hot and cold points on the earth's surface, alternately. Midsummer day at the poles would be little

short of thirty days of our present time, or about 720 hours of constant and continuous sunshine; and midwinter-night could not be any less than four months, and all that time almost without the shadow of a dawn. Under such circumstances, there could not be any thing else than annual creations of immense fields and mountains of polar ice, and as the cold and frozen poles turned round to the sun, what could follow as a pure result but the breaking up and moving along of vast masses of ice? The ice would loosen and break up, first, at and about the equator, and would continue breaking up gradually inward toward the poles. This would have the effect of causing all the ice and drift to move somewhat outward toward the equator, it could never produce an inward tendency toward the poles, and the effect of the sun's attraction upon such fields and mountains of frozen water would be to draw them in the direction at which he would be lying to the earth at the time. This would have the effect of causing the boulders, etc., to be borne a little eastward, while they were at the same time carried outward from the poles. I say eastward during one glacial epoch, but it would have the effect of producing a westward motion during the other, because then the earth would be, as it were, turned upside down. The combined effect, then, of the sun's heat and the sun's attraction, would be to cause a southeast motion to all erratics north of the equator, and a northeast motion to all south of the equator, during one glacial epoch, and at the next succeeding epoch, all objects so borne, north of the equator, would be carried in a southwest direction, and all objects south of the equator would be borne in a northwest direction. And need I say that so far geology has demonstrated the facts? Nor is the "Hepburn Theory" without other evidence. Uranus and her moons, at the present movement, present nearly the position in which I suppose the earth to be in during her glacial epochs. Now is there anything mysterious in the motions of Uranus' moons; while we behold her in Gemini, their motions appear to be retrograde; but could we behold them forty-two years after, when she is on the other side of her orbit, their motions would appear to be direct, like all the other satellites. Uranus, I believe, is therefore now passing through one of her glacial epochs, just as the earth has done and will in due time do hereafter. But the glacial epochs of Uranus must be vast and fearfully magnificent indeed, compared to those of the earth. But leaving them alone, I would say that my theory is, that the earth passes from the maximum of one glacial period or epoch to the maximum of the next glacial epoch, in regular rotation, in a period of about one million, two hundred and fifty thousand years, the approach to and withdrawal from such an epoch being very slow and gradual.

Admitting, then, the orbit of the sun to be the only cause of recession, as I contend, and granting that the counter ecliptic motion of the earth is a real, a constant, and a continual motion, then we have a tolerably clear and distinct basis to rest upon, both in reference to mechanical astronomy and the great and long continued glacial epochs of our globe.

Gloucester City, N. J. JOHN HEPBURN, SEN.

Reform in Warming Public Buildings and Cars.

MESSRS. EDITORS:—In your paper I have recently noticed two announcements which should gladden the hearts of all wishers for the public good, viz.: that in French cars foot pipes filled with warm water are provided, and that the New Haven Railway Company have adopted a similar expedient for heating their cars. It is my impression that sanitary science can be pursued in no worthier direction than in this matter of warming public rooms. We may decry the evil of ill ventillation and a dozen others, but the most deadly wounds are inflicted by cold on those who frequent public places, such as cars, churches, etc. However good our intention to observe the laws of health, we are at the mercy of those who maintain, either through ignorance or unconcern, cars, churches, schoolhouses, etc., without heating appliances disposed properly as modern facilities direct.

It is a principle which I would have distinctly enunciated that all public places having permanent seats should have steam or water pipes laid convenient for keeping the feet warm. Not only is this the best mode of disposing the heating surface, but if economy were to be consulted it is the cheapest. The surface is well distributed in the coldest part of the room, and it is well known that if the feet are kept warm a much lower temperature in the air may be tolerated with impunity. The head does not need warming. With a piece of small pipe in every pew of a church a congregation might be kept thoroughly warm with probably one fourth of the fuel required in warming by air furnaces. Unfortunately we can have little hope that reform in this matter will proceed very rapidly, as the robust men who manage these things cannot see from their stand-point of hardihood, which will bear anything, that any improvement is needed. It would, however, appear that some pocket nerves might be sensitive and that the philanthropic managers of our churches, and the intelligent guardians of our school children might be awakened to this great evil and act accordingly.

H. W. P.

Newark, N. J.

A Question in Hydraulics.

MESSRS. EDITORS:—The weir of a mill dam is 400 feet long between the abutments. When the water in the pool stands level with the comb of the dam, its surface is 8 feet above the surface of the water below the dam. If when a volume of water is running over the weir four feet deep, a sluice should be opened in the center of the dam 50 feet wide and 4 feet deep, what will then be the depth of the water on the comb of the dam, and what the depth on the same line in the middle of the sluice? Will not some one of your numerous scientific correspondents give his solution of the problem, and indicate the principle or formula by which he reaches his conclusion. X.

Pittsburgh, Pa.

Amputation Not Always Necessary.

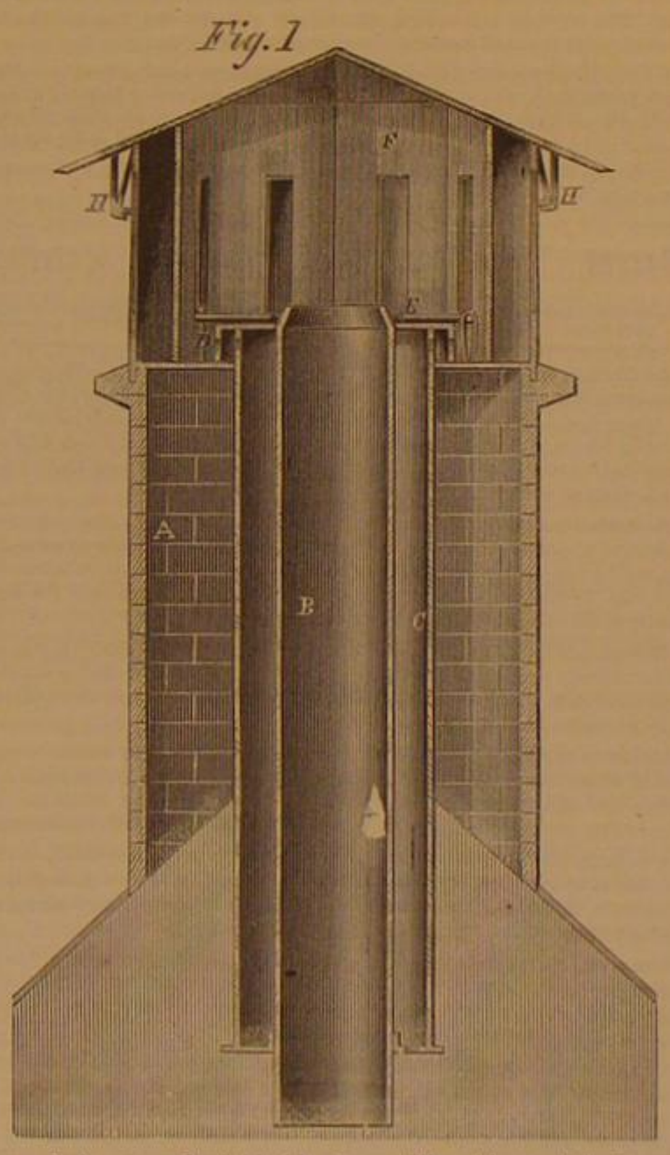
MESSRS. EDITORS:—The item mentioned under this head on page 5th, current volume, is a corroboration of facts known long ago among experienced surgeons. Old Dr. Hunter, in England, published almost a century since an account of similar results. During a riot where only about one-half of the rioters were arrested, and one-half escaped and succeeded in hiding themselves in a locality where they had to keep very quiet, with little to eat, the serious wounds of the latter were after six weeks, when their hiding place was discovered, in an infinitely better condition than those of the men who had been in the hospital under medical treatment. Dr. Hunter was honest enough to publish these facts and to confess that the usual medical treatment of gunshot wounds at that time was erroneous, and in consequence of this a useful reform was brought about, of which the basis was, to interfere less, and to trust more to the healing powers of nature. Every one who has had occasion to obtain information on this point knows scores of persons who would not submit to the proposed amputation of some limb, took their chance with nature's efforts, recovered, and found afterward the verification of the fact that a deficient natural arm or leg is always better than the best wooden one. No doubt that surgeons, and especially young surgeons, are rather rash in advising and performing amputations; our late war gives ample proof of this assertion. P. H. VANDER WEYDE, M. D.

New York city.

GOODSELL'S IMPROVED CHIMNEY CAP OR COWL.

Smoky chimneys and imperfectly ventilated apartments are nuisances which severely try the serenest tempers; a cure or

Fig. 1



remedy is an undeniable blessing. The object of the invention illustrated in the accompanying engravings is to furnish an improved chimney, calculated to prevent the escape of sparks and the blowing of wind down the chimney, and also to ventilate every room having connection with its flue.

Fig. 2.

A is the chimney and B the smoke flue, into which the flues from the different fireplaces may lead. Its upper end extends to a little above the top of the chimney. Surrounding this flue is the ventilating pipe, C, having openings at its lower end, which terminates at the ceiling of the room. Through these openings the impure air escapes. D is a cap having a hole through the center, the sides of which embrace the upper end of the pipe, B, and hold it in place. This cap has holes in its sides, seen in Fig. 1, by which the impure air in pipe, C, may escape to the chimney, the pipe being similarly perforated. The cap, D, rests upon a plate forming the top of the chimney, and is secured by means of a yoke, E, the open ends of which are sprung under hooks, the other end being held by a staple. F and G are two caps attached to the top of the chimney. They are of polygonal form and so arranged that the angles of one cap face the plane surfaces of the other. The sides of each of the caps are slotted, each slot in one cap being opposite a closed angular space in the other. It is thus impossible for the wind to blow the smoke down the chimney. The whole is covered by a conical cap attached to the side walls by the clasps, H. This form of cap is intended to act as a spark arrester and compel the sparks to drop back on the bottom plate.

Patented through the Scientific American Patent Agency, Nov. 19, 1867, by Bennett J. Goodsell. For further particulars address Goodsell Brothers, Pentwater, Mich.

Manufacture of Ivory Combs, Piano Keys, etc.

A correspondent of the Hartford *Courant* furnishes that journal with the following account of the above manufactures, at Deep River Ct. where the business is carried on very extensively. Indeed the two factories in this village and one at Center Brook, in the same town, are the only establishments in the United States where these goods are turned out.

The factories of Pratt, Reed & Co., located on the road to Chester, are owned by the same company that manufacture under the same name in Meriden. The company is a consolidation of three rival concerns that united under this name in the year 1863. It has a capital of $175,000. The buildings in Deep River are located on a lot of eight to ten acres. This and the Meriden establishment combined makes this the largest concern of the kind in America. In Meriden are manufactured the melodeon key boards and the ebony sharps for pianoes and melodeons. The company now employ some seventy hands at Deep River.

The elephants tusks are purchased by this company from importers residing in Salem, Mass., and Providence, R. I., to whom most all the ivory that reaches this country is consigned. The price paid has ranged from two-fifty to five dollars per pound, and now stands at about three dollars per pound. As this concern alone uses 100,000 pounds of ivory per annum it will be readily seen that elephant hunting may be as profitable as it is said to be exciting. The tusks received vary form six to nine feet in length, the former being about the average. They have been found weighing ninety pounds, though the average is but seventy pounds. The tusks are hollow in the center up to the point where they grow out of the heads, while a small nerve runs clear to the tip of the tusk.

The first operation is "junking," when the tusk is sawed into semi-circular blocks and again sawed either into the length of a comb or of a piano forte key, as may be required. The outer "bark" that encrusts the ivory is then hewn off, when the blocks are marked with a lead pencil as required, according to the size of the combs. A fine saw, carefully watched, then cuts off the strips for combs. For piano forte keys the junks are hewn on a machine, and then a split saw cuts them into blocks, whence they are again sawed into the required sizes for "heads" and "tails." Of the combs, the ends are next rounded, and the ivory partially dried in fire clays, so that they can be turned in the ivory planing machine invented by this firm. A very neat sorting machine next sorts them into sizes of from one, two, to four inches, and deposits them in boxes which are revolved by an endless leather belt. The combs, after being planed and sorted, are bleached in the bleach houses (alluded to hereafter), and then polished on a smooth wheel on which a cotton cloth with some unknown dressing (which has been substituted for buck skin) has been placed. The wheels have to receive this dressing after each three dozen combs have been polished. The combs are then sized, when comes the most delicate operation of all, sawing the teeth. This is done with imported saws most finely tempered, and as thin as the thinnest paper—so thin that they cut from forty to seventy teeth to the inch. Though the same are imported, their teeth are cut by the company's mechanics, and most delicate workman they have to be. The combs are then dampened, when they are pointed on a very curious machine with very rapid motion. This completes the combs, which are then packed up according to their sizes. The piano ivory after being sawed into heads and tails, as spoken of, are soaked, next washed off by hand, then put into trays and taken to the bleach houses, which are constructed like long green houses. The trays are hung up directly under the glasses, where the ivory is exposed for from eight weeks to six months, according to the weather and sunlight. The combs are exposed in this way after being sawed, for from four to five weeks. The combs slide into the trays, while the piano forte keys are held by pins. After one side of the ivory is thoroughly bleached the trays are reversed, and the other side exposed. The bleach houses are five in number and very large, from 160 to 600 feet long. One of them, however, is used as a lumber storehouse. Of late years this company have manufactured its own piano forte key-boards. Of frames for these they manufacture ten different styles for as many different piano forte manufacturers, embracing some of the most prominent in the country. For one firm alone they make 100 sets per month. In this department of the factory is a very neat machine for morticing and broaching. In these frames are used black walnut, cherry, pine, and some ash. The key-board itself is of pine, except the front and back slips, which are of bass wood. Next to the frame making and cutting, comes the board fitting. The ivory laying is

next done, then the "lushing," which last operation is only gone through with when desired. The manner of it is as follows:—The front of the key-board is in front of the operator, with the mortice in which the pipe plays directly before him; into the mortice he forces a little silk cushion to prevent a rattle. The key-board is next placed in a machine which throws a very fine white oily dust, which would do admirably for snow in amature theatricals. The sawing operation necessary to separate the different parts of the key-board are next carefully prepared, and the edges of the keys filed, after which the sharps are separated from the keys and buttoned. The keys are next put on the frame and squared. The ebony sharps (made at Meriden) are then put on and the whole wiped off and balanced. The final operation is to fill the edges and "case" the boards, which are then ready for the market.

The piano forte key-boards are made entirely to fill orders. This department of the business is but a few years old. Of combs this firm turns out 500 dozen a day here and the same number at Meriden.

Editorial Summary.

Removal of Organic and Inorganic Substances in Water.—On page 24, last volume, we gave the substance of a paper on this subject, read by Mr. Edward Byrne, member of the Institute of Civil Engineers, before that body. This gentleman, in continuing his experiments, has just presented in another paper to that Society, some later results of interest. Using as filtering materials, magnetic carbide, silicated carbon, and animal charcoal, he found that the former had but little effect in softening water, whereas this property was possessed in a high degree by both the others, although silicated carbon, after being effective for a time, finally rendered water harder than before. Charcoal after removing impurities from the water for a certain time, then began to give back a portion of the organic matters, while silicated charcoal in about the same time returned not only the organic, but also the inorganic matters. By employing Prof. Wanklyn's delicate tests, it was proved that in its percolation through these filters, the organic matters, at least nitrogenous ones, were not oxidized. The author, in concluding, recognized the value of filtration for clearing water of matter in mechanical suspension, but found it practically useless for removing substances in solution.

Hight of Mount Hood.—A Californian correspondent referring to an article on this subject, in our last volume, sends us the report of Lieut. Col. R. S. Williamson, of the United States Topographical Engineers, who, last summer, ascended the peak and made much more careful observations, and hence obtained more accurate results than any previous observer. His instruments consisted of cistern barometers graduated so as to read to the 1-2000ths of an inch, and wet and dry thermometers easily reading to tenths of a degree. At the summit the barometer, estimated for a temperature of 32° Fah. stood at 19.941 inches. Making the necessary computation, the hight of this peak was found to be 11,225 feet, an elevation far below what has hitherto been accepted as the true one.

Engineering Achievements.—In laying out the line of the London Metropolitan Railway, the tunneling, in some cases passed under massive houses, and frequently this was done without causing a crack in the walls. In one case the arch was carried up so that now its top forms a kitchen floor. Other feats in engineering, which have been achieved, were cutting across eight or ten feet sewers, and replacing them without stopping the flow more than a few minutes; and in one place, carrying a branch railroad under the underground one, thus making a sub-subterraneous road; diving like a whale, and coming up again to breathe under Smithfield market, for whose use this was built to bring in the "dead meat" for London's hungry millions.

The Mission of Meteors.—The uses of these starry visitors to our sublunary sphere has at length been discovered by a French *savant*, M. Dufour. From a careful study of the motions and effects of meteors, he has found, among other things, that these bodies scatter promiscuously in their course a peculiar dust of oxidized meteoric matter, consisting principally of phosphorous in a decomposed form but combined with other elements essential to the growth of plants. M. Dufour has calculated that the annual deposit of this fertilizing material is equal to about two cubic yards per acre of the earth's surface.

An Unbroken Telegraphic Circuit was made, and messages were sent, on a Sunday night, last month, from Houston, Texas, to Helena, Montana. Telegrams between these places went *via* New Orleans, Mobile, Knoxville, Washington, New York, Chicago, and Salt Lake City, and the entire length of route was 4,786 miles. Had the San Francisco operator not been out of the office, he would have been drawn into the circuit, and the length extended from Salt Lake City a thousand miles more. The weather was very favorable and the wires were in good condition.

In hardening and tempering steel too much care cannot be exercised to have proper fuel. A green coal fire—bituminous coal—such as is fit for taking a welding heat on iron, is entirely unfit for hardening purposes. The sulphur contained in the coal combines with the steel to form sulphuret of iron and ruins its texture. A clean charcoal, anthracite, or a coked bituminous coal fire is required.

Manufacturing, Mining, and Railroad Items.

As a result of the late Angola tragedy, our exchanges abound in editorial suggestions and the communicated views of correspondents, concerning reforms in railroading. Space would fail to note all these different plans proposed, some having real merit, and others being the light of absurdity. The latest one that has come under our notice is a proposition for making the roofs of the Monitor cars some light structure, and only slightly fastened to the main body of the car, so that in case of overturning an escape for the imprisoned passengers might be opened. New methods for heating the cars have become a special subject of attention, and the introduction of the plan in use on European railways is strongly urged in some quarters. In these carriages, stoves are entirely dispensed with, and their place is supplied by tin tanks of hot water, encased in some non-conducting material, let into the car floor in front of every seat, upon which to place the feet. At regular stations the hot water is renewed. In going from London to Liverpool but one, and from London to Edinburg but two such charges are made.

We find in a Canadian exchange an interesting account of a silver mining region discovered the past year on Thunder Bay, north shore of Lake Superior. An American company was first in the field, and have enjoyed an almost exclusive monopoly since. The ore consists of native silver and the black sulphuret, argentiferous galena and leaf silver. The yield of the working ores has been at the rate of $700 per ton, and with this encouragement several other companies have commenced operations within a few months. Our authority believes this to be one of the richest silver regions in the world, either on the old or new continent.

The first half mile of the experimental elevated railroad in Greenwich street is fast approaching completion. Its constructors seem confident that the line, when finished, will be accepted, and its continuation to the Central Park authorized. We learn that a company has been formed to build another elevated road through the city, upon a plan of Mr. R. Montgomery, who uses corrugated iron for the beams and supports. He asserts that he can complete a durable track from the Battery to Union Square in ninety days.

The Candee rubber factory, at New Haven, Ct., turns out two thousand pairs of rubber boots and shoes per day. The machinery of the establishment is said to be valued at $300,000.

Statistics from the official reports of the Government mines inspectors, show that last year in the coal mines of England, Scotland and Wales, one human life was sacrified for every 67,877 tons of coal raised, and one death took place in every 216 colliers employed. The gross total of accidents last year was an increase of 20 upon 1865, but the increased number of deaths was out of all proportion to the increase in the accidents. In six accidents arising from explosions of fire damp, 536 men and boys were killed.

Although comparatively little capital is invested in the lead mines of Dubuque, Iowa, the local papers of that place state that the yield for the year is from four to four and a half million pounds, of which 830,000 pounds have been taken from the Kelly lead. This mineral has yielded 45,000 pigs of lead. The average price of the mineral for the year has been about nine cents, making the total product of the mines over $360,000.

Influential parties in Connecticut are organizing to secure, from the next State Legislature, the extension of the New Haven and Derby railroad to the Hudson river, there to connect with a road to be built by a company already formed under the general railroad law of this State, through to Erie. From New Haven the course of the old air line will be followed, through Willimantic, Ct., to Boston.

Recent American and Foreign Patents.

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

Artificial Embankments.—J. C. Schooley, New York city.—This invention consists in constructing a core or spiral column within an earthen dyke or levee, above or below the natural surface of the earth, and is formed by pouring into a prepared channel any suitable liquid material which will become hardened when cooled, thus forming a continuous line of impervious wall, without open joints.

Railroad Axle Box.—Louis A. Dochez, New York city.—This invention relates to a journal box for railroad axles, and its object is to prevent the box, and to make the lubricating device self-indicating, so that the deficiency of oil can be ascertained at a glance.

Binder for Shingles, etc.—C. B. Martin, Fond du Lac, Wis.—This invention relates to a binder for shingles, laths, staves, and other similar articles to which it may be adapted, which binder consists of wires; in combination with a wooden band or bands.

Machine for Separating Wheat from Garlic.—Samuel Gantz, Beaver Creek, Md.—This invention is a simple, compact, and cheap portable machine, operated by hand or other power, by means of which wheat can be thoroughly and easily cleansed from garlic, rye, and other similar impurities.

Weather Board Hook.—John Nester, Portland, Oregon.—This invention consists in an improved form of weather board hook, in combination with a fluid level, graduated rule, marker, and gage, the whole constituting a carpenter's combined tool, of great utility and convenience.

Beehive.—David Shaeffer and Aaron McCabe Shaeffer, Centerville, Iowa.—This invention contains a new device for protecting the honey from the approach of moths and millers, and a new and improved arrangement of the several parts of the hive.

Tumbler Washer.—E. Walton Russell, Baltimore, Md.—In this invention a jet is closed at its top by a plug valve seating upward, which closes by the force of the water. The valve rod projects from the top of the jet. When an inverted tumbler is placed over the jet its weight opens the valve and a shower of spray is thrown into the tumbler until it is removed.

Gate.—Isaac N. Young, Swan, Ind.—This invention is designed for a farm or road gate, and is made to be opened or closed by persons in carriages without the necessity of their getting out of the vehicle.

Horse Hay Fork.—John Gilmore, Phœnixville, Pa.—In this invention a new device is employed for opening, closing, and locking the jaws of the instrument, whereby greater convenience and efficiency of operation is secured.

Pruning Shears and Hedge Trimmers.—Joseph Sill, Montoursville, Pa.—In this invention one jaw is provided with a socket which fits to the rod to be cut, and enables the knife to pass through the wood at an acute angle with its grain, thereby greatly facilitating the cutting of stout shrubbery.

Kite.—E. J. Hughes, Pittsburgh, Pa.—This invention relates to an improvement in kites, and consists in making them in the form of birds, with a peculiar method of attachment and arrangement of parts.

Hasps and Hooks for Gates and Doors.—Wm. Bisbee and Fleming G. Hearn, Yreka, Cal.—This invention relates to an improvement in hasps and hooks for gates and doors, intended to meet the shrinkage of timber which takes place during long continued dry weather and the swelling consequent on continued rains.

Field Threshing Machine.—A. W. Tucker, Waxahachie, Texas.—This invention relates to a new threshing machine, which is arranged upon wheels, so that it can be drawn over the field, after the reaper has moved over the same, and so that it will rake up all the straw laying in its track, and will thrash the same and discharge it, while it will retain the grain which has been freed from the straw.

Sled Brake.—J. L. Heffron, Marathon, N. Y.—This invention relates to a sled brake which is so arranged that it will only operate to retard the motion of the sled when the sled is crowding on the horses, while it will be out of the way when the sled is drawn ahead or when backing.

Machine for Making Peat or Clay into Blocks or Bricks.—Eliphalet Hall, Clinton, N. Y.—The wheel at and around its periphery is divided into a series of molds of uniform size and shape and at equal and regular distances apart. These molds are formed by the concentric rings to the wheel, joined together by the cross and radial partitions.

Distilling Apparatus.—H. G. Dayton, Maysville, Ky.—This invention relates to a new distilling apparatus, and its object is to effect a slow and gradual distillation to separate the fine spirits from the fused and bad spirits.

Combined Cultivator and Seeding Machine.—Castle Churchill, Cedar Falls, Iowa.—This invention relates to a new and improved cultivator, and seeding machine combined, and consists in a novel construction and arrangement of parts, whereby several advantages are obtained over the ordinary implements of the kind in use.

Plow.—A. N. Moore, North Cohocton, N.Y.—This invention consists of cutting knives or scrapers attached laterally to the plow share at a short distance above the plow point, together with lateral wooden wings, and curved corners of the share, for the purpose of delivering off the soil more effectually, and filling it up against the roots of corn or other vegetation.

Maize or Corn Harvester.—L. B. Hamilton, Boston, Mass.—This invention relates to a new and improved machine for harvesting Indian corn, to wit, cutting the standing stalks, one or more rows simultaneously, and gathering and conveying the same, as cut, to the rear part of the machine where they may be bound if desired, or thrown in proper sized gavels or bundles upon the ground convenient for shocking. The invention consists in the employment or use of revolving cutters constructed in such a form or shape as to operate with a drawing cut. The invention also consists in using in connection with the rotary cutters, fingers, constructed of cylindrical rods having sharp pointed ends, and placed in such relation with the cutters that they will retain or hold the standing stalks while being cut, and assist, in an eminent degree, the work of the cutters. The invention also consists of rotary spiral conveyers placed in such relation with the cutters and fingers, that the standing stalks, as cut, will be carried back in an upright position to the rear part of the machine, where they may be bound or discharged in gavels from the machine. The invention further consists in constructing the body of the machine in such a manner that passage ways will be formed through which the cut stalks can be conveyed with facility to the rear part of the machine.

Apparatus for Delivering Goods.—James D. Sinclair, Brooklyn, N. Y.—This invention relates to a new device for discharging goods from warehouses, or for lowering the same from the upper stories to the ground floor, or to any one of the intermediate floors, as may be desired, and consists more particularly in the construction and arrangement of the traps, which are arranged at the intersections of the inclined ways upon which the articles to be delivered slide down.

Washing Machine.—E. W. Dixon, Forest Grove, Oregon.—This invention relates to a new and improved clothes washing machine, of that class in which a swinging or oscillating pressure block or head is employed. The invention consists in a novel manner of constructing said pressure block or head, the arrangement of the handles or frames attached thereto, and a novel manner of constructing the interior of the suds box, whereby several advantages are obtained.

Stump Extractor.—James Elliott, New York city.—This invention relates to a new and improved device for extracting stumps, more especially small or medium sized stumps, such as those of the scrub oak, etc. The object of the invention is to obtain a device for the purpose specified, which may be operated with the greatest facility, and admit of stumps being extracted very expeditiously.

Cultivator.—S. G. Peabody, Champaigne, Ill.—This invention relates to a new and improved cultivator, constructed principally of metal, and so arranged as to be capable of being used either as a single or double implement. The invention consists in a peculiar construction of the device, whereby a very strong, durable, and efficient implement of the kind specified is obtained, and one which may be readily adjusted to be drawn from place to place.

Plow, Potato Planter, and Seeding Machine.—Solomon Shetter, New Cumberland, West. Va.—This invention relates to a new and improved combination of a plow, potato planter, and seeding machine, and it consists in the employment or use of an endless carrying apron, operated from a traction wheel, and arranged and applied in connection with a hopper, plow, and a covering share, whereby seed potatoes and other seed may be planted expeditiously and in a thorough manner.

Traveling Bag.—Zachariah Walsh, Newark, N. J.—This invention relates to a new and improved manner of attaching the cloth or fabric, of which the sides of the traveling bag is composed, to the jaws or frame of the bag, whereby a very secure and cheap connection of those parts is obtained; and it further consists in an improvement in the construction of the jaws of the frame whereby the latter is prevented from cutting or chafing the cloth or fabric of which the sides are composed.

Dining Table.—Manuel Pira, East New York, N. Y.—This invention relates to a novel application of a revolving dish holder to a dining table, whereby any one of the number of persons seated at the table may, without any difficulty whatever, help himself to any article of food on the dish holder, and without disturbing any of the company at the table, the invention also admitting of a table cloth being used, a result not hitherto attained with revolving dish holders.

Hand-Loom.—H. H. Mitchell, Mineral Point, Wis.—This invention relates to improvements in a hand-loom, and consists in attaching a cord and weight for regulating the movement of the yarn-beam, in the place of the lever arrangement in the improved hand-loom for which letters patent have been granted to J. W. Hayse, and also in placing weights on the treadles, together with iron screw-pins or tappets in the rollers.

Increasing the Sonorous Quality of Wood for Sounding-Boards.—Wm. H. May, Bridgeport, Conn.—This invention relates to an improved mode of preparing wood to increase its sonorous quality, to be employed for sounding-boards and other parts of piano-fortes, violins and other musical instruments.

Machine for Cutting Out Boiler-Tubes.—W. Bell Smith, Charleston, S. C.—This invention relates to an improvement in a machine for cutting out the tubes of steam boilers, and consists in a hollow mandrel secured to the flue-sheet of a tubular boiler by a shifting clamp and bolt, within which mandrel is fitted a self-feeding sliding cutter bar, the head of which carries the cutter on an incline or wedge that moves forward to force the cutter out and give it its feed motion by means of a fixed nut working in a screw on the outer end of the cutter bar, the whole being constructed and operated by gear or friction wheels with a hand crank.

Reel for Reaping and Mowing Machines.—William F. Rundell, Genoa, N. Y.—This invention relates to an improvement in the construction of that class of reels for reaping and mowing machines which are not provided with a central shaft, and it consists in a novel way of constructing the reel, whereby the parts are firmly secured together without the aid of oblique braces hitherto used, the reel rendered capable of being readily put together and taken apart, and a smaller reel than hitherto allowed to be used, by which the team may be hitched nearer to the frame of the machine than usual.

Attaching Ornamental Heads to Nails, Screws, etc.—Thos. C. Richards, New York city.—This invention relates to a new and improved mode of attaching ornamental heads to nails, screws, etc., whereby said heads may with the greatest facility, be applied to the screw or nail after the same has been driven or screwed in a wall or other fixture. The object of the invention is to obtain an economical means for effecting the object, as well as one which will admit of the ornamental head being adjusted expeditiously on the nail or screw.

Gunpowder Canister.—Olin Scott, Remington, Vt.—This invention relates to a method of constructing canisters for containing gunpowder, and it consists in forming the same of tin or other suitable metal of a hexagonal or similar form, with corrugated sides and heads, and in securing the heads in the canister by seams or otherwise.

Marine Governor.—Edward M. Troth, New York city.—This invention consists in the use of a pendulum, which is connected with the slide valve of a steam chest, so that when the pendulum is brought out of its vertical position, and swings toward the bow of the vessel, it will operate the slide valve, which will cause the steam to operate upon the piston in a small cylinder, in such a manner that the throttle valve will be closed.

ROTATING CRANE.—John S. Coffman, Greenville, Ind.—This invention relates to a method of constructing cranes, or derricks, whereby they are more easily manipulated and more simply and economical constructed. It consists of a frame, or stand, on the top of which is a revolving windlass and windlass frame, around the axle of which windlass is the cord or rope by means of which merchandise is raised.

BLIND AND SASH FASTENER.—Andrew H. Wemple and Thomas D. Richardson, New York city.—The object of this invention is to provide a cheap and efficient fastening for outside blinds, shutters, and windows, whereby the same are securely fastened by one operation.

LUBRICATOR.—John L. Whipple and Adolphus Bonzano, Detroit, Mich.—This invention relates to a method for lubricating slide valves, cylinders, lift rod and wearing surfaces in other situations.

DRAWING WICKS THROUGH BURNERS.—F. A. Plaetterlein, West Meriden, Ct This invention relates to a device for clamping and drawing wicks through the tubes of lamp burners, and consists in the use of a flattened sheet metal bar, doubled up in the center and provided at one end with teeth for biting the wick, and perforated to pass over the teeth of the ratchet, or wick elevator.

SAFETY ATTACHMENT TO RAILROAD CARS.—Samuel Pennock, Kennett Square, Pa.—This invention relates to a device for absorbing the momentum or shock of colliding railroad cars, and consists in connecting the inner end of the draft bar of each car with a wedge, which rests upon a spring bed. During a collision the draft bar is thrown in, and the wedge is pushed over the elastic bed, depressing the same, and thereby transferring the shock from a horizontal to a vertical line; the crushing of railroad cars is thus prevented, and even the disagreeable shock is overcome.

OAR LOCK.—Michael A. Lanagan, Brooklyn, N. Y.—This invention has for its object to furnish an improved oar lock that will allow the oar to be moved freely in every direction, from which it will be impossible for the oar to escape should it be dropped, in which it may be quickly placed, and from which it may be quickly removed.

DETACHER AND ANCHOR STOPPER.—Michael A. Lanagan, Brooklyn, N. Y.—This invention has for its object to furnish a simple, safe, and effective device designed especially for use as a boat detacher and as an anchor stopper, but equally useful for other purposes wherever it is desired to detach a suspended object.

PORTABLE MILL.—Silas Dodson, Jersey City, N. J.—This invention has for its object to furnish an improved grindstone mill, simple in construction, convenient of adjustment, and which will do its work faster and better than the mills constructed in the usual manner.

WELL TUBES.—Wm. B. Hutchinson, Newbern, N. C.—This invention consists in combining with a malleable, cast, solid-jointed, perforated cylinder, having an oval-shaped bottom, to enable sand to wash or pass out rapidly, a diamond-shaped, perforated, self-discharging, conical or oblong-shaped sand basket, placed within the said perforated cylinder, and provided with a conical or oblong wire-gauze filterer.

PORTABLE FENCE.—A. Labair, Pewaukee, Wis.—This invention relates to an improved portable fence, and consists of a fence of upright, horizontal bars, having a foot or abutment at each end of each length on opposite sides thereof, which may be made of the same lumber as the uprights or horizontal bars.

BAG HOLDER.—C. D. Brainerd, Dansville, Vt.—This invention consists in a novel manner of hanging or arranging two jaws, or arms, for holding the mouths of bags open while being filled, by means of which the jaws, or arms, can be drawn together, or toward each other, to admit of the mouth of the bag being easily placed upon and over them, as well as also to accommodate bags of different widths; the jaws, or arms, when released, immediately springing apart, and thus tightly grasping and firmly holding the bag in its place or position. Also, in a novel construction or arrangement of the bag-holder frame, whereby it can be adjusted and set to accommodate bags of different lengths.

STREET CAR BRAKE.—Jacob Katzenberg, New York city.—This invention has for its object to furnish an improvement in the manner of applying the brake, which shall be simple in construction and effective in operation, and which will allow the brake to be applied with full force by the driver, while at the same time both his hands may be free to manage his horses.

STONE BOAT.—Thomas V. Cook, Lanesboro', Pa.—This invention consists of a cast iron shoe, in proper form, provided with suitable uprights or plank holders, to which are fitted planks or similar supports for stone or other materials, said planks being bolted to the said shoe in such a way as to form a very strong and durable apparatus for the drawing of stone or other materials upon the ground.

BENDING HARNESS AND OTHER IRONS.—Wesley Malick, Tidioute, Pa.—This invention relates to an improved device for bending harness irons.

FIRE-ARM.—L. Conroy, New York city.—This invention consists in a novel arrangement for extracting or removing the waste cartridge shell from the bore of the barrel, which extractor for the cartridge is connected with the breech block of the gun, and operates in conjunction therewith.

CAR COUPLING.—John T. Stoakes, Parish of New Church, England.—This invention has for its object to furnish an improved car coupling, which shall be self-coupling; which cannot become accidentally uncoupled while the cars are upon the track, which will at once uncouple itself should the car or cars be thrown from the track, and which can be easily and quickly uncoupled when desired, even should the train be in rapid motion.

SAW MILL.—Philip Estes, Leavenworth, Kansas.—This invention relates to an improvement in head blocks for saw mills and consists in an open rack and pinion connected with a lever having a clamping eccentric and carrying four pawls and a ratchet wheel having two dogs.

ROTARY FEED FOR SAW MILLS.—James M. Scott, Kinsman, Ohio.—It has hitherto been found impossible to procure a rotary motion from the pitman of a saw mill. This is obtained by this invention and is intended to be applied to feed the mill.

MILLSTONE BUSH.—C. Custer, Philadelphia, Pa.—This invention relates to improvements in boxes for bushing the spindles of millstones, whereby a spindle may be adjusted with perfect accuracy by means of thumb screws and wedges operating in loose wedges lying against the spindle which wedges are made of iron, brass or wood, or may be faced with Babbitt metal, leather, or any other anti-friction material.

CULTIVATOR.—R. Garter, Lowell, Mass.—This invention relates to an improvement in cultivators mounted on wheels and adapted to the working of corn, cotton and other crops and general field work and consists in forming a truck frame inside of the side beams so connected that the frame may be raised and lowered readily for giving more or less depth to the teeth or plows.

TABLE LEAVES SUPPORT.—N. Long, Eaton, Ind.—This invention relates to an improvement in table leaves and consists in an arrangement of the supports in connection with springs, whereby they are rendered self-acting and when the leaves are raised will take their place under them to hold them up in the usual way.

CHILDREN'S CARRIAGE.—A. D. Fowler, Newark, N. J.—This invention has for its object to improve the manner of attaching the fore wheel to the arms of the frame of children's carriages, wheel barrows, etc.

SASH ADJUSTER.—P. H. Hardy, Terre Haute, Ind.—The object of this invention is to provide a substitute of the expensive box window frame in common use by adjusting the sashes with cords and pulleys attached to the sashes and to the frame in another and simpler manner, and it consists in so attaching the cords and adjusting them that the sashes shall balance each other.

GATE.—C. H. Platt, North Fairfield, Ohio.—This invention has for its object to furnish an improved gate, simple in construction, durable, and not liable to get out of order and which may be adjusted to swing at a higher or lower level or secured in such a position as to allow sheep or small stock to pass freely beneath it.

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."

☞ *All reference to back numbers should be by volume and page.*

J. D. M., of Ga.—The Electric Gas Lighting Apparatus manufactured by Cornelius & Baker, of Philadelphia, are very convenient. The appliance is attached to each bracket and by simply lifting an india-rubber plunger which fits inside a cup lined with silk, the electricity is communicated by a chain or wire to the burner. We have the article in use at our home. An engraving of the Electric Bracket may be found on page 328, Vol. XI., 1864, or probably Messrs. Cornelius & Baker will send a circular illustrating the invention by addressing them at 710 Chestnut street, Philadelphia.

W. D.—The Patent Reports are not on sale. Apply for them to the Member of Congress from your district. They are printed for public, free distribution by the Members.

C. B., of Pa.—Hemlock bark extract is made by some perating machine, of which several forms have been patented. The special of machine, however, is of less consequence; the principal tools for an economical preparation are proper grinding mills, strong pressure to expel the last and best liquid from the fibers, and kettles, etc., to boil the extract down to a lesser bulk and make it more fit for transportation, for which the bark itself is entirely unfit, and therefore the skins have usually been brought to the bark region being less bulky than the bark required to tan them. There is a market in New York for the extract, but the success of its manufacture depends not in having plenty of bark, but like many other enterprises, mining operations, etc., on a sufficient capital to be invested in proper machinery.

A. M., of N. J., asks for a simple recipe for producing soluble glass, and a composition to coat walls previous to their being papered and varnished. A quite extensive description of the preparation of soluble glass (liquid flint) will be found in one of the last numbers of the SCIENTIFIC AMERICAN of 1866. As to the composition for coating walls we presume that soluble glass will do all that is wanted.

J. F. R., of West Castleton, says: "Explain to me the reason of the change of the atmosphere in the fall of the year. During the day a lead-color haze overspreads everything, but at night as a general thing it is perfectly clear." The color of the sky depends greatly upon the state of the atmosphere, and particularly upon its dampness, which is greater in cold than in warm seasons. We do not mean to say, however, that the amount of moisture in the air is greater in winter than in summer, but in winter the vapor of the atmosphere will condense but at a slight decrease of temperature, while it will not do so in summer. The clearness of cold winter nights is explained by the fact that the moisture freezes and little evaporation is taking place.

W. C., of N. Y., is asking how cascarilla bark is prepared for introducing into matches and tobacco. The odor of the bark resembles that of musk. For matches the bark is reduced to powder, and mixed with the dipping composition. For tobacco a decoction is applied, but it is said to occasion vertigo and intoxication. In medicine this bark was formerly often prescribed as a substitute for Peruvian bark, but it has lost much of its reputation.

G. D. J., of Conn.—"Can you inform me of any ingredient that will render rubber or leather impervious to oil, or anything that can be mixed with oil that will produce the same result. The rubber or leather will be continually in contact with the oil and the object is to preserve them from being destroyed by the oil." The following composition if properly applied will answer your purpose: Dissolve in an iron pot 1 part of finely cut gum elastic in a mixture of 4 parts of linseed oil and 8 parts of "solar stearin," apply gentle heat, and stir in 12 parts of amber varnish when the gum is all taken up.

B. H. L., of Pa.—"Can you give me some information in regard to deodorizing benzine; there is an article in our market that is free from offensive odor." A chemist lately recommended to digest it with a solution of oxide of lead in caustic soda. Try it.

H. M., of Ala., wants to know if there is a good market for hemlock extract and if there are any patents covering machines for its preparations. The extract is not so much in demand as the ground bark tanners preferring the latter. There exist several patents for extracting tannin from the bark which you will find by referring to the SCIENTIFC AMERICAN.

W. G., of Pa., asks for information about the manufacture of sulphate of iron from iron pyrites. We do not know of its being prepared directly from them and doubt whether it will pay to do so, as copperas is quite largely obtained as a waste product in the boiling of the crude lye in manufacturing alum.

J. M., of Ala., seeks for information about the preparation of crystallized candy. Prepare a solution of loaf sugar in lime water and boil it down very cautiously until threads can be drawn from it. Transfer then the sirup into broad vessels, cover them well and keep them in a warm room. Crystilization will have set in in a week or ten days.

J. L., of Ind.—"Do you know of an invention for opening, closing, and fastening the upper swing casement of Gothic church windows, to be operated by a person standing on the floor 20 or 30 feet below the top of the window?" We think such contrivances, managed by a cord and spring, are in quite common use. Such a device could be easily contrived.

J. W. H., of Minn., asks the following question of practical millers: Will it take any more power to grind a certain amount of wheat per hour—say eight bushels—on a pair of millstones four feet diameter than it will to grind the same amount on a pair of three-and-a-half or three feet diameter?"

D. S., of N. Y., wishes to have information on setting up stationary engines; more particularly where he is to find the lines for "lining up" an old engine. He wishes a diagram published. The setting or lining up of an engine is so simple a process that it seems puerile to publish diagrams to explain it. The center of the piston, center of the cross-head, and center of crank shaft should be in one line. Usually one or more "spiders" of wood—merely crosses with a hole through the center where the two arms intersect—are fitted to the bore of the cylinder and a line drawn through to the center of the pillow block bearing. Proper measurements and gaging, with an ordinary amount of skill, can do the rest. After all, the practice of the shop is better than the information given through the medium of our columns. There is no royal road to a practical knowledge of the steam engine.

L. D. M., of Tenn., requests a recipe for hardening mill picks to stand on hard burrs. He finds great difficulty in getting a durable edge. The question has already been answered through our columns. We cannot repeat answers an indefinite number of times to oblige a single inquirer. Pallett's "Miller and Millwright" gives the following as a pickle: 5 galls. rain water, 3 oz. spirits niter, 3 oz. harishorn, 3 oz. white vitriol, 3 oz. sal-ammoniac, 3 oz. alum, and two handsfull of horse-hoof parings; to be kept closed from the air.

J. L., of Ill.—"Take a pulley 4 feet diameter, 8 inches face, 6 arms, weight, 225 lbs., at what velocity will the centrifugal force overcome the force of cohesion, the wheel to be evenly balanced and rotate true on the shaft?" No rule for such a case can be laid down, as the quality of iron varies greatly and the weight may be so distributed in the rim, arms and hub as to either greatly strengthen or weaken the wheel.

O. A., of N. Y., asks what is better to coat chills for coring castings than shellac varnish or oil. He uses oil and fine sand baked on in an oven. We know of nothing better than his plan. Perhaps some molder may furnish a better recipe.

T. W., of R. I., wishes to know how to lay out the holes through floors for a quarter turned belt. He says the information received through the SCIENTIFIC AMERICAN was not quite satisfactory, and hopes some correspondent will reply. We regard the laying out of belt holes for any sort of belt as a perfectly simple process and have given such explanation as appeared to us to be easily comprehended; but if a correspondent can make it clearer we shall be glad.

R. J. E., of Wis.—"Would the weight on the step of a perpendicular shaft with a large fly wheel be any less when the wheel and shaft was rotated than when at rest; or is the weight on the standard of a governor diminished when the balls are raised by centrifugal force?" In both cases the answer is, No.

O. H., of N. Y.—"If 33,000 lbs. falling 60 feet will work up to one horse-power for one hour, less the friction, will coiled springs that require the same power to wind them up produce the same result?" Theoretically the result will be the same. Imperfection in the springs or the medium of transmission of the power may affect the result, but the principle of the indestructibility of force is consonant with the above statement.

P. D., of Canada.—"You have mentioned that good turbines realize 80 per cent of the theoretical power of the water. Am I to understand that such a wheel with proper appliances would raise four-fifths of the water used in driving it to the same hight as that from which it acted on the wheel?" No. The driving water would balance the column to be raised. 2d. We have no data from which to give the amount or value of coal used by this government for steam purposes. It has varied greatly within two years.

Business and Personal.

The charge for insertion under this head is one dollar a line.

Camden Tool and Tube Works Co., Camden, N. J., Manufacturers of Tube and the most improved Tools for Steam and Gas Fitters and Tube Manufacturers.

J. H. Sternbergh, of Reading, Pa., manufactures and offers for sale Superior Hot-Punched Nuts, at low prices.

Wanted to correspond with parties having capital to invest in a Woolen, Cotton, Flax, Sash and Door, and Agricultural Implement Factory, or any first-class manufacturing business. We have the best location in the West. Shipping facilities unequalled, and a never-failing water-power. Address Williams & Orton, Sterling, Ill.

Parties in want of Fine Tools or Machinists' Supplies send for price list to Goodnow & Wightman, 23 Cornhill, Boston, Mass.

Allen & Needles, 41 South Water street, Philadelphia, Manufacturers of Allen's Patent Anti-Lamina, for removing and preventing Scale in steam boilers.

Manufacturers of Tag Holders will please send address to Box 1019, St. Paul, Minn.

Manufacturers and Patentees of Machinery for cutting and sawing laths, address or send circulars to lock box 39 Lawrence, Kansas.

Parties or Manufacturers who have for sale Lathes, Drills, Boring Machines, etc., please address, giving prices, H. F. Stock, Toledo, Ohio, Box 607.

To Manufacturers—A Vegetable Cutter, just patented, that slices, minces, and grates, a hundred times faster than any other, at disposal on royalty. Rights not for sale, but district agents wanted. Address Hachenberg, Hudson, N. Y.

E. Myers, Creagerstown, Md., wishes a small article of iron made in quantity. Manufacturers please send address.

A. W. Gray & Sons, Middletown, Vt., Manufacturers of their Improved Patent Horse-power, with machines for threshing and cleaning grain. Also, machines for sawing wood with circular and cross-cut drag saws. Parties wishing any of the above machines will do well to correspond with the above manufacturers before purchasing elsewhere.

F. Cutting, Woburn, Mass, wants to communicate with J. L. Gray, Patentee, April 2d, 1867, of tin can with grooved top.

Persons having Patent Office Reports they wish to dispose of can find a purchaser by addressing Theo. Hagar, New York City Postoffice.

Bakewell's Electricity—H. C. Baird, Philadelphia, sells it—Price $2, not $12, as his advertisement erroneously stated in last issue.

A new Patent Corpse Preserver, the best thing yet invented. Its economical, simple construction saves labor and ice. The entire Right, or State and County Rights for sale. For particulars inquire of the inventor Peter Wendhiser, Rockville, Conn.

Wanted—A cheap machine to move two loaded cars on the level, four or five miles an hour. Address, giving description and price, G. H. Albee, Menasha, Wis.

Carter's combined writing and copying ink is a good article. We use it. Messrs. Carter & Bros., 36 Water st., Boston are the manufacturers. J. P. Dinsmore, 36 Dey st., New York, sell it.

H. N. Winans' anti-incrustation powder (11 Wall st., N. Y.,) has proved reliable and uninjurious in 12 years' use, in cleaning boilers.

Plow and other Agricultural Tool Manufacturers send descriptive circulars to Hughes & Rawlings, Quincy, Ill.

D. G. Smith, Carbondale, Pa., has for sale 31 volumes American Railroad Journal, 1833 to 1849, inclusive, well bound. Price $30. Also several back volumes Scientific American.

Soap and Candle Makers Wanted—A good man will find employment by sending addresses, references, salary expected, and an estimate of cost, in detail, of starting a manufactory on a small scale, by addressing Box 342, Houston, Texas.

EXTENSION NOTICES.

Lavinia L. Bartlett, administratrix of the estate of Russell D. Bartlett, deceased, of Bangor, Me., having petitioned for the extension of a patent granted to the said Russell D. Bartlett the 14th day of March, 1854, for an improvement in machines for making shovel handles, for seven years from the expiration of said patent, which takes place on the 14th day of March, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 2d day of March next.

B. G. Fitzhugh, of Elliott City, Md., having petitioned for the extension of a patent granted to him the 28th day of March, 1854, for an improvement in harvesters of grain, for seven years from the expiration of said patent, which takes place on the 28th day of March, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 9th day of March next.

Wm. H. Seymour, of Brockport, N. Y., having petitioned for the extension of a patent granted to him the 28th day of March, 1854, for an improvement in harvesters, for seven years from the expiraton of said patent, which takes place on the 28th day March, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 9th day of March next.

Improvement in Weather Board Hooks.

The implement shown in the engravings is a combination of a weather board hook, spirit level, graduated rule, marker and gage. Fig. 1 is a side view, Fig. 2 a back view, and Fig. 3 a front view of the tool. It is about twelve inches long, one inch in thickness, as in Figs. 2 and 3, and from one to two inches wide, as in Fig. 1. The back, front, and one side —that in Fig. 1—are covered with a smooth brass plate. The sides and back are perfectly straight, the middle portion of the front for about seven inches is also straight and parallel to the back. It is terminated at either end by the perpendicular walls of two shoulders, A. In the center of this side is set a spirit level, B. The back, C, of the implement is a scale or rule, graduated from the point, D, into inches and their fractions. A slide gage, E, may be moved back and forth along this graduated plate in the slot by a screw turned by the thumb knob, F. This forms a very convenient spacing gage for laying out work.

The side presented in Fig. 1 has a long groove in the brass plate in which the knob, G, slides. This knob carries a pointed blade which is held in place by the thumb nut, G, and is used to mark across the board. The conveniences and advantages of this combined tool must be apparent to every carpenter. It is the subject of letters patent granted December 31, 1867, to John Nester, of Portland, Oregon. Communications relative to rights, etc., may be addressed as above.

Fig. 1

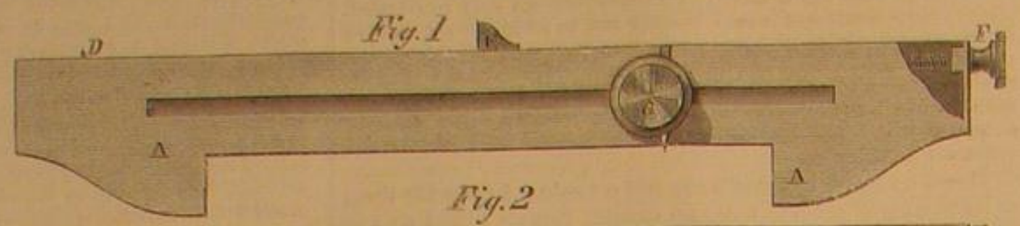


Fig. 2

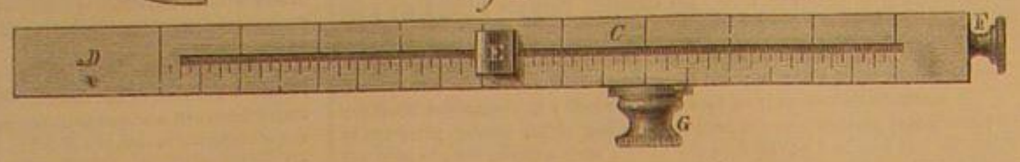
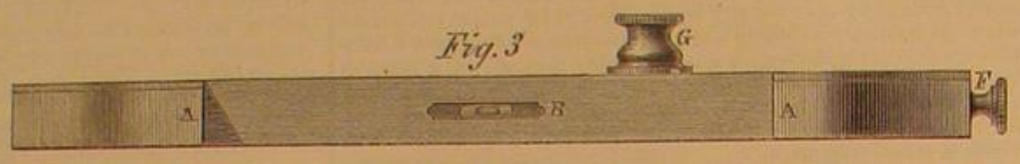


Fig. 3



NESTER'S WEATHER-BOARD HOOK & COMBINED CARPENTER'S TOOL.

Improvement in Skates.

The elegant and fascinating pastime of skating, in which at the present day all ages and classes participate so extensively, during the winter season, and which may be called one of the few pleasant smiles which seem to greet us from the countenance of hoary old Jack Frost, seemed to receive a new impetus a few years since, by the adoption of it by the ladies; and, since this very sensible assertion of woman's rights, has increased year by year, until the trade in this auxiliary to winter sports and rosy cheeks has assumed most extraordinary proportions, the number of skates of all kinds manufactured and sold in the United States amounts to fabulous sums. For a number of years skates were secured to the feet by a clumsy arrangement of straps, buckles, screws, pins, etc., and were, to say the least, inconvenient and uncomfortable. Various attempts have been made from time to time to produce an article which should take the place of these adjuncts of a winter afternoon's sport, and with various degrees of success; but none which seem to recommend themselves more highly than the one herewith illustrated, known as "Forbes' Patent Acme '67 Skate," in contradistinction to a former pattern by the same inventor, who tells us he started resolved to produce a skate which should be universally adopted, and recommend itself alike to manufacturer and user—a resolution which, we think, he has fully carried out.

Fig. 1.

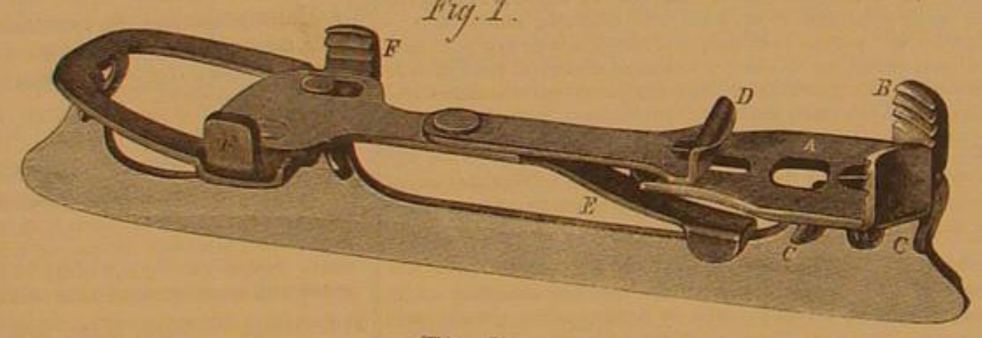
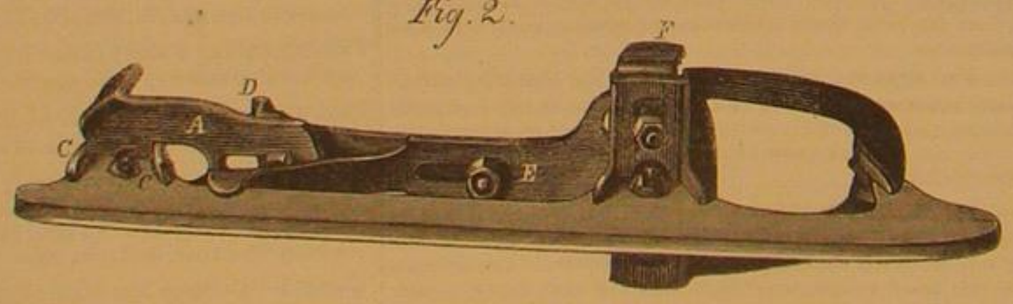


Fig. 2.



FORBES' PATENT ACME "67" SKATE.

In the engravings, A represents the heel clip, with corrugated projections, B, to engage with the back of the heel. This portion is rigidly secured to the runner by two embracing lugs, C, and a screw. The front portion, D, of the heel, is movable by means of an adjustable bolt and nut traversing in a slot in the middle piece, E, as seen plainly in Fig. 2. Two adjustable corrugated projections, F, serve to secure the front of the foot. These may be so arranged as to secure the runner in the center of the sole, or on one side, as may be desired.

The inventor says this skate has the following points of excellence: It is composed of the fewest number of pieces necessary to produce the required combination of motions. It is strong, being made from plate cast steel, entirely, except the runner. It easily adjusted to suit different boots. It requires no plates in the boots, and there are no holes to get filled up with dirt, snow, or ice. It may be readily detached from the runner, to clean or to grind the runner, and is not expensive to manufacture. It may be fitted to the boot in the center, or to the inside, as may be desired, and when once set for a pair of boots, will always occupy the same position on the foot when taken off and replaced. It is extremely light and elegant in appearance, and requires but a second or two to apply it to the foot.

Orders and communications should be addressed to Starr Manufacturing Company, Dartmouth, N. S. The right for the United States is for sale by the inventor, John Forbes, who may be addressed as above. Patented through the Scientific American Patent agency, July 2, and October 8, 1867.

Labor and Luck.

Among the wise sayings of Rev. H. W. Beecher are the following:—The mere fact that you are obliged to labor is not a misfortune. The mere fact that your labor produces slow results is not a misfortune. The thing that you desire as an alleviation would be the greatest curse to you. Do not be ashamed of that place where God has shut you up. God has put your tasks upon you, and remember that your enjoyment is to consist in the essential manliness of your nature. It is to consist in the active use of those forces which God has endowed you with, wherever his providence has put you. And if he has withheld from you some of those enjoyments which he has granted to others, be assured, if you are faithful, that in some way they will be made up to you. Do not be ashamed of hardness. Stand to it and fight out your battle. See to it that, whatever you lose—whether it be money, or place, or what not—you do not lose manhood, or courage, or honesty, or simplicity, or truthfulness. Stick to them. They are half your your life.

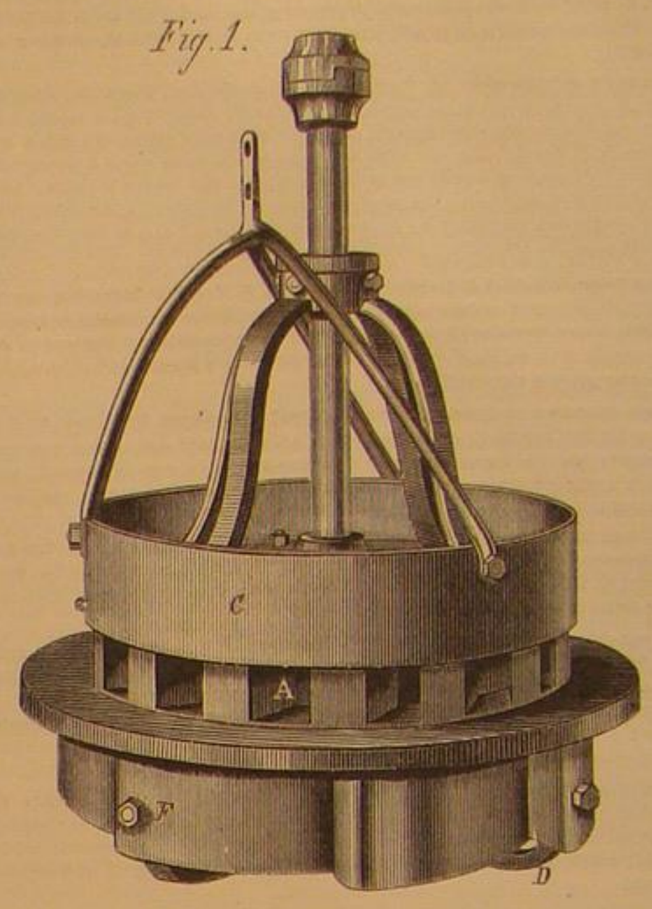
I think if you were to go from man to man, in all the ordinary channels of life, you would find very few men, if you took them at that hour when they made their secret complaints, who did not labor under the impression that though they should be resigned to their condition, it was a condition of misfortune that they were obliged to exert themselves. The young man, beginning in life, says to himself: "I am obliged to rise early, and sit up late, and labor incessantly; but I hope for a better time." Ah, yes! that better time is the fool's paradise of laziness. He is obliged to work now; but he looks forward to the time when he will not be under the necessity of working. He points to the favored sons, as he calls them, of rich men, who were not born to work, and who are useless, and worse than useless, in society, and laments that, instead of having their good fortune, he is doomed to a life of severe toil. But I tell you, what you call good fortune has been their ruin, and the necessity of laboring has been your salvation. It has been that which has made you what you have been, and what you are still. It has been a token of God's mercy to you And instead of bemoaning your condition, thank God for it.

BROWN'S DOUBLE-ACTION TURBINE WHEEL.

The turbine form of water wheel has justly obtained precedence over the breast and overshot on account of its utilization of a very large percentage of the power employed, from 75 to 85 and even 90 per cent being claimed in some cases. The principle obstacle to its best performances has been, undoubtedly, a want of proper construction to allow the easy discharge of the water after having performed its work. Possibly, also, the whole power of the water admitted to the wheel is not employed in its propulsion; and perhaps it could not be so employed. Yet anything like an approach to it would be a gain. The wheel shown in the accompanying engravings is constructed with a view to obviate these defects.

Fig. 1 is a perspective view of the wheel with the concentric gate partially closed; Fig. 2 is a plan view of the wheel, its buckets, and the outer casing, and Fig. 3 is a vertical section of one of the return or reacting buckets. A are the buckets of the wheel, the peculiar form of which is seen in Fig. 3; B, the openings or inlets for water. The gate, C, Fig. 1, can be raised or lowered as may be desired to admit the quantity of water desired. The weight of the wheel and shaft is supported by a step in the center of the spider, a part of which is seen at D, same figure. The water passes into the wheel in the direction of the arrows in Fig. 3, striking against the curved abutment, A, and passing around the partition, E, reacts against the outer wings, F, shown in perspective in Fig. 1, and by dotted lines in Fig. 2, thus giving an additional impetus to the wheel by the impact of the water.

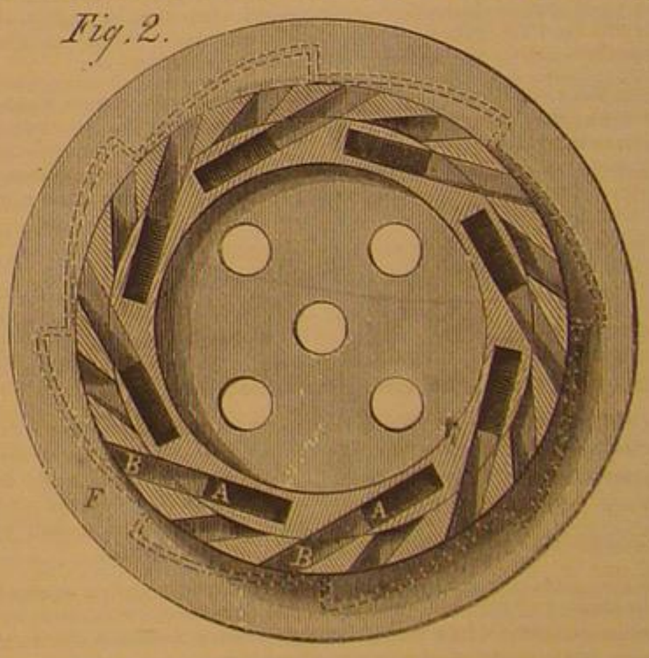
Fig. 1.



The case of the wheel is much larger in diameter than the wheel itself, and allows the free exit of the water after having performed its work. The manufacturer of the wheel says:

"In a recent trial of a wheel of this construction superintended by myself with great care the wheel gave off a clear percentage of useful effect equivalent to 90 per cent of the water expended. This, I think you will agree, is a remarkably good result, especially as nothing was left to theory or calculation, the wheel was actually put to work, the weight

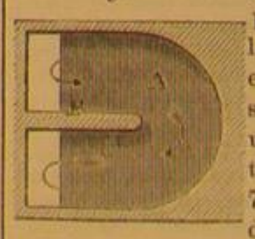
Fig. 2.



actually lifted and the friction of the apparatus employed carefully measured. My experiments extended through a number of trials with different weights and the result given above is the average, the wheel doing even better than this in some of the trials.

"The wheel used was only 30 inches in diameter and the weight lifted on the first trial was 22,728 pounds, 6 feet, 9 inches in one minute, on second trial 16,876 pounds, 11 feet, 6 inches per minute. The water expended on the first trial was 184,571,136 lbs. per minute and the weight 22,728 lbs. lifted 6 feet, 9 inches in one minute is equal to 153,414 lbs. lifted one foot in the same time. On the second trial the water used was 224,294 pounds per minute and the weight lifted in the same time 195,761·6 pounds; the average result after deducting the friction, which amounted in both trials to 2,498 pounds, is 90 per cent of useful effect."

Fig. 3



The patent for this wheel was obtained through the Scientific American Patent Agency May 1, 1866, by Harvey Brown. All communications relative to it should be addressed to Harvey Brown, Urbana, Ohio, or the Ohio Machine Works, Cincinnati, Ohio.

PETROLEUM IN ITALY.—The Government of this State has lately granted three privileges for boring wells on the territories of Farnuovo, Taro, and Medesano. Two of them have been given to American capitalists, who intend to go to work as soon as they get their "grande machine," as the Italians call them and which they expect from this country.

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VOL. XVIII., No. 3....[NEW SERIES.]....*Twenty-third Year.*

NEW YORK, SATURDAY, JANUARY 18, 1868.

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GAGING THE DIAMETER OF CYLINDRICAL BODIES.

Sometimes the simplest tools used by the mechanic are the most difficult to use properly, because of this very simplicity. The proper use of the file for instance, can be acquired only after long and patient practice, yet no tool used by mechanics is simpler in form and construction. The callipers is another instance, and even those rigid steel gages for measuring one particular size will give different apparent results in different hands. Delicacy of touch—the educated fingers—an experience acquired and rendered valuable only by long practice is necessary to the use of the callipers. The two jaws but touch at an almost infinitessimal point on either side of the object to be gaged and if that object is a cylinder the act of gaging requires much caution.

The machinist's apprentice invariably gages large, or he forces the callipers over the shaft in one place and allows it to pass without pressure in another; the consequence is an imperfect job. As much depends on the manner of use as on the reliability of the instrument. Unless the same degree of force is employed at all times and on all parts of a shaft in callipering, the result is imperfect work. Testing a turned shaft while rotating is eminently unreliable; the presence of oil or dirt on the surface of the shaft will render the gaging inaccurate, and callipering a shaft on the rough surface left by a dull tool is useless.

It is surprising that mechanics do not more generally use a gage that measures the whole circumference rather than one that touches it at only two points. The callipers is valuable in detecting irregularities in the cylindrical form, but a simpler tool will more accurately determine the size of one portion as compared with another. It is merely a flattened copper or steel wire furnished with a handle at each end. When used, one end is passed under and around the shaft and drawn past the other, one end being held in one hand and one in the other. By slacking up a trifle and moving the wire back and forth around the shaft it will accurately fit the shaft's surface, when a line can be drawn with a scratch-awl across both parts of the wire where they pass each other on the shaft. These lines will be the gage for the size until the job is finished. If the shaft is too large the two lines will not meet and if too small they will pass each other. Copper is preferable to steel wire, as it is more yielding to the curvature of the surface of the shaft. Of course this is not to be used while the shaft is turning, as the wire would soon become enlarged by wear. For ordinary purposes the callipers are sufficient, but where accuracy is required we commend a trial of the wire callipers.

ENGINEERING TALENT REQUIRED IN AGRICULTURE.

This country is new. Although portions of it have been settled by civilized men more than two centuries, yet those portions, the earliest settled, are still new when compared with European countries. Neither Virginia, the site of the first English settlement, nor Massachusetts, the home of the pilgrims, exhibits the careful culture or even the settled appearance of many European localities. Vast tracts of valuable land lie unreclaimed in Virginia; and almost as large an amount in the aggregate, although distributed in smaller parcels, are fallow and untouched in the Eastern States. These neglected lands, valuable only as pastures, are really the richest on our farms. They are called "sour," barren, and "cold," but they need only judicious aid to become generous, fertile, and valuable. Marshes may be made fields, swamps be reclaimed and made fertile meadows, and sand hills, gardens, by the employment of manual skill, guided and directed by scientific knowledge. Our now barren hillsides may be made to yield a good return for labor judiciously expended. Our swamps, instead of breeding musketoes and malaria, may be made to return a rich harvest of edible products, and our rocky, stony, slopes to give sustenance to sun-loving products with the aid of intelligent management joined to industrious carefulness.

We do not advise the expenditure of money upon all lands now unproductive. Happily we have millions of acres of the richest soil unimproved and unused which require no outlay beyond the ordinary labors of the husbandman to produce in profusion grain, vegetables, and fruits. But there are localities in the immediate vicinity of our mercantile and manufacturing centers which would richly repay the expenditure of scientific talent as well as manual labor.

For this result we need the direction of our engineering and scientific talent into this purely utilitarian channel. We need agricultural engineers. Engineering, as at present understood in this country, is considered nothing unless directed to the inception and completion of large works of a private nature, or those of a public character. Farming, unless "landscape farming," the decoration of the villa of some retired business man or ambitious ruralizer, or the laying-out of some public park, is almost entirely ignored by our engineers.

We are aware that much money and time has been spent within the past fifteen years in amateur farming, each landholder being his own engineer as well as manager. Most of those who desire to improve the condition of their lands have believed that but little practical knowledge was required; the theories obtained from manuals and periodicals they supposed all-sufficient. Perhaps this was and is a mistake. It may be possible that men, not practical or resident farmers, might know better what to do to reclaim a bit of waste land than the farmer himself; at least such men are to be found in Europe, and we do not believe they are wanting in this country. Certainly there is room for the exercise of engineering talent, beside the building of bridges, aqueducts, tunnels, and other works of a public character, and for the proper employment of scientific knowledge. Notwithstanding the rapid increase in our manufacturing facilities, we shall still be, as a nation, agricultural. It would be well that our scientific mechanics believed this and diverted some of their talents to the improvement of the land. When they do this we may look for a new era in the development of our natural resources. The field is wide and extensive, but the laborers—the willing laborers—are few.

THE CARE OF WATER PIPES IN WINTER.

Where water is conveyed to dwellings by pipes whose ramifications extend through the building, it is difficult to prevent it from freezing, as however perfectly the house is warmed there are passages in the walls, under the floors, through the area, and in other places where the heat cannot affect the pipes. Severely cold nights will at times leave the evidence of their recurrence either in frozen or ruptured pipes.

A common plan adopted is to leave the water running during the night, which besides being wasteful and extravagant where the water must be paid for and the supply is limited, is not always effectual. The freezing begins from the outside of the pipe, and allowing a diminutive stream to flow through the cold hours of the night may diminish the danger of freezing but not entirely prevent it. The proper method is to have a cock in the cellar by which the water can be turned off from the distributing pipes.

When a pipe is frozen, pouring down hot water is of no use. It is speedily cooled and becomes as cold as the pipe, while it cannot be removed. Cloths wound about the pipe and hot water poured upon the cloths is the most effectual means for thawing frozen pipes we have ever tried. Still with any preventives or remedies, constant care and judicious management are required to prevent annoyances from frozen water pipes.

THE WEAR OF IRON RAILS.

Railway managers and stockholders, if not the public generally, are well aware that the life of rails lately laid is much much shorter than those put down when railroading was in its infancy in this country. The *Railway Times* states that "in one case on the Boston and Providence line, iron rails have been in continuous use on the main track over thirty years; in an other on the New Bedford and Taunton, iron rails have worn twenty-seven years, and are still in good condition; and the original 45-pound rail laid down on the Philadelphia and Reading lasted over twenty years under an amount of traffic unsurpassed in this country; and we have several other accounts of rails that have worn from fifteen to twenty years. The rails especially mentioned above were of English make, or rather Welsh make, and weighed only 45 pounds to the yard. The specifications for the manufacture of these rails were very short, and were stated concisely as follows:—'Best No. 1 cold-blast mine iron was first run out in a finery fire; second, puddled, and the balls shingled under tilt hammers; third, rolled into bars; fourth, these bars were cut, piled, heated, and hammered into blooms; and fifth, these were re-heated and rolled into rails.' The rails thus made and thus light in weight, stood an amount of wear very much greater than rails since made have been capable of, even when the weight is double per yard. Indeed it has been in one instance, shown by templates, that the wear of a 62-pound modern-made rail is greater in a use of a single year than that of the old 45-pound rail in a continuous wear of twelve years."

It is well known that a large proportion of modern made rails have worn so as to need repairing within two years after being laid, and in many cases they were entirely worn out in five years. It is certain that as good ore can now be obtained as could be twenty or thirty years ago, and that the processes of working iron have received many improvements; so it would seem that we might obtain rails not only equal to those mentioned above, but that we ought to get superior work. Whether the opposite result is to be attributed to the parsimony of railroad managers or the cupidity of manufacturers is a question we do not care to discuss. It is certain, however, that true economy and real business enterprise demand an improvement. Perhaps the authority from which we quote is correct when it says:—

"The iron can be under-worked, leaving too much cinder in it, the common fault, or it may be over-worked, as it is found in practice that the old 45-pound rail, so remarkable for its wearing qualities, when re-worked into rail looses its original superiority, and is apt to be too soft. The mixture and amount of working needed to give the great wearing qualities pertaining to the earlier make of iron rails, we think rail manufacturers could easily find, if railway managers would pay a fair price for the article when made. Wearing qualities are worth paying for in rails as in every thing else. A machine that will last twenty years, doing a given amount of work, is surely worth double that of one that will not last but five years. Our remarks are just as applicable to steel rails as to iron. Railway managers must insist upon good wearing qualities, and rail manufacturers may very properly insist upon being well paid for good work."

IRON WORKING---THE PUDDLING PROCESS.

Our article on puddling, published on page 361, Vol. XVII., has brought out several letters from practical men. P. McC., of New Jersey, says: "Your article is in the right direction. If there is any one employment in the mechanic arts which calls for improvement by the inventive genius of the age, it is that of puddling. In the first stage of the process, when the metal is melting, and in fact until it has reached what is termed a "foment," it exhibits the strangest tendency to stick to the bottom, back wall, bridges, jambs, etc., and if allowed to do so, there it must usually remain until loosened by the increasing heat. While "balling," bad melting cannot be remedied; the iron that was permitted to stick has not advanced a stage, yet it must be got rid of. It will not run off with the slag, and it is "sopped" up by rolling the balls into the now fomented iron, until absorbed. The after working, squaring, rolling, heating, etc., will work out some of it, but not all. This is the greatest difficulty encountered in the adaptation of mechanism as a substitute for the live puddler, who has eyes to see, judgment to guide, and hands to manipulate the contents of the fiery furnace."

W. R. J., of Pennsylvania, writes: "Your article on the puddling process will, I know, be read with great interest by all your readers concerned in the manufacture of iron. I have always thought that this most important process has never received the attention it deserved from those writing on cognate subjects. I am satisfied that there are a great many of the readers (myself among the number) of your excellent paper that would like to see the article referred to followed up by some of our practical men in a series of articles on this important subject; and carried through the rolling-mill department. I have been a weekly reader of your valuable journal for a long time, but have never summoned up courage to write to you on this subject. But as you have introduced it in such an able manner I hope to see a continuation, and ask you to invite the attention of persons qualified to communicate the results of their experience to numbers of American iron workers who are anxious to learn."

A Popular Error.

Sometime ago we noticed in an exchange a statement that "some old iron is rendered much more valuable by being knocked about. Thus, old iron in the form of horseshoe nails, and, indeed, horseshoes themselve, fetch a much higher price than the original metal from which they were made; the toughness it acquires by constant blows and concussions gives it a greatly enhanced value in the market." We much doubt this; the toughest wrought iron rather becomes deteriorated by "constant blows and concussions," unless these blows are given while the material is in a semi-plastic state, as when red hot. It is well known that the material for horseshoes and horseshoe nails is of the toughest and most fibrous iron. It is not uncommon to see a farrier or a country blacksmith take a nail rod, and without placing it in the fire, form a nail which, by the percussion of hammer and anvil, becomes red-hot, so that the finished nail is cut off and falls glowing at the foot of the anvil. This could not be done with any but the toughest iron. Possibly the thorough hammer-working to which horseshoes and horseshoe nails are subjected in the process of their transition from the bar to the finished article enhances their value so that they may fetch a higher price than the original metal; but the reason is not to be found in their use on the feet of horses or on pavements, but in the toughness acquired in their manipulation.

The Coroner's Jury on the "Angola" Disaster.

The coroner's inquest into the causes of the late railroad disaster at Angola, N. Y., after eleven days' investigation, has decided that the accident was caused by a bent axle under the car which was burned—the last car on the track, that which first left the rails. The jury recommended the adoption and enforcement of a more thorough system of gaging and inspecting wheels and axles.

THE SURGEON GENERAL'S REPORT for the year ending July 1st, just received, shows that during this period two hundred and eighty soldiers were furnished with artificial legs; two hundred and thirty-six with arms, and thirty-eight with surgical apparatus. Six feet, nine hands, three eyes, and one palate complete the list of artificial substitutes provided for the loss of dame nature's gifts.

STEEL WHEELS AND AXLES.

Men whose business it is to know such things are aware that cast iron is the poorest of all metals to withstand shock or strain, and that its cheapness and the facility with which it can be produced, is the sole reason of its adoption for general purposes. In proof of this assertion we have only to refer to the continual efforts made to improve its character by alloying it with copper, wrought iron, and other metals, but the general results have not been satisfactory or at all uniform. Cast steel has also been tried for castings, but except in a few instances, no reliability as to soundness and strength has been attained.

Steel ingots, of course, are cast daily comparatively free from flaws, but these are cast in iron molds which are not admissible save for the plainest forms of castings in steel. It is impracticable for this reason alone, if for no other, to make molds for steel castings for general purposes, and the production of castings, which are well known to have a much higher cohesive strength than iron, has been greatly delayed. By long experience, however, and after a series of costly experiments, Mr. Wm. Butcher, formerly of Sheffield, Eng., but now of the steel works bearing his name in Philadelphia, has been able to cast and core out steel in green sand molds from wooden patterns, and to produce a metal which, for soundness and strength has never been equalled. The results are certainly gratifying to every mechanic as regards advancement in this branch of trade. We have seen spur wheels, pinions, bevel wheels, railway frogs, hydraulic cylinders, cams, and mechanic work generally, made under his direction, which were beautiful specimens of work. The car wheels in particular merit great attention and will bear the closest scrutiny as regards soundness and strength. In the latter quality they are far in advance of the very best cast-iron gun metal we have ever seen. The best tests by government do not show more than 88,000 pounds to the square inch, tensile strength for cast-iron gun metal, whereas a piece of one inch section, taken from one of these car wheels, tested in a machine at Whitney & Son's Car Wheel Works, gave the extraordinary result of 82,347 pounds. When it is considered that the limit of endurance claimed for wrought iron is 55,000 and 60,000 pounds, some idea can be formed of the tenacity of this metal.

We speak in this connection merely of "cast" steel, and not of that which has been hammered. It will readily be conceded that metal of the same quality, subjected to the hammer, would have a tensile strength unsurpassed. Indeed steel axles of the make alluded to—4¾ inches diameter, supported three feet apart—have borne the impact of 630 pounds falling 26 feet, 37 times, with an average deflection of 2½ inches back and forth before breaking. Such endurance as this requires no further comment.

It is gratifying to know that railway managers are availing themselves of Mr. Butcher's skill and experience, not only for its pecuniary value to their companies, but what is of far greater importance, the safety of their passengers.

We feel that we are doing them a service in setting forth these facts as strongly as possible, and that the success of accidents from broken flanges and "sprung axles" are rapidly diminishing with their introduction.

Diseases of the Stomach.

The following practical hints on the nature and treatment of certain diseases we copy from that most excellent monthly, the *Herald of Health*:

CHRONIC INFLAMMATION.—Sub-acute gastritis, or chronic inflammation of the stomach, is of frequent occurrence. It sometimes follows acute gastritis, but is more often developed by unphysiological habits. In many of its symptoms it resembles acute dyspepsia, or a mere functional derangement of the stomach, and it is not always easy to discriminate between the two. The stomach is far more liable to chronic than to acute inflammation.

CAUSES.—Among the most prominent causes may be named alcoholic stimulants, hot tea and coffee, over-eating, the use of mustard, vinegar, pickles, horse radish, pepper, condiments, irritating medicines, corrosive poisons, etc. When we consider what an incongruous amount of stuff is taken into the stomach at a modern luxurious dinner, we ought not to be surprised that this organ is frequently the seat of severe trouble. Soup, fish, flesh, oil, vinegar, pastry, confectionery, ice cream, nuts, fruits, vegetables, wines, and numberless other minor ingredients, of conflicting chemical qualities, are among the materials "thrown in." Stir these things all up in a vessel together, and who of us would not sicken at the appearance and oder. Yet at a modern dinner it is a common thing to have all these heterogeneous substances crammed into the human stomach, there to ferment and generate those vicious and pernicious gases that cause disease. Truly "Man is fearfully and wonderfully made;" no other creature could exist on such a diet. It would kill a gorilla in a month. It does kill, although more slowly, thousands of that high and mighty variety of the human race commonly called "gentlemen." Violent exercise after eating, large drafts of cold water when the body is heated, and the habit of constant stuffing, will, after a time, cause chronic inflammation of the stomach. Long fasting is said to be a cause, though this is not generally the case. This condition is sometimes observed in dogs who have died of starvation. Arsenic and other substances applied to external wounds may cause it.

SECRETS OF HEALTH.—First, keep warm. Second, eat regularly and slowly. Third, maintain regular bodily habits. Fourth, take early and very light suppers. Fifth, keep a clean skin. Sixth, get plenty of sleep at night. Seventh, keep cheerful and respectable company. Eighth, keep out of debt. Ninth, don't set your mind on things you don't need. Tenth, mind your own business. Eleventh, don't set up to be a sharp of any kind. Twelfth, subdue curiosity. Thirteenth, avoid drugs.

TREATMENT OF CONSUMPTION.—It seems at first sight as superfluous to state that in a disease of debility like consumption, patients should breathe pure air, as that they should have good nourishing food, but it is not so. Theoretically, the value of pure air is accepted; but practically it is universally neglected. Healthful respiration has yet to be applied not only to every-day life, but in the treatment of disease. In ill health, and particularly diseases of the respiratory organs, the dictates of science and common sense are grossly outraged. If those persons who have consumption, or who have an inclination to it would spend an hour every day in breathing pure air to the fullest extent to which their lungs are capable of taking it in, they would do more to prevent and cure this disease than it is possible to do by medication.

Effect of Darkness and Silence.

Dr. Kane, and other Arctic voyagers, have all testified that in those regions "where eternal silence reigns supreme," the effect upon the brain and ear from the absence of sonorous impulses in the atmosphere is exceedingly annoying and absolutely injurious to the auditory nerves. As the organs of hearing are destroyed by loud and continued noise, and an intense light will weaken and ultimately destroy the power of sight, so it would appear that the auditory, or optic, nerves become impaired by the partial or total deprivation of their natural stimulus, sound or light. Dr. H. Ralls Smith, of Chicago, wishing experimentally to investigate this subject, recently spent a considerable length of time in the Kentucky Mammoth Cave, where silence and impenetrable darkness reigned supreme. The effect was very distressing and almost insurmountable, resulting in temporary defection of hearing and aberration of mind. From his own experience this gentleman is firmly convinced that the blindness of the finny denizens of this cave has been brought about gradually through successive generations, and from his observations he is confident that the sense of hearing is also wanting in these beings, although originally existing in the species when first immersed in their living tomb.

Obituary.

WILLIAM MITCHELL GILLESPIE died on the first day of the present year, at the residence of his father, in New York city. He was a native of New Yock State, a graduate of Columbia College, and subsequently Professor of civil engineering in Union College, a position he retained until his death. He was the author of a practical manual on "Roads and Railroads," generally regarded as a text book and authority; of an abstract of the writings of Auguste Compte, and of a volume entitled "Land Surveying," beside many articles furnished to the journalistic press. He was quite independent in his modes of thought, genial in manner, although somewhat finical, a warm friend, a thorough student, and honest investigator. He was much beloved by those under his care, as a teacher, and highly appreciated not only by the faculty of the college, but by a large circle of friends, as well as by the scientific world at large.

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office,

FOR THE WEEK ENDING DECEMBER 31, 1867.

Reported Officially for the Scientific American

PATENTS ARE GRANTED FOR SEVENTEEN YEARS the following 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.*

72,711.—PAPER FILE.—James Adair, Pittsburgh, Pa.

I claim the paper holder, as a new article of manufacture, constructed substantially as described.

72,712.—HAND GRIPPING TOOL.—E. A. Alpress, Bristol, Conn.

I claim as a new improved article of manufacture, tongs or pliers, the handles, S, pivoted together at a', their outer ends pivoted to the jaw, c c, while the rear ends, d d, of said jaws work in sockets, 11, to produce the opening and closing of said jaws parallel to each other, substantially as described.

72,713.—ANIMAL TRAP.—S. M. Armstead, Grand Haven, Mich.

I claim, 1st, The method of raising the trap door, A, by means of the connecting chain, B, and the treadle, C, arranged substantially as described, for the purposes described.

2d, The spring hook, D, and its attachment to the bait hooks, E E, operating substantially as described for the purpose indicated.

3d, The combination of the trap door, A, the connecting chain, B, the treadle, C, the spring hooks, D, and the bait hooks, E E, with the box, F, and cage, G, arranged to operate substantially as set forth for the purposes designed.

72,714.—STEAM ENGINE.—Wm. Ball, Chicopee, Mass.

I claim in a steam cylinder the arrangement of the depressions, t, formed with reference to their induction and eduction ports at points intermediate between the ends of and around the inside circumference of the cylinder, substantially as and for the purpose described.

The arrangement of the steam passages, k, for conducting steam from the cylinder, below the piston head, in its ascent, around into space between the piston and cylinder head, to form a cushion for said piston, substantially as shown and described.

In said cylinder, the arrangement of ports, h1 h2 h3 h4, for operating the valves thereof, substantially as described.

The cut-off valve, f, in combination with the balance valve, c'', and piston, c, substantially as described.

The steam port, 1, in combination with port, 2, so arranged as to hold the piston in a fixed position until released, to prevent damage to the lower head of the cylinder, substantially as shown and described.

The arrangement of the steam exhaust port, 4, by which a free exhaust of steam from the upper end of the cylinder is effected before the ascent of the valve, c'', substantially as shown and described.

Producing a rotary reciprocating in connection with a vertical motion of the piston, c, in connection with one or more ports, h1 h2 h3 h4, substantially as shown and described.

The port, 4, arranged with reference to the ports, 6 and 7, whereby a free exhaust is secured after the ascent of the piston, c, and by which, in connection with the steam cushion at the upper end of the cylinder, all injury is prevented to the cylinder in its ascent, substantially as described.

72,715.—MACHINE FOR STAMPING ORES.—Wm. Ball, Chicopee, Mass.

I claim, 1st, In connection with a quartz crushing machine, the sills, D, when constructed of metal in place of wood, as and for the purpose described.

2d, Arranging the bed plate, J, crosswise of a series of spring timbers, E, having their bearing upon metallic sills, D, substantially as and for the purpose described.

3d, The construction of the staves, e', tapering in form from the bottom toward the top, as specified, to suit the bell form of the mortar, substantially as and for the purpose set forth.

4th, The hammer die, c, in combination with the surrounding stave-holding ring, e', substantially as and for the purpose described.

5th, The two-part ring, h, secured beneath the top plate, and between it and the lining around the stamp-shaft opening, substantially as and for the purpose described.

6th, A tubular urn-shape ring necking, d, made in two parts, and secured upon the top plate around the stamp-shaft opening substantially as and for the purpose described.

7th, The connection of the stamp shaft, K, with the steam piston, I, by means of the bonnet, l'', flange, i', and collar, j, with the interposed elastic washers, as described, all arranged and combined together in the manner and for the purpose set forth.

72,716.—MANUFACTURE OF SLEIGH BELLS.—Wm. E. Barton, East Hampton, Conn.

I claim the globular sleigh bell, cast in one piece, as herein described.

72,717.—CAR COUPLING.—Edwin R. Bigelow, Salem, Mass.

I claim the arrangement and combination of the opening, f, in the top of the draw-bar chamber with the tumbler, made substantially in the manner, and arranged in rear of the mouth of the draw bar, and applied thereto, so as to operate with a compound motion, as specified.

Also the arrangement of the journals or pin, c, of the tumbler, so as to be below that part of the tumbler which supports the pin when the tumbler is in its lowest position, in combination with vertical slots, d', made in the sides of the chamber, d, of the draw bar, the tumbler being formed substantially as represented.

Also the arrangement as well as the combination of the abutments, or their equivalent, with the draw bar, and with the tumbler applied thereto, so as to operate with a compound motion, as and under circumstances substantially as hereinbefore set forth.

72,718.—HEAD ROLLS FOR PIN MACHINES.—E. F. Bradley (assignor to Howe Manufacturing Co.), Birmingham, Conn.

I claim the combination of the two wheels, B C, having a groove formed in each of their peripheries, and revolving at different surface velocities, when arranged in relative position to the carrying device substantially in the manner herein set forth.

72,719.—METHOD OF MAKING HUB BANDS.—Edwin B. Butler, New Britain, Conn.

I claim the method herein described of making hub bands, that is to say, take a strip of metal of width equal to that required for the band, and of proper length, welding the two ends of said strip together, and afterward swaging the same in dies, constructed substantially as set forth.

72,720.—STEAM GENERATOR.—G. H. Clarke, Brooklyn, N.Y.

I claim the arrangement of the series of hollow balls constructed substantially as described.

72,721.—WIND WORM FOR BLACKSMITHS' BELLOWS.—Christopher F. Conrad, Adrian, Mich.

I claim the serpentine wind channel, C B, constructed and operating in the manner and for the purposes substantially as set forth.

72,722.—HARVESTER.—Robert F. Cooke (assignor to himself and Peyton B. W. Cooke), Newark, N. J.

I claim the cam wheels or grooved drum, R, constructed with inclined and straight surfaces, r r', alternately, so that when the inclined surfaces, r, pass the lever, motion will be communicated to the knives, and when the straight surfaces, r', pass the lever, the knives will be at rest, substantially as and for the purposes described.

72,723.—BURGLAR ALARM.—C. J. Crum and Wesley Irwin (assignors to C. J. Crum and James Harsha), Circleville, Ohio.

We claim, 1st, The combination with the stock, A, and notched flange, a a1 a1, of the hammer, E, spring, D, rod, C, match-lighting nipple F, and a screw or other attaching device, K, substantially as described.

2d, The combination with the parts, A a D E and F, of the lamp bracket, H, and match holder, J, substantially as described.

72,724.—HEEL SHAVE FOR BOOTS AND SHOES.—F. S. Dawes, Hudson, Mass.

I claim, 1st, The combination with the slotted parts, D D, of the bridge, A, screws, d d, and blade, C, substantially as and for the purposes set forth.

2d, The combination with the slotted pieces, D D, bridge, A, and handles, B B, of the blade, C, guard piece, F, and screws, d d and f f, substantially as and for the purposes set forth.

72,725.—WATER DRAWER.—James Daykin, Cleveland, Ohio.

I claim the yoke or loop, C, and stem, E, as arranged in combination with the valve, F, and spout, A, for the purpose and in the manner substantially as set forth.

72,726.—MACHINE FOR BLOCKING AND SHAPING HATS.—Rudolf Elckemeyer (assignor to Elckemeyer Hat Blocking Machine Co.), Yonkers, N. Y.

I claim, 1st, Introducing steam within the banding shell, during the operation of stretching and blocking the hat body, substantially as and for the purposes described.

2d, In combination with a banding shell, or a series of banding shells, a valve controlling the steam passage thereto, connected with and moved from the vibrating frame or some other part of the machine, which moves in unison with the holding plates, substantially as described, whereby the valve is automatically opened to admit steam within the banding shell during the operation of stretching and blocking, and closed at other times to prevent the waste of steam.

3d, The combination and arrangement of a series of banding shells upon a wheel provided with a locking mechanism, and organized with respect to the hat block and holding plates, substantially as described, whereby the operator can readily shift the shells to correspond with required changes of size of hats, substantially as set forth.

4th, The arrangement and combination of the separate steam passages from the banding shells through the wheel, with the bearing and steam passage through the horizontal shaft on which the wheel of shells turns, substantially as described, whereby the steam is cut off from all the banding shells of the series except the one which is in the proper place to coöperate with the hat block and holding plates.

72,727.—BOOTS AND SHOES.—Alfred B. Ely, Newton, Mass.

I claim the use of resinous bodies combined with fibrous materials, substantially as described

Also a heel stiffener made of the above described substances, and formed into shape by means of heat and pressure, substantially as set forth.

Also a heel stiffener made of felted or woven fabric, saturated with resinous material, so that the article, when shaped under heat and pressure, shall possess the proper hardness and elasticity, substantially as described.

72,728.—BEATER PRESS.—George Ertel, Liberty, Ill.

I claim, 1st, The combination of a compressing and beater press, when arranged substantially as shown and described.

2d, The combination of the driving wheel, K, the slotted shaft, P, and the tongue, y, of a combined compressing and beater press, when constructed and arranged substantially as shown and specified.

72,729.—ATTACHMENT FOR SAFETY BRIDLES.—Reuben Fink, Lancaster, Pa.

I claim the lever, A, with its eye, a, and central pivot, b, on which is hinged a curved bearing, B, all combined and arranged in the manner and for the purpose specified and shown.

72,730.—GANG PLOW.—Wm. Foster, Greenfield, Ind.

I claim, 1st, In combination with the pivoted tongue, C, the guide straps or bars, L, pivoted jaws, M M', and treadles, N N', substantially as and for the purpose described.

2d, In combination with the treadles, N N', and pivoted jaws, M M', the spring, O, and stops, P P', substantially as and for the purpose specified.

3d, The upright lever, K, in combination with the frame, E F ff', and foot board, A2 k, arranged and adapted to be operated substantially as and for the purpose set forth.

72,731.—APPARATUS FOR COOLING BEER AND OTHER LIQUIDS.—Patrick H. Griffin, Albany, N. Y.

I claim, 1st, The employment of a series of chambers to receive and transmit the liquid to be cooled, in combination with each other, placed one above the other, as described, their floors being perforated so as to permit the liquid to fall in drops from the one to the other, being subjected in each chamber to a blast of air to facilitate cooling.

2d, The combination of an apparatus, as described, with a surface-cooling apparatus, substantially such as the hollow walls, and the coil of pipe, described in the above specification.

72,732.—FAN.—T. W. Hawkins, New Haven, assignor to himself and Moses Hawkins, Birmingham, Conn.

I claim, in combination with the several splints, B C D, etc., and the handles, A, the flange plate, E, when arranged so as to operate in the manner described.

72,733.—BEER COOLER.—Henry Heimerle, Buffalo, N. Y.

I claim, 1st, The combination and arrangement of the upright tank, A, with the inclined pipes or conductors, B, for the purpose and substantially as herein described.

2d, The combination and arrangement of the tank, A, conductors, B, and open troughs, C, constructed as and for the purpose herein described.

72,734.—BRICK FOR CURVED MASONRY WORK.—Edward Hennessey, Washington county, D. C.

I claim the bricks, made of stone or any material, corrugated and tapering, as herein described, for conduits or curved work, as in masonry, to prevent the bursting or collapsing thereof.

72,735.—SHEEPSHEARS.—John T. Henry, Hamden, Conn.

I claim, 1st, The head, C D, formed upon or attached to the shank of the blades, and constructed relatively to the edge of the blades, so that the two parts, C D, will bear hard together at the extreme point from the blades, and opening toward the blades so as to be adjusted by the screw, H, to govern the bearing of the blades upon each other, substantially as herein set forth.

2d, In combination with the blades, E F, and respective arms, A B, the head constructed so as to conceal the spring, substantially as set forth.

3d, In combination with the blades, E F, and the spring, G, the adjusting screws, a and b, in the arms of the respective blades, so as to operate in the manner described.

4th, The link, I, in combination with the two arms, A and B, arranged so as to adjust the opening, substantially as herein set forth.

72,736.—WAGON BODY.—Geo. W. Hoskin, Philadelphia, Pa.

I claim the inclined wagon body, D, arranged substantially as and for the purpose herein specified.

72,737.—FOUR-WHEELED VEHICLE.—Dean W. Hutchinson, Big Spring, Kansas.

I claim the attachment to four-wheeled vehicles of the cog plates, A A A A, the cog wheels, B B, the fifth wheels, G G, the arms, E E E E, the kingbolts, D D, the strap, H, the lock bolts, K K, the braces, L L L L, combined, constructed, and operated, as above described.

72,738.—PIANO FORTE ACTION.—Alexander B. Irving, Indianapolis, Ind.

I claim the repeating arm, C, attached to the key, A, and adjusted by means of the set screws, K L, spring, I, and set screw, J, the butt, D, attached to the arm, C, and jack, E, attached to the butt piece, G, of the hammer, the whole constructed and arranged substantially as set forth and described.

72,739.—MODE OF CONSTRUCTING SEWING MACHINE CASES.—John Johnson, Hartford, Conn.

I claim, as an article of manufacture, a sewing machine case, as described, viz., the tongue and groove miter joints, including panels, substantially as described.

72,740.—CLINOMETER AND LEVEL.—John L. L. Knox, Pittsburgh, Pa.

I claim a combined clinometer, plumb, and level, having a vertical circular box, with an arrangement of scales so graduated as to give, in connection with one or more index-fingers, the amount of deflection of an object from a vertical or horizontal position, in both circular and linear measurement, substantially as above set forth.

72,741.—TIP FOR GAS BURNER.—Reinhold Lanstrom, Cincinnati, Ohio.

I claim, 1st, The application of soapstone in the construction of tips for gas burners, when constructed and applied substantially as above described and shown.

Also, a new article of manufacture in the soapstone tips for gas burners, herein described.

72,742.—ELECTRICAL INDICATOR.—Samuel S. Laws, New York city.

I claim, 1st, An electro-magnetic indicating apparatus or instrument, whose indicating or working device can, by means of a single-toothed wheel and suitable mechanism, such as described, or its equivalent, be moved step by step in either of opposite directions, at will, in the manner and for the purposes specified.

2d, The lever, G or G2, having an armature at one end, and a spring pawl, J and J2, at the other, the spring stop pawls, K K2, the connecting rods, M M2, and the toothed wheel, E, when all combined and arranged together substantially and so as to operate as and for the purpose specified.

3d, The stop pawls, K K2, when arranged in connection with either one or both of the levers, G G2, and toothed wheel, E, or their respective equivalents, so as to operate substantially in the manner and for the purpose described.

72,743.—HARNESS SADDLE.—Wm. Leonard, Boston, Mass.

I claim a saddle, having its hair stuffing, d, protected from contact with the cloth, e, by an impervious lining, f, which is cemented to the inner surface of the cloth, substantially as set forth.

72,744.—COOLING MILLSTONES AND CURB.—John Mallin, Bedford, Ohio.

I claim the openings, E D, diaphragm, G, and fan, H, all combined and arranged as and for the purpose set forth.

72,745.—SOUND-BOARD FOR PIANO FORTE.—Lorenzo Matt, Boston, Mass.

I claim as my invention, the improved sounding-board made substantially as described, viz., of a series of layers of wood, differing in their widths, and tapering in their transverse sections, and laid flatwise on each other, and glued or cemented together with the grain of each one of the series crossing that of the next adjacent one at acute angles, all essentially as hereinbefore described, and as represented in the accompanying drawings.

72,746.—KETTLE.—H. Matthews, South Yarmouth, Mass.

I claim the combination and arrangement of the notched brace, D, with the cover, B, and the body, A, of the kettle.

72,747.—DIE STOCK FOR CUTTING SCREWS.—Duncan McArthur, New Haven, Conn.

I claim the arrangement described of the ring, C, with its cams, e, and plate E, combined with the dies, d, and the adjusting rack, O, the whole constructed so as to operate in the manner herein set forth.

72,748.—WHIP HANGER.—S. C. Merriam (assignor to himself and Daniel W. Talcott), New York city.

I claim the arrangement of two levers, B B, in combination with a wedge-shaped block, D, constructed and operating together in the manner and for the purpose substantially as set forth.

72,749.—WINDOW SHUTTER.—Philip Miller, Sharpsburg, Pa.

I claim the construction of a detachable inside window shutter, consisting of a frame, b, hinged sash or sashes, c, with removable panels of a translucent fabric stretched or spread over side and end pieces, I I, substantially as and for the purposes hereinbefore set forth.

72,750.—STEAM-ENGINE VALVE.—J. F. Morse, Oshkosh, Wis.

I claim, 1st, A balanced oscillating valve, having its face-plates, h and g, so arranged that as they are worn they may be adjusted by the wedges, o, constructed and arranged to operate substantially as described.

2d, The wedges, o, and nut, q, when constructed and arranged to operate substantially as described and for the purpose set forth.

72,751.—SEWING GUIDE.—Peter H. Niles, Boston, Mass,

I claim a sewing guide composed of a ring or clasp, provided with a rib, c, substantially as herein described and for the purpose specified.

72,752.—COW CATCHER FOR PREVENTING ACCIDENTS ON RAILROADS.—Wilson J. Orr, Manorville, Pa.

I claim the combination, with a locomotive cow catcher, of an interior sliding frame with projecting spikes or points, when constructed and arranged as herein described.

72,753.—MACHINE FOR PEGGING BOOTS AND SHOES.—D. D. Palmer, Waltham, Mass.

I claim, 1st, The stock, A, as constructed, and the sliding punch, B, having a toothed rack, e, connecting with the pinion, f, disk, g, and pitman, h, for operating the slide, D as herein described.

2d, The movable piece or stock, E, pivoted to the handle or stock, A, for holding the awl slide or holder, D, as also the peg driving punch, H, and cutting blade, j, as herein set forth.

3d, The lever, O, pawl, P, and guide, M, as arranged, in combination with the slide, B, for feeding in the strips of peg wood to be cut by the combined action of the knives, J and N, and driven by the punch, H, substantially as herein specified.

4th, The combination of the stationary block, K, guide, M, cutter, N, with the movable block, E, and knife, j, substantially as and for the purposes herein set forth.

5th, The arrangement of the lever, S, pawl, u, spring, t, and friction roller, s, as constructed and combined with the plate, Q, and inclined ledge, v, on the sliding punch, B, so as to operate for spacing the distance between the pegs as they are driven, substantially as described.

6th, The gage, W, spring lever, X point, y, and index, z, in combination with the stock, A, for a hand shoe-pegging apparatus, substantially as and for the purposes herein set forth.

72,754.—STOVE GRATE.—Daniel E. Paris, Troy, N. Y.

I claim, 1st, Two grates, lying side by side, having each two outwardly-projecting journals, eccentrically attached, on either end, at or near their front or back sides, and one or both vibrated horizontally by means of a pronged or double shaker.

3d, An eccentrically-journalled grate, with its rear side lying on the front part of a like grate, and so constructed for dumping that, as the rear part of the back grate turns upward, the rear part of the front grate falls downward.

72,755.—MANUFACTURE OF STEEL AND IRON.—Jas. Park, Jr., Pittsburgh, Pa.

I claim producing cast steel of mild or low temper, or wrought iron, in the manner substantially as hereinbefore described, by first melting partially-carbonizing wrought iron in the ordinary or any other suitable furnace, and then adding to and melting in it highly-heated wrought iron, so as to reduce the percentage of carbon in the mass, and repeating the process, if necessary, until the carbon is sufficiently reduced or entirely removed.

72,756.—HARVESTER.—T. E. Platt (assignor to himself and George D. Lambert), Newtown, Conn.

I claim the arrangement of the clutch, H, upon a shaft, E, and in connection with the cutter-bar, so that by means of the said clutch, the cutter-bar may be raised, substantially as set forth.

72,757.—TOBACCO-CUTTER.—A. J. Rayner, Buffalo, N. Y.

I claim, 1st, A tobacco-cutting machine, having two knives, E and F, upon one hinged cutter-frame, B, arranged and operating substantially as herein described and for the purpose set forth.

2d, In combination with the above, the guide-rail, D, and the projection, C', upon the cutter-frame, B, constructed and operating in the manner and for the purpose substantially as described.

72,758.—CASTER STAND.—Chas. Reistle, Brooklyn, N. Y.

I claim, as a new article of manufacture, the table caster above described, consisting of the base, a, the ridges, f, the standard, b, and brackets and springs, d, as specified.

72,759.—LANTERN.—James O. Smith, New York city.

I claim, 1st, The combination of the guard, having a groove, a, in its upper part, with the top of the lantern, having slotted holes, d, to receive said guards, as described, said guards being attached to the base of the lantern by soldering or equivalent means, by which combination and construction of parts the guards are firmly secured to the lantern, and without liability of being detached at the top by heat.

2d, The formation of the projections, C, upon the base of the lamp, as described; that is to say, said projections being made a part of said glass body, and so formed as to accomplish each of the several results set forth.

72,760.—CONSTRUCTION OF HOT-WATER BOILERS.—Henry Steger, New York city.

I claim the convex head, b, secured to the boiler, a, by the ribs and grooves a' c, in combination with the head, d, setting within the lower end of the boiler, and the flange, l, secured by ribs and grooves at o, as and for the purposes set forth.

72,761.—FASTENING FOR BOTTLE-STOPPER.—Robt. S. Stubbs, Dover, N. H.

I claim the said bottle-stopper fastener, as composed of the curved yoke and the strap, constructed and applied together in the manner and so as to operate substantially as specified.

Also, the arrangement of the yoke and strap with the neck and cork of a bottle, in manner substantially as specified.

72,762.—SHINGLE CARRIAGE.—Charles Taft, Northbridge, Mass.

I claim, 1st, A shingle-carriage, to facilitate the shingling of roofs of buildings, constructed substantially as shown and described.

2d, The combination, with the hinged arms or pieces, E E, of the table, G, guard-boat, H, and pins, b b, substantially as and for the purposes set forth.

72,763.—CIRCULAR SAW MILL.—John Todd (assignor to himself and William P. Duncan), Bellefonte, Pa.

I claim, in combination with the hinged frame, H, for moving the friction feed and backing wheels into and out of action with the drive wheel and its shaft, the pivoted weighted lever, K, jointed to the frame as described, and its support, M, for holding both of said wheels out of action, substantially as and for the purpose described.

72,764.—LAMP.—A. P. Tyler, Cleveland, Ohio.

I claim, 1st, The globe, A, as constructed with the conical chamber, D, tubes, c, one or more, in the manner as and for the purpose substantially described.

2d, The herein described mechanical power or apparatus for producing a current of air, when arranged and constructed as shown and described, in combination with the tubes, C, chamber, D, and globe, A, all arranged in the manner and for the purpose set forth.

72,765.—WINDOW-SASH SUPPORTER.—F. N. Violet, Fond du Lac, Wis.

I claim the two cams, h h, with their cogs or gears, m m, in combination with the case and spring, when the whole is constructed and arranged to operate in the manner and for the purpose herein set forth.

72,766.—BOLT FOR SAW-FRAMES, ETC.—F. Washbourne, New York city.

I claim, as a new article of manufacture, a headed bolt, made, as above described, of wrought metal, the head and shank being made in separate pieces, and afterwards brazed or soldered to each other, as specified.

72,767.—CURTAIN FIXTURE.—Herman Wocher and Benedikt Geiger, Philadelphia, Pa.

We claim the spring, E, in combination with the hollow weight, C, and guide-rod, D, substantially as and for the purpose set forth.

72,768.—CURTAIN FIXTURE.—Herman Wocher and Benedikt Geiger, Philadelphia, Pa.

We claim, 1st, The combination of the curtain, A, roller, B, counterbalancing weight, E, elevating cord, D, attached directly to the weight, E, and a guide, whereby said weight is confined to a specific path, all arranged to operate substantially as and for the purposes set forth.

2d, Also, the combination, with the curtain, A, and its essential accessories, of a hollow or chambered supporting weight, E, adapted to admit of graduation, substantially as and for the purpose set forth.

72,769.—LET-OFF MECHANISM FOR LOOM.—Edward Wright (assignor to L. J. Knowles & Brother), Worcester, Mass.

I claim the combination, with the pawl and lever and springs, G, of the guide and feed-finger, N, mounted upon the lay, substantially in the manner and for the purposes set forth.

72,770.—WIRE DISH-STAND.—E. P. Woods and Daniel Sherwood (assignors to Woods, Sherwood & Co.), Lowell, Mass.

We claim, 1st, The arrangement of the bars, A, provided with the legs, s, and inclined sides, B, substantially in the manner shown and described, and for the purposes specified.

2d, The arrangement of the bars, A, as described, in combination with the spiral, c, substantially as described, and for the purposes specified.

72,771.—KNITTING MACHINE.—Walter Aiken, Franklin, N.H.

I claim the combination of the latch, Q, and stud, r, or their equivalents, with the two cam-bars, D P, of the rib and plain-work needles.

Also, the combination and arrangement of the swing-arm, N, or its equivalent, with the frame, A, and its supporting mechanism and cam-bar, P, of the rib-needles, the same being to enable such rib-needles, with their supporting mechanism and cam-bar, to be turned away from the plain-work needles in manner as set forth.

Also, the combination for holding and releasing the shipper-shaft, and regulating the length of the plain and ribbed work of a stocking-heel to be produced, as described, such combination consisting of the worm, V, the worm-gear, W, its studs and spring, the lever, X, its latch, e', latch-lever, b', and spring, d', and the bolt, z, and its operative lever, a'; the shipper-shaft being provided with a notch or groove, or its equivalent, for reception of the bolt, as set forth.

72,772.—COVERING FOR FOOT-BALLS.—H. A. Alden, Mattewan, N. Y.

I claim, 1st, A foot-ball composed of a bladder, or its equivalent, capable of being distended by inflation, provided with a separate covering or casing of vulcanized rubber, whether combined or not with a cloth backing, substantially as and for the purposes set forth.

2d, A foot-ball formed of a hollow rubber ball, provided with a suitable inflating apparatus, and covered by an outer casing of vulcanized rubber, with or without a cloth backing, substantially as and for the purposes herein described.

72,773.—POTATO-DIGGER.—Peter Antonidus, Freehold, N. J.

I claim, 1st, The combination of the plough, F, axle, B, and hounds, D, when the latter are so connected with the axle by hinged joints, that the depth of the cut may be regulated without interfering with the horizontal position of the hounds, substantially as set forth.

2d, The combination of the plough, F, bar, H, axle, B, hounds, D, plate, K', and lever, K, constructed and arranged substantially as set forth.

3d, The combination of the plough, F, bar, H, axle, B, hounds, D, and set-screw, L, constructed and arranged substantially as and for the purpose set forth.

72,774.—SPIRIT METERS.—Moritz Augenstein, New York city.

I claim, 1st, The horizontal measuring-drum, E, containing the chambers, G G G, each being constructed and arranged upon the shaft, d, in combination with the semicircular tube, c, or any equivalent therefor, in the manner and for the purposes substantially as herein described and set forth.

2d, Also, the vertical chamber, B, and vertical tube, C, arranged and combined, by means of the horizontal tube, a, or any equivalent therefor, in the manner and for the purposes substantially as herein described and set forth.

3d, Also, the vertical tube, D, containing the spirit-strainer, b, arranged therein, and having at or near its lower end the horizontal or semicircular tube, c, and which tube, D, is so arranged in combination with the vertical tube, C, as to receive the spirits or liquor passing over and through the spout, I, into or near the upper end thereof, in the manner and for the purpose, substantially as herein described and set forth.

4th, Also, the channel or trough, o, and vertical tube, p, connected therewith, and extending to the receiving chamber, I, and the brushes, h h, arranged upon the end of the measuring cylinder, E, and combined and operated in the manner and for the purposes substantially as herein described and set forth.

5th, Also, the discharging chamber, H, combined with the horizontal measuring drum, E, with opening, T, arranged above the discharging pipe or tube, in the manner and for the purposes substantially as herein described and set forth.

6th, Also, the combination of the horizontal measuring drum, E, with the registering device, J, in the manner and by the means substantially as herein described and set forth.

7th, Also, the receiving chamber, I, in combination with the discharge tube, n, and with the door, K, each being arranged in the manner and for the purposes substantially as herein described and set forth.

8th, Also, the meter frame or box, o, with the top, L, having thereon the tongues, P P, extending around the top of said box, o, and firmly secured thereto by means of the screw-pins or bolt, k, having an opening in each of the respective heads thereof, so as to receive and pass through the same some suitable ribbon or cord, so that the same may be sealed with government seal, in the manner and for the purposes substantially as specified.

9th, Also, the conducting of spirits or liquor, after the same shall have been measured in the manner substantially as aforesaid, from the said chamber, H, into the receiving chamber, I, so that the average quality thereof may be ascertained for any given time of the operation of manufacturing of spirits or liquor, in the manner and by the means substantially as herein described and set forth.

72,775.—HARVESTER RAKE.—Cornelius Aultman, Canton, O.

I claim the combination of the rake-stale, linked to a revolving post, with a pivoted arm and roller, that are operated by a camway, and controlled by a spring, for the purpose of giving said rake a motion along or near to the sides and ends of an oblong or irregular-sided platform, in addition to its circular motion, substantially as described.

72,776.—DEVICE FOR HOLDING GLASS.—B. H. Badger, New York city.

I claim the device for holding glasses, consisting of the jaws, A B, knob, C, ring, f, fingers, a b, spring, c, wires, d, provided with hooks, e, substantially as and for the purposes set forth.

72,777.—METHOD OF ALTERING THE CALIBER OF MUSKET AND OTHER GUN-BARRELS.—C. E. Bailey, Springfield, Mass., assignor to Allen Patent Fire-Arms Manufacturing Company, New York city.

I claim the insertion of an inside tapered tube, A, in a seat formed for it by boring out the barrel, B, of a gun or rifle in such a manner that it tapers inside from breech to muzzle, and corresponds with the outside tapered surface of the tube, A, and firmly securing the latter in place by brazing at the muzzle and other parts, substantially as and for the purpose described.

72,778.—CLUTCHES FOR OPERATING HORSE HAY FORKS.—D. B. Baker, Rollersville, Ohio.

I claim, 1st, The combination of the pivoted bars, P P, supporting rod, J, and stop, R, with each other and with the short arms of the clutch, A A, as a support for said clutch and also to produce an automatic action, substantially as and for the purpose specified.

2d, The hook, d, in combination with the above so arranged that when the clutch is supported by means of the rod, J, the weight or draft at the hook, d, will always swing the long arms of the clutch, A A, in one direction which when being arrested by the stop, R, leaves one arm in a vertical position so as to facilitate the process of changing the point of bearing which produces an automatic action, substantially in the manner specified.

72,779.—CARRIAGE CLIP.—L. J. M. Baker, Enon, Ohio.

I claim the combination of the shaft iron, F, plate C, bolt, E, and hooks, B', substantially as and for the purpose set forth.

Also the combination of the plate, C, and spring, D, substantially as and for the purpose set forth.

72,780.—CULTIVATOR.—J. T. Baltimore, Marble Rock, Iowa.

I claim, 1st, The combination of the beams, G, pivoted at their front ends to the arms, E, of the frame, C, and passing through the slotted arms, F, with the beams, H, pivoted to their inner sides, substantially as described.

2d, The combination of the elbow levers, L, cross bars, M and K, with the standards, I, connected to the beams and arranged for operating the shovels substantially as described.

72,781.—SHEEP SHEARING AND TAGGING TABLE.—Hollis Barr, Breckeville, Ohio.

I claim the adjustable arms, E E, having the cords, f f, attached in the manner described in combination with the shearing and tagging table, the several parts being constructed and operating in the manner as and for the purpose set forth.

72,782.—CLOTHES DRYER.—C. B. Bennett, Amboy, Ill.

I claim the combination of the standards, a, with the shears, b, and bars, c, substantially as described and shown by the specification connected herewith.

72,783.—COMBINED CORN SHELLER AND SEPARATOR FEEDER.—Jacob Bernheisel, Sen., Green Park, Pa.

I claim, 1st, The feeder, J, with the grate, L, as combined when constructed and operating as herein described and for the purpose set forth.

2d, Also the combination of the grated concave, N, with its spiral springs, P, and sleeves, E and O, when constructed and operating as herein described and for the purposes set forth.

3d, Also the feeder, J, grate, L, concave, N, springs, P, and plate, R, when arranged and combined with the cylinder, M, sieves, E and G, and fan, B, as herein described and for the purposes set forth.

72,784.—ADJUSTABLE HASPS AND HOOKS FOR DOORS.—William Bisbee and Fleming G. Hearn, Yreka, Cal.

We claim, 1st, The spring, C, in combination with the box hasp, B, for self-adjustment in contraction and expansion of doors, etc., substantially as above set forth and described.

2d, The said spring, C, in combination with the adjustable hook, F, and hasp, B, substantially as and for the purpose above set forth and described.

72,785.—DEVICE FOR DRAWING WICKS THROUGH BURNERS.—Friedrich A. Blatterlein, West Meriden, Conn.

I claim the strap, A, doubled upon itself to form two sides with the teeth, a, upon their lower ends when such sides are provided with one or more rows of perforations, b, for engaging with the ratchet wheel in the burner, whereby the wick is drawn through the latter, as herein shown and described.

72,786.—BURGLAR ALARM.—Lyman W. Blakeslee and A. D. Smith, Cincinnati, Ohio.

We claim the combination with the alarm, A, and the rod or trigger, E, of stationary curved tongue or catch, G, and hook, H, all applied and operating in the manner and for the purpose set forth.

72,787.—SEWER PIPE MACHINE.—Jacob Blank, Cuyahoga Falls, Ohio.

I claim the jointed knife or cutter, L, when arranged and operated by the spindle, J, pinions, K N, in combination with the die and cylinder, A, for the purpose and in the manner substantially as described.

72,788.—BAG HOLDER.—C. D. Brainerd, Danville, Vt.

I claim the combination of the spring bands, I, secured at one end to the sliding frame, C2, jaws, M, eyes, N, rods, O and Q, and treadle, R, all arranged and operating as herein described for the purpose specified.

72,789.—TRUSS FOR HERNIA.—A. F. H. Braun, San Francisco, Cal.

I claim the screw, a, having its bearing against the lever, D, the spiral spring, d, through which the screw passes, and the nut, b, for regulating the pressure of the pad in combination with the frame, C, and axis, D, substantially as and for the purpose described.

72,790.—METHOD OF MAKING EYELETS.—G. B. Brayton, Boston, Mass., assignor to himself and J. W. Hoard, Bristol, R. I.

I claim, as a new method of manufacturing eyelets, the cutting of sections from a metal tube and then forming these into shape, substantially as described.

72,791.—DOOR BELL.—A. T. Brooks, New Britain, Conn.

I claim the slotted hub plate, a, vibrating cams, c, cap, n, actuating spindle, b, with the bell plate and striking mechanism, substantially as and for the purpose described.

72,792.—MECHANICAL MOVEMENT.—A. W. Brown, Brooklyn, N. Y., assignor to himself and C. B. Squire, New York city.

I claim, 1st, The wheel, A, plate, A1, shafts, S1 S1, and cams, C C, or their equivalent, arranged to operate together in the manner and for the purpose substantially as described.

2d, The plate, A2, wheel, A3, pins, P P P P, and ribs, I I, arranged to operate together in the manner and for the purpose substantially as described.

72,793.—BOILER WATER GAGE.—N. H. Bundy (assignor to himself and E. Philbrick), New York city.

I claim the combination of the automatic valves, F F', constructed and operating substantially as described with the three-way cocks or valves, E E', controlling passages arranged substantially as described for action in concert when required with a blow-off cock, m, essentially as herein set forth.

72,794.—PREVENTING INCRUSTATION OF STEAM BOILERS.—Samuel G. Cabell, Quincy, Ill.

I claim, 1st, The application to steam boilers of an electrical conductor arranged to convey the electricity from within the boiler or steam space to the exterior of the boiler said conductor being insulated where it passes through the shell of the boiler, substantially as described.

2d, In combination with an electrical conductor arranged as described the use of permanent magnets located within the boiler, substantially as set forth.

72,795.—CART.—James W. Cahoon (assignor to Burgess B. Long), Philadelphia, Pa.

I claim the employment of lifting cams or eccentrics to elevate the forward end of a vehicle, substantially as and for the purpose described.

Also as a locking device for the forward end of a cart or other vehicle a cam or eccentric and a connecting rod or strap, substantially as shown and described.

Also the combination with a cart-tilting device substantially such as shown and described of a brake, as and for the purpose set forth.

72,796.—ANTI-FRICTION AXLE AND JOURNAL BOX.—James H. Carkeet, Montgomery, Ala.

I claim the application of hollow cylinders to the relief of friction, as above substantially described and set forth.

72,797.—FORM BLOCK FOR SHAPING BASKETS.—Henry Carpenter, New York city.

I claim a form block for shaping or manufacturing peach or other conical baskets composed of two parts, one fixed and the other movable, connected by a hinge, and arranged to operate substantially as shown and described.

72,798.—BATH BOILER.—E. H. Chapman and T. M. Hammett, Philadelphia, Pa.

We claim the vertical boiler, A, having internal pipes, a c and d, and an opening, I, arranged in the manner and for the purpose described.

72,799.—COMBINED CULTIVATOR AND SEEDING MACHINE.—Castle Churchill, New Hartford, Iowa.

I claim the seed-distributing device composed of the plates, b, fitted between the fixed and the movable heads, a a', on shaft, F, in combination with the hopper, I, and the scattering wheel, K, on shaft, J, and the spout or trough, H', all arranged for joint operation substantially in the manner as and for the purpose set forth.

72,800.—SWIFT.—Eben M. Coffin, Woburn, Mass.

I claim the improved swift as made of the two forked arms, A A, and the two clamps, B C, arranged and combined substantially in manner as specified.

72,801.—ROTARY CRANE.—J. S. Coffman, Greenville, Ind.

I claim, 1st, The axle, C, having on it a screw thread and the nut, D, as a guide for the rope, F, substantially as shown and described and for the purposes set forth.

2d, Also the rotating windlass frame, B, in combination with the wheel, W, axle, C, nut, D, and stand, A, substantially as shown and described and for the purposes set forth.

72,802.—BREAST PAD.—Richard Collins, Chicopee, assignor to Aaron G. Lord, Springfield, Mass.

I claim, 1st, An inflatable pad having a rigid base and a flexible front, substantially as herein described.

2d, An inflatable dress fitter or pad having a rigid base and flexible front, neck, c, and the inflating tube, l, all constructed and operating substantially as and for the purposes herein set forth.

72,803.—BREECH-LOADING FIRE-ARM.—Loughlin Conroy (assignor to himself and Tristram Dodge Vanderveer), New York city.

I claim, 1st, The combination of the breech block, hammer, trigger and trigger guard hung upon a common center pin when the trigger guard is so constructed in connection with the holding or recoil block as to operate thereon and on the breech block, substantially as and for the purpose described.

2d, The combination of the hammer with the trigger when hung upon a common center pin and arranged to operate in connection with a spring, or its equivalent, substantially as described.

3d, The cartridge retractor formed of two parts, R and T2, the latter pivoted at its forward end to the center, or nearly so, of the part, R, and its rear end pivoted to the upper and forward portion of the breech block, the part, R, provided with a cam upon its forward end corresponding to a suitable notch cut in the under side of the barrel, all constructed and operating as herein shown and described.

4th, The arrangement of the recoil block, M, with its curved arm in combination with the spring, b3, by means of which the breech block is supported and the guard lever kept in position when the breech is closed, as herein shown and described.

5th, The hook, b, attached to the lever guard in connection with the pin, a, by means of which a drop motion is obtained at that point so that when the lever guard is pulled downward to open the breech it comes in contact with the curved arm of the recoil block, M, and by the time the hook, b, catches upon the pin, a, the recoil block is raised sufficiently to permit the breech block to pass under it the breech being opened by continuing the pull on the lever guard, as herein shown and described.

72,804.—FRUIT PICKER.—Peter Conver and Samuel Conver, Yates City, Ill.

We claim the pectinated crown, d, and body, A, as formed and constructed in combination with handle, D, and bag, C, when all are arranged in the manner herein set forth and described.

72,805.—BEEHIVE.—G. L. Conwell, Knoxville, Iowa.

I claim, 1st, The under section, A, forming a box for the reception of the main hive, B, and provided with the drawer, D, opening at either side and the drawer, E, opening at the back, said section having projecting inclined front with opening, x, and screen, b, the whole constructed and used in the manner and for the purposes set forth.

2d, The combination of the sections, A B C, with their drawers, honey frames, and boxes, provided with their communicating spaces and ventilation, their several parts constructed, arranged, and used, in the manner and for the purposes specified.

72,806.—TRUCK FOR TRANSPORTING STONE.—Thomas V. Cook, Lancaster, Pa.

I claim, 1st, A metallic shoe, s, with front and back wings, or projections, or their equivalent, bent so as to form an angle with each other, or to form a bend, substantially as shown and described, and for the purposes set forth.

2d, The shoe, s, in combination with the planks, C D, and F, substantially as shown and described, and for the purposes set forth.

3d, A stone boat, composed of the shoe, s, and any planking, substantially as shown and described, and for the purposes set forth.

72,807.—WINDOW SASH STOP.—Richard H. Cooper, St. Louis, Mo.

I claim the bolt socket, A, whole as to its top, and provided with no slot anywhere except at its end, and having an interior stay or guide partition, a, when combined and arranged with the spring bolt, C, having a stop pin, c', and tongue, c1, arranged to slide in the notch, c2, and substantially in the manner set forth.

72,808.—BEEHIVE.—William Courtney, Richview, Ill.

I claim, 1st, In combination with the frames forming the main hive, H, as described, the perforated comb-dividers, I, constructed and arranged substantially as set forth.

2d, The combination of the main hive, H, and surplus honey box, G, when respectively constructed and arranged within the external case to operate in conjunction, substantially as set forth.

3d, The combination of the main hive, H, surplus honey box, G, and perforated cover, F, arranged in relation to one another and the external case, substantially as and for the purpose set forth.

4th, A beehive, constructed with the parts, A B C D E G, and H, arranged substantially as set forth.

72,809.—SUPPLY VALVE FOR WATER CLOSET.—Hugh H. Craigie, New York city.

I claim the water chamber, o, in combination with the valve, e, when said water chamber, o, is placed on the supply side of the valve, and arranged substantially as specified, so that the water is ejected from said chamber as the valve closes, for the purposes specified.

Also, a diaphragm valve, J, placed between a moving piston, k, and the valve, e, to be controlled substantially as set forth.

72,810.—WATER SUPPLY FOR WATER CLOSET.—Hugh H. Craigie, New York city.

I claim, 1st, A water way, b, formed in the bottom of the cistern, between the inlet valve, e, and the outlet pipe, c, in combination with a covering plate, introduced substantially as set forth.

2d, The valve, e, seat 5 and supports, constructed as specified, in combination with the cistern, a, to which it is attached by the ends passing under the cleats, s, as set forth.

3d, The service box, f, applied inside the cistern, and rising above the bottom thereof, in combination with the supply valve, e, substantially as and for the purposes set forth.

4th, The service box, f, attached as set forth, in combination with the water way, b, and supply valve, e, as and for the purposes specified.

5th, The adjustable arm, k, and bracket, l, for the fulcrum of the lever, g, in combination with the valve, e, and cord or wire, substantially as and for the purposes set forth.

6th, The arm, p, extending from the lever, g, in combination with the vales o and e, as and for the purposes specified.

7th, The tube, i, passed through the bottom of the cistern, and secured by a flange and nut, in combination with the lever, g, and valve, as and for the purposes set forth.

8th, The supply valve or cock, r, placed in the bottom of the cistern below the water, in combination with the lever, t, and float, u, adjustable on its stem, as and for the purposes set forth.

72,811.—CORN HARVESTER.—Cyprian U. Crandall, Galesburg, Ill.

I claim, 1st, Constructing a corn harvester or picker, with feelers or conveyers, A A, for raising the fallen stalks of corn to an upright position, substantially in the manner as described.

2d, The combination of the gatherers, B B, with the feelers or conveyers, A A, substantially in the manner and for the purpose as herein described.

3d, The construction and arrangement of the rollers, C' C C, substantially in the manner and for the purpose as herein described.

4th, The arrangement of the rubber spring with the rollers, when the rollers are constructed and arranged substantially in the manner and for the purpose as herein described.

5th, The wires or rods, d d, as arranged, substantially in the manner and for the purpose as herein described.

6th, The arrangement of the endless carrier, D, with the rollers, when the rollers are constructed and arranged substantially in the manner and for the purpose as herein described.

7th, Constructing a corn harvester with a swinging carrier, I, substantially in the manner and for the purpose as herein described.

8th, The adjustable tongues or poles, M M, handles, upright bars, N N, and rods, O O, substantially in the manner and for the purpose as herein described.

9th, The feelers or conveyers, A A, rollers, C' C C, spring, c, wires or rods, d d, carriers, D and I, and poles, M M, all as arranged and combined, substantially in the manner as described.

72,812.—MILLSTONE BUSH.—C. Custer, Philadelphia, Pa.

I claim, 1st, The millstone bushing, constructed as described, consisting of the segmental wedges, C, having chambers, a, in the upper ends, placed in the four corners of the shell, B, with their concave faces fitting against the spindle, and supported by the adjustable radial plates, b, upon the under side of said shell, and adjusted by the reverse wedges, D, fitting against the wedges, C, in the same radial recesses, and adjusted from the under side, by means of the screw bolts, c, and nuts, e, as herein described, for the purpose specified.

2d, The combination and arrangement of the hollow wedges, C, reverse wedges, D, radial slides, b, screw bolts, c, shell, B, follower, h, and chamber, g, as herein described, for the purpose specified.

3d, The radial slotted slides, b, in combination with the hollow segmental wedges, C, when such slides support said wedges by passing across their inner corners, as herein set forth for the purpose specified.

72,813.—EAVES TROUGH.—John P. Dauth, Reading, Pa.

I claim the holder, represented in figs. 1 and 2, intended to pass around the trough, and hold it tightly or loosely, as it may be wanted, and from which the trough can be removed and replaced at will, by taking out the bolt at A, fig. 1, or detaching at A, fig. 2.

72,814.—TESTER FRAME FOR BEDSTEAD.—Johnson C. Davis, Montgomery, Ala.

I claim the tester frame herein described, consisting essentially of the ring, b, transverse arms, c, and staff, a, the latter, at its upper end, forming a rigid connection between the ring and arms, and thereby a rigid support for the ring, in the manner described.

72,815.—ADJUSTING KNOBS TO SPINDLES.—Alfred Dawes, Hudson, Mass.

I claim, 1st, Knobs and spindles, screwing the one into the other by screw threads of different degrees of fineness on the two ends.

2d, In the shank of door knobs, that screw upon their spindles, the making two or more screw holes for the reception of the set screws, so placed in the circumference that no two are opposite, at the same time, to the faces of the spindles.

3d, The making one end of the spindle, for door knobs, with a different number of sides from the other.

4th, The combination of door knobs and spindles, screwing the one upon the other, with the spindle having a different number of sides, and screw threads of different degrees of fineness in the two ends, and having one, two, or more screw holes in the shank of the knobs, to receive the holdfast screws, all for the purposes and in the manner substantially as described.

72,816.—ALCOHOL AND SPIRIT STILL.—H. G. Dayton, Maysville, Ky.

I claim, 1st, Carrying the liquid, with which a still is to be supplied, through the condensing vessel, B, for the purposes of moderately heating it by the rising vapors, and for thus preparing it for the still, substantially as herein shown and described.

2d, Providing the vessel, B, with a crown plate, C, by which the heavy vapors are separated from the spirits, and by which the condensed spirits are prevented from falling back into the still, substantially as herein shown and described.

3d, The annular trough, b, when formed on the inside of the vessel, B, in combination with the crown plate, C, all made and operating substantially as and for the purpose herein shown and described.

4th, The vessel, B, provided with a trough, b, crown plate, C, cooling coils, G, and discharge pipes, d and g, made and operating so that the finest are separate from the medium spirits, as set forth.

72,817.—PROCESS OF MAKING SOLUBLE BLUEING FOR USE IN LAUNDRIES AND BLEACHING.—James H. Dilks (assignor to C. T. Raynolds, & Co.), New York city.

I claim the process, substantially as above described, of making soluble Prussian, Paris, or Chinese blue in lumps or powder.

72,818.—LUMP BLUE FOR USE IN LAUNDRIES AND IN BLEACHING.—James H. Dilks (assignor to C. T. Raynolds & Co.), New York city.

I claim, as a new article of manufacture, a soluble blue in lumps, made substantially as above described.

72,819.—WASHING MACHINE.—Ellis W. Dixon, Forest Grove, Oregon.

I claim the open dasher, consisting of the cross bar, D, side pieces, a, and slats, b, in combination with arms, C, shaft, B, frames, F, cross bars, d, uprights, b, box, A, and blocks, E, all arranged and operating as described.

72,820.—AIR PUMP.—Thomas Doane, Boston, Mass.

I claim the eduction valve, D, arranged to yield and operate substantially as described, in combination with a piston, C, and cylinder, F.

72,821.—AXLE BOX.—Louis A. Dochez, New York city.

I claim, 1st, The arrangement in the axle box, A, of the concave false bottom, F, having central opening, vessel H, oil chamber, G, pads, J, and wicks, I, as herein described for the purpose specified.

2d, The vessel, H, fitted through a hole in the false bottom, F, into the oil chamber, G, and provided with holes near the upper edge, made and arranged as described, for the purpose of collecting the drippings from the axle, and of separating the dust and impurities from the oil.

3d, The lubricating pads, J, secured to concave blocks, K, which are provided with stem or ribs, c, guided in inclined grooves, substantially as and for the purpose herein shown and described.

4th, An auxiliary oil or grease reservoir, M, arranged above an axle in a journal box, and provided with a fusible plug which will melt by the heat of the axle, when the same is no more supplied with lubricating substance, as set forth.

5th, The oil chamber, G, vessel, H, wicks, I, pads, J, and blocks, K, when arranged as described, in combination with the perforated block, L, hollow cover, C, of axle box, and with the plug, e, which is soluble by the heat of the axle, when the same is no more supplied with oil, all made and operating substantially as herein shown and described.

6th, The plate, F, F', when arranged as described, and when combined with the spring, a, grooved axle box, A, and axle, B, all made and operating substantially as herein shown and described.

72,822.—PORTABLE MILL.—Silas Dodson, Jersey City, N. J.

I claim the arrangement of the burr, N, adjustably secured to the cross bars, H, of the toothed disks, G revolving in one direction, and the burr, O, upon the longitudinally adjustable shaft, B, revolving in independent bearings in the opposite direction, said shaft carrying the adjustable conveyers, S, as herein shown and described.

72,823.—CLOTHES PIN.—William M. Doty (assignor to R. C. Browning), New York city.

I claim, 1st, A clothes pin, composed of a combined hook and wedge, arranged for operation substantially as herein described, so that, by forcing down the wedge, the rope or line upon which the hook is placed will be jammed and held tightly between the said wedge and the hook, as and for the purposes set forth.

2d, The combination with the slotted wedge, of the skeleton wire hook, having the ends which straddle the wedge united by a strip or plate, fitting and capable of sliding within the slot in the said wedge, substantially as and for the purposes set forth.

72,824.—DULCIMER.—Ezra Durand, Norwich, Conn.

I claim the combination of the perforated sounding post, E, perforated sounding board, C, perforated center bridge, I, and notched bass bridge, G, the whole constructed substantially as herein described, for the purpose specified.

72,825.—APPARATUS FOR CARBURETING COAL GAS.—Wm. A. Earseman and Robert W. Gray, Pittsburg, Pa.

We claim, 1st, An improved apparatus for carbonizing and saving gas for illuminating purposes, constructed as described, and operated in connection with a burner and check, in the manner and for the purpose set forth.

2d, An upper chamber, E, in combination with the pipe, I, button valve, s, shaft, b, and set screw, c, all constructed and operated as set forth.

3d, The perforated partition, d, perforated pipe, G, in combination with the chamber, D, and its subdivisions, D' D", constructed and operated substantially as described.

4th, The fluid line, J, in conjunction with the pipe, I, and chambers, E and D D' D", constructed and operated as set forth.

5th, The employment of finely carded wool as the interposing fibrous material, in the manner and for the purpose set forth.

72,826.—STUMP EXTRACTOR.—Jas. Elliot, New York city.

I claim, 1st, The combination of the fork, H, with its handle, c, with the chain, G, T-shaped strut, F, and windlass, B, as herein described, for the purpose specified.

2d, The stump extractor constructed as described consisting of the lever, D, windlass, B, hand wheel, C, chains, E G, strut, F, and fork, H, constructed and arranged as described, whereby the fork, H, is depressed, and the windlass operated to extract the stumps, as herein shown and described.

72,827.—FOOD FOR STOCK.—Davis Embree, Dayton, Ohio.

I claim, 1st, The mode of preparing distillers' slops for food, by adding alkaline substances in quantities sufficient to neutralize the acids in the slops, and no more.

2d, The mode of restoring to distillers' slops, thus prepared, the starch and saccharine matter taken out in the process of distillation, by steeping coarse animal food in the hot slops, substantially in the manner set forth.

3d, The mode of preparing saturated slops from meal, by the application of steam to a mixture of coarse animal food and meal, substantially in the manner set forth.

72,828.—HEAD BLOCKS.—Philip Estes, Leavenworth, Kansas.

I claim, 1st, The lever, D, provided with eccentrics working on the shaft, s, upon each side of the pinion, C, for clamping the knee, B, upon the bearer, A, as herein shown and described.

2d, The combination of the open rack, a, pinion, C, knee, B, forked lever, D, pawls, c, rachet wheel, E, dogs, d, segments, e, and adjustable stop, g, as herein described, for the purpose specified.

72,829.—SEWING MACHINE.—John Fanning, Brooklyn, N. Y., assignor to John S. Andrews, New York city.

I claim the movable finger, o, in combination with the looper, h, and lever, k, to which motions are given by the lever, f, and cam, 5, as and for the purposes specified.

72,830.—RENDERING ARTICLES INCOMBUSTIBLE.—Ambrose G. Fell, Brooklyn, N. Y.

I claim the application of the compound herein described to wood, textile fabrics, paper, and all analogous substances, substantially as described for the purposes specified.

72,831.—CHECK AND DRIVING REIN.—E. R. Ferry, New Haven, Conn.

I claim the combination of the check rein, d, and driving rein, b, with the bit of the bridle, when the said check rein passes through the eyes, a, thence directly to the bit, and the whole constructed and arranged so as to operate in the manner described.

72,832.—TRACE BUCKLE.—Charles Fillmore (assignor to himself and George Washer), Romeo, Mich.

I claim the buckle frame, A, and the plates, B and D, constructed and used together, with the tugs, E and F, substantially as and for the purpose set forth.

72,833.—CHILDRENS' CARRIAGES.—A. D. Fowler, Newark, N. J.

I claim, 1st, The clip, D, for children's carriages, constructed as described, consisting of the part, d1, upon the upper side of the arm, B, cast with a shoulder upon it, the outer end passing around and embracing the part, a', of the spindle, the part d2, upon the under side of the arm, B, fitting against the shoulders of the part, d1, thereby forming a continuous bearing, as herein set forth, for the purpose specified.

2d, The hollow spindle, A, cast in one piece, and provided with the part, a', by which it is secured in the bearing of the clip, D, as herein set forth, for the purpose specified.

72,834.—MACHINE FOR SEPARATING WHEAT FROM GARLIC.—Samuel Gantz, Beaver Creek, Md.

I claim, 1st, The grooved incline, S, having the slots, s s, and the apparatus, a a, arranged as shown, and the whole constructed and operating substantially as and for the purpose described.

2d, The guide block, I, having the arches, 1 1, substantially as and for the purpose specified.

3d, The grooved gum roller, D, when used in a separating machine, substantially as and for the purpose set forth.

4th, The wheel, C2, having the grooves, c c, terminating in the channels, c' c', substantially as and for the purpose shown.

5th, The combination of the incline, G, guide, I, gum roller, D, wheel, C2, and rake, M M' m, substantially as and for the purpose described.

6th, The combination of the wheel, C2, and toothed roller, K', substantially as and for the purpose shown.

72,835.—CULTIVATOR.—R. Garter, Grand Rapids, Mich.

I claim 1st, The arrangement of the wheels, E E, hung on the inside of the frame beams, A A, with an adjustable cast iron slide, b, working in uprights, c c, having serrated or toothed faces for fastening it at any hight, with corresponding serrated washers, h h, on the bolts, d, by the crank nuts, e, substantially as and for the purposes herein described.

2d, The sliding adjustable wipers, k, in combination with the wheels, E E, constructed and operating as and for the purposes herein described.

3d, The cast iron loop, n, and clevis, n', combined with the draught pole, F, constructed and applied substantially as set forth.

72,836.—ENVELOPE.—J. C. Gaston, Cincinnati, Ohio.

I claim an envelope having the perforations in the end flaps or back, or both, so located as to be covered and concealed by the closing flap, C, when closed, substantially as and for the purpose set forth.

72,837.—HORSE HAY FORK.—John Gilmore, Phœnixville, Pa.

I claim, 1st, The combination of the jaws, J J, sides, A A, sliding rods, C C, connecting rods, R R, cranks, m m, shaft, M, arm, m', snap, s, spring slide, s', and handle, D, when the said parts are constructed, arranged and combined substantially in the manner and for the purposes specified.

2d, In a horse hay fork of the within described construction, the projecting curved lugs, e, in combination with the sliding rods, C C, and jaws, J J, the latter having the shoulder, v, so formed that when the jaws are retracted it will rest upon the upper side of the lugs and support the jaws, J J, independently of their pivot, substantially in the manner described.

72,838.—MACHINE FOR TRIMMING STRAWBERRY VINES.—Wm. C. Goodwin, Hamden, Ct.

I claim, 1st, The combination of the rotary cutting blade with the fixed cutting blade, when constructed, arranged and fitted for elevating and cutting the runners or creeping vines, substantially as herein described and set forth.

2d, The combination of the rotary cutting blade with the pinion and internal gear, or their equivalent, when constructed, arranged, and the blade caused to rotate in the manner and for the purpose substantially as herein described and set forth.

72,839.—HARVESTER RAKE.—Wm. F. Goodwin, East New York, N. Y.

I claim, 1st, The ball and socket connection between the vertical rake shaft and its driving mechanism, substantially as described.

2d, The arrangement of the ball and socket joint in the rake driving mechanism, in line with the hinge or joint of the cutting apparatus or platform, substantially as described.

3d, The driving pulley and chains, in combination with the coupling arm or its equivalent, and the rake standard, arranged substantially as described.

4th, The separate inclined ways, e e', for regulating the depression of the rake and reel arms independently of each other, as described.

5th, The friction rollers, f f', arranged to regulate the elevation of the rake and reel arms independently of each other, as described.

6th, The angular head, G, in combination with cap, D3, and inclined ways, e e', substantially as and for the purpose described.

72,840.—HARVESTER RAKE.—Wm. F. Goodwin, East New York, N. Y.

I claim, 1st, The vibrating rake frame, or case, C2, provided with the tubular arm, C3, arranged and operating in combination with the vertical shaft, substantially as described.

2d, The rake shaft, D, provided with the crank arm, E, in combination with the tubular arm, C3, and the rake frame, C2, substantially as described.

3d, The horizontal track or way, b, provided with the cam switches, b2 b3, in combination with the reciprocating and vibrating lever, E2, connecting rod, E1, and crank arm, E, for giving the rising and falling movements to the rake, as described.

72,841.—HARVESTER RAKE.—Wm. F. Goodwin, East New York, N. Y.

I claim, 1st, An overhanging reel and a independently revolving rake, supported at a point in rear of the cutting apparatus and between the driving wheels, substantially as described.

2d, A revolving rake and an independently revolving overhanging reel, arranged upon a common shaft or support, in combination with a sprocket wheel and reel driving gear, arranged upon the same support or shaft, substantially as described.

3d, The sprocket wheel, P1, located upon a rake shaft, arranged between the driving wheels and operated from a similar wheel on the end of the drive wheel axle by means of a chain, G, arranged substantially as described.

4th, An inclined reel shaft, supported at a point in rear of the cutting apparatus, in combination with the bent or angular reel arms, substantially as described.

5th, The hub, I', or its equivalent, intermediate between the bevel wheels on shaft, I, provided with the cap or guide, F, substantially as and for the purpose set forth.

6th, The combination of standard, B, arm, B1, bent shaft, I, revolving rake, and an independently revolving reel, arranged and operating substantially as described.

72,842.—MECHANICAL MOVEMENT FOR CONVERTING POWER INTO SPEED.—Wm. F. Goodwin, East New York, N. Y.

I claim, 1st, The arrangement of a series of wheels within a wheel on and around one shaft or axle, whereby any desired number of revolutions can be produced, and any required power can be obtained for converting speed into power and power into speed for multiplying and transmitting motion, and for power machines for hoisting and other purposes, substantially as described.

2d, The arrangement of the hollow sleeves on the shaft, S, and in the journal boxes, U and U', on the frame, F, and posts, F', and the pulleys, P and P', constructed and operated in the manner and for the purpose substantially as described and shown.

72,843.—REVOLVING RETORT FOR ROASTING ORE.—Wm. F. Goodwin, East New York, N. Y.

I claim a corrugated retort, constructed in form and manner and for the purpose substantially as described.

72,844.—SPRING POWER REPEATING FIRE-ARM.—John Gordon, New London, Ct.

I claim the combination as well as the arrangement of parts for effecting the retraction of the hammer after a pull on the trigger, such consisting of the spring, f, and its wheel, C, the cord, l, and winding wheel, D, or the equivalent thereof, the hooked pawl, s, the escapement wheel, E, and its click, t, and ratchet, F, and the lever pawls, G H, applied to the trigger, A, and the main spring, d, as set forth.

72,845.—PADLOCK.—John B. Green, Darien, assignor to himself and J. A. Reed, Stamford, Ct.

I claim a padlock having a curved body, A, and straight latch, B, hinged together by the screw, a, and socket, b, and otherwise constructed and arranged substantially as herein specified.

72,846.—COTTON GINNING MACHINE.—R. R. Gwathmey, Middletown, Ky.

I claim, 1st, The mode of hulling and ginning cotton into one same machine, and at the same operation, by means of one, two, or more ribbed aprons, combined with one, two, or more saw-cylinders, invariably driven or rotated in the direction shown by red ink arrows, x x', figs., plates 1 and 8, in the manner and for the purpose above set forth and described.

2d, The combination of wire cage cylinders, C' C" with saw cylinders, C and C', and ribbed aprons, E' J' and E J, the whole constructed and operated in the manner and for the purpose above set forth and described.

3d, The combination of ribbed cylinder, R R (plate 3), with top saw cylinder, C, and ribbed apron, E' J', and shoveller screw, S C, the whole constructed and operated for the purpose and in the manner above set forth and described.

4th, The combination of upper saw, C, with top apron, E J, and screw, S C, by means of which the cotton is hulled and rid of all dirt and trash, in the manner above set forth and described.

72,847.—PEAT AND BRICK MACHINE.—Eliphalet Hall, Dunnamora, N. Y.

I claim the presser and pusher, with or without the lever-arm and carrying-pawl, when combined together and arranged to operate with reference to the mold-wheel, A, substantially as and for the purpose specified.

72,848.—CORN HARVESTER.—L. B. Hamilton, Boston, Mass.

I claim, 1st, The combination and arrangement of the S-shaped cutters, U, spiral conveyors, J, fingers, K, and body, E, with box, C, as herein described for the purpose specified.

2d, The cylindrical-pointed fingers, K, in combination with the rotary S-shaped cutters, U, as and for the purpose specified.

72,849.—CARTRIDGE EJECTOR FOR BREECH-LOADING FIRE-ARMS.—Henry Hammond, Hartford, Conn.

I claim the combination of the unlocking bolt, a, and the stud, d, with the extracting bar, e, its notch, f, and the ejecting spring, s, constructed and operating substantially as herein described.

72,850.—SASH ADJUSTER.—P. H. Hardy (assignor to himself and E. M. Hardy), Terre Haute, Ind.

I claim, 1st, The adjusting box, C, with its movable stop plate, a, constructed, arranged, and operating substantially as herein shown and described for the purposes set forth.

2d, In combination with the adjusting box, C, connecting the upper and the lower sash together so that they will balance each other, substantially as described for the purposes set forth.

72,851.—SLED BRAKE.—J. L. Heffron, Marathon, N. Y.

I claim, 1st, The sliding plate, d, on the roller, B, for closing the slot, b, in the runner, when made and arranged as described, and when fitted between the two bars, c c, as set forth.

2d, The combination of the roller, B, fitted in the slotted runner, with the sliding plates, d, levers, f, semi annular levers, g, and adjustable dogs, h, all made and operating substantially as herein shown and described.

72,852.—WEEDING MACHINE.—Geo. H. Hess, Chicago, Ill.

I claim the machine, consisting of the inclined blades, A, attached to the central standard, C, and the latter secured to a hand frame, having a single wheel at the front and handles at the rear, all constructed and arranged substantially as herein described.

72,853.—TRUNK.—James A. House and Henry A. House, Bridgeport, Conn.

I claim, 1st, The combination, substantially as described, of the elastic shield or the metal clamp, for the purposes specified.

2d, A perforated metal clamp, through which an elastic boss or shield projects, and by which the shield is fastened to the trunk, substantially as described.

3d, The combination of the elastic boss with the metal plate, having claws grasping the boss, as shown in figs. 4 and 5.

4th, Clamping an elastic boss upon the head of the nail or screw which fastens the clamp in position, as described.

72,854.—LIGHTER AND ALARM.—Thomas N. Howell, Circleville, Ohio.

I claim, 1st, The lamp, A, constructed as described, and provided with the spring, E, in combination with the spiral match-holder, a", and the friction plate, G, as and for the purpose described.

2d, In combination with the above, the alarm apparatus, consisting of the stud, F, spring, f, nipple, f", and stop, f"', as and for the purpose described.

72,855.—KITE.—Edward I. Hughes, Pittsburg, Pa.

I claim the kite frame, constructed as described, consisting of the bent bar, A, saddle, B, curved operating bar, G, backbone, C, beak and sternum, D, tail bars, E, and wing bars, F, all constructed and arranged as described, for the purpose specified.

72,856.—FENCE AND TRELLIS HOOK.—D. S. Humphrey, East Townsend, Ohio.

I claim a cut hook-headed spike or nail, constructed as described and for the purpose specified, as a new article of manufacture.

72,857.—WELL TUBE.—Wm. B. Hutchinson (assignor to himself and Mitchell, Allen & Co.), Newbern, N. C.

I claim the combination of the conical gage strainer, F, perforated inverted conical sand basket, D, and perforated pointed cylinder, A, having the openings, G, in the hollow bead near its lower end, as herein described, for the purpose specified.

72,858.—POLING HOPS.—Allen Ingalls, Hartwick, N. Y.

I claim the combination and arrangement of the poles, A, cross bars, C, and cords, D, as and for the purpose set forth.

72,859.—METALLIC COLUMNS FOR BRIDGES.—Almon B. Ives, Bloomington, Ill.

I claim the cast-iron column, A, consisting of two arms, B B, constructed as described, and provided with ribs or flanges, R R, cap, c, and foot or shoe, H, said arms bolted at the top and spread at the foot, and connected by one or more braces, D, substantially as and in the manner herein set forth, said column, A, to be used for abutments and piers in iron and wooden bridges, substantially as and in the manner herein described and specified.

72,860.—HORSE HAY FORK.—R. V. Jones, Canton, O.

I claim, 1st, The use of the cross bar, G, in combination with its arm, E, as and for the purpose specified.

2d, The strap, A, with its prongs or teeth, B, in combination with the bar, F, with its prong, J, and cross bar, G, and the arm, E, and cord, I, arranged and used as and for the purpose set forth.

72,861.—CAR BRAKE.—Jacob Katzenberg, N. Y. city.

I claim the jointed foot lever, J, pivoted to supports, K, attached to the platform, B, or railing, C, or to both, and connected with the brake rod, I, by a chain, L, passing around a friction pulley, M, substantially as herein shown and described and for the purpose set forth.

72,862.—DRESS HOOK.—Max A. Keilig, Boston, Mass.

I claim the formation of the hook tongue, a, with the shoulder-bend, c, as and for the purpose set forth.

72,863.—PORTABLE FENCE.—A. Labair, Pewaukee, Wis.

I claim a fence constructed as specified, and so devised that all the parts may be formed of the same kind of lumber, substantially as described.

72,864.—SCALE.—Ezra B. Lake, Bridgeport, N. J.

I claim the combination of a vibrating frame or beam of a scale, a graduated plate or plates, and a weight, controlled by a graduated arm or arms all substantially as and for the purpose herein set forth.

72,865.—OAR LOCK.—Michael A. Lanagan (assignor to himself and John Dailey), Brooklyn, N. Y.

I claim the combination of the hinged row lock, A, and pivoting bolt, C, with each other, substantially as herein shown and described, and for the purpose set forth.

72,866.—BOAT-DETACHING APPARATUS.—Michael A. Lanagan (assignor to himself, John Dailey, Robert Russell, and Andrew Mercein), Brooklyn, N. Y.

I claim the combination of the slotted lock and trip lever, E, with the hooked bars, B and C substantially as herein shown and described, and for the purpose set forth.

72,867.—MEANS FOR ATTACHING BRACKETS TO GLASS.—Leopold Jonas Lavater, Paris, France.

I claim the application of the gummed paper or cloth labels, f, for the purpose of securing brackets, A, to glass or other smooth or polished surfaces, B, substantially as herein shown and described.

72,868.—GLOBE VALVE.—Lewis Leigh, Bridgeport, Conn.

I claim the spring, g, with the socket, h, and clamp, i, applied around the valve stem between the stuffing box and hand wheel, as and for the purposes set forth.

72,869.—ILLUMINATED SIGN.—Chas. Lewando, Boston, Mass.

I claim an illuminated sign, made by combining with the perforated plate, D, a traversing parti-colored semi-transparent band, C C, through which the light for illumination passes, substantially as described and for the purpose set forth.

72,870.—ROLLER FOR TOWEL.—Wm. H. Lewis, N. Y. city.

I claim a movable end piece for securing the end of the towel roller, substantially as set forth.

72,871.—TABLE LEAVES SUPPORT.—N. Long, Eaton, Ind.

I claim the combination of the self-acting supports, C, with the springs, b b, and cords, d d, constructed arranged, and operating as and for the purpose herein shown and described.

72,872.—MACHINE FOR MAKING CIDER.—Wm. Lucas, Rushville, Ill.

I claim, 1st, The metal plate, v, in the sockets, b, when arranged as described and for the purposes set forth.

2d, The combination of the crushing rollers, B C, pressing rollers, E F, guards, q, troughs, r r, spout, J, and strainer, I, when arranged to operate as shown and described.

72,873.—MODE OF SEPARATING BARK FROM WOOD.—Joseph Maitre, Chatillon, France.

I claim the process described in the present memorial, and consisting in the employment of heat in the shape of hot water, hot steam, hot air, or gases, either separately or in combination in conveniently arranged apparatus, for the purpose of decorticating or barking oak and other descriptions of wood, in the manner herein explained, and as illustrated by the annexed sheet of drawings, representing one of the modifications of the said apparatus.

72,874.—BENDING DEVICE.—Wesley Mallick, Tidioute, Pa.

I claim, 1st, The arrangement of the elbow lever, B b, hung in the slots, a and a', and the frame, A, substantially in the manner and for the purpose specified.

2d, The combination of the stop, E, arranged in the slot, a, with the frame, A, and lever, B b, as herein described for the purpose specified.

3d, The horizontal lever, F, constructed as described, in combination with the elbow lever, B b, grooved projections, c c, and frame, A, substantially as herein described for the purpose specified.

72,875.—WHIP RACK.—J. A. Marshall, Mechanicsburg, Pa.

I claim the construction of a wire spring holder and spring guide, substantially in the manner and for the purpose as herein set forth.

72,876.—SHINGLE BAND.—C. B. Martin, Fond du Lac, Wis.

I claim the binder for shingles, constructed as described, consisting of the perforated wooden boards, A, and wires, B, operating as described for the purpose specified.

72,877.—METHOD OF PREPARING WOOD FOR MUSICAL INSTRUMENTS.—Wm. H. May, Bridgeport, Conn.

I claim, 1st, The improved mode of treating wood, to increase its vibratory power and sonorous quality, for application to the sounding boards and other parts of piano-fortes, and other musical instruments, or an equivalent process, substantially as herein described.

72,878.—MATERIAL FOR THE MANUFACTURE OF GLASS.—Peter E. Minor, Schenectady, N. Y.

I claim the manufacture of glass of the dross or refuse which is thrown off in the smelting of iron ore, substantially as described.

72,879.—HAND LOOM.—H. H. Mitchell, Mineral Point, Wis.

I claim the combination and arrangement of the lay, E, supporting the take-up beam C, with the link, e, loose ratchet pulley, H, shaft, a, screw-pins, b, and weights, g, all operating as described for the purpose specified.

72,880.—PLOW.—A. N. Moore, North Cohocton, N. Y.

I claim, 1st, The employment of the scrapers, b, and wings, d, either separately or together, in combination with a plow, substantially as and for the purpose shown and described.

2d, The slotted wing, d, substantially as shown and described, in combination with a plow, for the purposes set forth.

3d, The curved corners, a, of a plow, substantially as shown and described, in combination with the wings, d, for accomplishing the more perfect lateral delivery of the soil, all as set forth.

72,881.—MOTOR FOR CARRIAGES.—Duncan Morrison (assignor to himself and Wm. Hammond), Portland, Me.

I claim the arrangement of the levers, A B, pulleys, a b, cords, c c', trucks, e e' and f f', weights, g g', toothed belt, h, drum, i i', and the releasing device composed of the lever, n, cord, o, pulleys, p r, and spring catches, m, all as and for the purposes set forth.

72,882.—STEAM ENGINE GOVERNOR.—Daniel F. Mosman, Cambridge, Mass.

I claim, 1st, the combination of two shafts, A B, having independent rotation in the same direction, and a sleeve, G, adapted to receive longitudinal motion, by any inequality in the rotation of the said shafts, substantially as and for the purposes set forth.

2d, The combination with the shafts, A B, of the arm, F, and pin, f, the scroll cam, C, and sleeve, G, constructed and operating substantianlly as described.

3d, The combination of the sleeve, G, plungers, H H,' and pins, k k', and helical cam, L, constructed and operating substantially as described.

4th, The helical cam, L, in combination with a traversing rod, K, with an intervening device, such as the spring pins, k k', or their equivalents.

5th, The helical cam, L, in its combination with the pulley, M, the pawl and ratchet, m m', and the shaft, A.

6th, The cam, C, sleeve, G, ratchet wheels, g g', pawls, n n', and pins, f1 f2, on the arm, F, operating substantially as described.

72,883.—ROTARY BRICK MACHINE.—M. C. Motch (assignor to himself and W. F. Smirall), Covington, Ky.

I claim, 1st, The hopper, B, having the ribs, c, on its inner sides, in combination with the shafts, a and a', provided with the compressing arms, b, all constructed and arranged to operate substantially as and for the purpose described.

2d, The follower, C, actuated by the eccentric, E, in combination with the revolving drum, O, having the sliding molds, i, arranged thereon, substantially as set forth.

3d, The rotating mold drum, O, provided with a number of sliding mold boxes, i, constructed and arranged substantially as described.

4th, The repressing board, S, operated in the manner and for the purpose specified.

5th, The springs, U, in combination with the mold boxes, i, when the same are constructed and operate substantially as and for the purpose herein set forth.

6th, The guides, T and T', when constructed substantially as described and for the purpose specified.

7th, The shearing knife, Q, when operated in the manner substantially as shown and described and for the purpose set forth.

72,884.—PUMP PISTON.—Benj. H. Naves, Philadelphia, Pa.

I claim, 1st, The inside lining, C, constructed with a tapering base for receiving the clapper or valve box, and also with a provision at or near its upper end for receiving a packing, e, substantially as described.

2d, The pump bucket, A, constructed with two parts, a a', with packing, b, between said parts, being confined together, and the clapper held in place by means of the tangs on the ends of the bail, E, substantially as described.

72,885.—SCRIBE HOOK FOR WEATHER BOARDING.—John Nester, Portland, Oregon.

I claim the weather-board hook, M, having the shoulders, I I, when used in combination with the scale, O, slide gage, F, spur, G, and sliding marker, B, the whole being arranged in one instrument, and forming a combined tool of the character and for the purposes set forth.

72,886.—SMOKE EXTINGUISHER FOR BOILERS.—William H. Nobles, St. Paul, Minn.

I claim the arrangement of the flues, E F and G G, with the blower, B, perforated shaft, L, and discharge opening, M, whereby to carry off the smoke and sparks, and to dispense with a smoke stack, substantially as herein set forth.

72,887.—MACHINE FOR BORING HUBS.—D. J. Owen, Springville, Pa.

I claim the stationary screw shaft, A, bearing the slide, D, and adjustable cutters, f f', in combination with the yoke, F, bearing the hub, composed of two parts, when such yoke is adapted to revolve carrying the hub, the latter being fed to the stationary cutters by means of the screw, a x, and the double nut, l m, as herein described for the purpose specified.

72,888.—COUPLING FOR WHIFFLETREES.—Milton J. Palmer, Syracuse, N. Y.

I claim the sections, A and B, with their respective flanges, b b', ears, E E, arm, F, segments, c c, and projections, e e, when constructed and used in the manner and for the purposes specified.

72,889.—CULTIVATOR.—S. G. Peabody, Champaign, Ill.

I claim, 1st, The slide bolt E, applied to the draft pole, B, and arranged in relation with the cross bar, C, to operate in the manner substantially as and for the purpose set forth.

2d, The arrangement of the front bar, D, with the standards, F, of the caster wheels, G x, and the arms, g, of the cross bar, C, substantially as and for the purpose set forth.

3d, The cross bar, C, provided with the pendant arms, G, in combination with the plow beams, H H', and adjustable frames, I, all arranged substantially as and for the purpose specified.

4th, The stay or brace bars, j j, in connection with the bars, C D, and the standards, F, of the caster wheels, G, all arranged substantially in the manner as and for the purpose set forth.

5th, The bracing of the handles, J J, by means of the bars, K, substantially as set forth.

6th, The placing of the draw bolt, L, at the rear of the draft pole, substantially as and for the purpose specified.

72,890.—WINDMILL.—Walter Peck, Rockford, Ill.

I claim, 1st, The weighted link, S, lever, M, and link, M', as arranged, in combination with the adjustable collar, L, and links, L', arms and sails, K, K', for the purpose and in the manner as described.

2d, Windlass, U, rod, R, and yoke, R', in combination with the link, S, as and for the purpose set forth.

3d, In combination with the above described mill, the auxiliary mill or wings, P, as and for the purpose set forth.

72,891.—RAILWAY CAR.—Samuel Pennock, Kennett Square, Pa.

I claim, 1st, A momentum absorbing attachment to railroad cars, tenders or locomotives, which is made and operated substantially as herein shown and described.

2d, The movable platform, J, when provided with roughened, partly-projecting, partly-receding surfaces, substantially as herein shown and described.

3d, The movable platform, J, when connected by rods, I, or directly with a wedge or wedges, H, which work upon a follower, E, resting upon spring, F, in a box, B, arranged on a car, substantially as herein shown and described.

4th, The movable platform, J, when provided with a movable coupling bar, K, the same moving independent of the platform and within it, substantially as and for the purpose herein shown and described.

5th, The follower, E, when combined with the bolts, G, and springs, F, in the box, B, and with the wedge, H, and platform, I, substantially as herein shown and described.

6th, The connecting rods, I I, when set on edge, and when working in the slotted plate, b, in combination with the sliding platform, J, and wedge, H.

72,892.—HOSE COUPLING.—Duane T. Perkins and Charles F. Hovey, Springfield, Mass.

We claim, 1st, In a hose coupling composed of two parts, I I', interlocking by means of the inclined ears or lugs, B B, the nut, c, turning upon the stud, a, applied to either or both of said parts, substantially as and for the purpose set forth.

2d, The annular groove, x' water channel, x, and ports, m m, in combination with the elastic strip, w, the whole arranged substantially as described, and constituting a packing to be applied directly to the end of either or both parts of a hose coupling, and operating both by its own elasticity and by the pressure of the water, as set forth.

72,893.—CORPSE PRESERVER.—C. F. Pike, Providence, R. I.

I claim, 1st, The application of a tubular ice box to a corpse preserver, whether the same be made with openings near the bottom or on the bottom, or whether the same be made tight, and you get your cold by conduction, substantially as herein described, and delineated on the drawings hereunto annexed.

2d, Also the construction of the corpse preserver substantially in the manner set forth in the drawing and described in the specification, of getting the rotation or movement of the air in the chamber, A, substantially as described.

3d, Also the combination of the tubes or pipes, E, with the chamber, A, cases, I J, cover, C, substantially as herein described and for the purposes herein set forth.

72,894.—PRESERVING, REFRIGERATING, AND TRANSPORTING PERISHABLE ARTICLES.—Chas. F. Pike, Providence, R. I.

I claim, 1st, The application of the pipes or tubes to a vessel for the purposes of refrigeration, preservation, and transportation of meats, fruits, and provisions from one place to another, substantially as set forth and described whether the rooms are built to the ship, or built and put into the ship or vessel.

2d, Also, the combination of the tubes or pipes with the rooms, R, vessel, V, substantially as herein described and set forth, and for the purposes set forth.

72,895.—CONSTRUCTION OF RAILROAD CARS FOR PRESERVING AND TRANSPORTING MEATS, FISH, AND VEGETABLES.—Chas. F. Pike, Providence, R. I.

I claim, 1st, The application of tubular ice-boxes to a railroad car for the purposes of refrigeration, preservation, and transportation of meats, fish, and fruits from place to place, substantially as set forth and described.

2d, Also, the combination of the pipes or tubes with the room or rooms, R, with the running-gear, H, substantially as set forth, when used for the purposes set forth and described.

3d, Also, the tubular ice box, with or without its being perforated at the top and bottom, with the room, R, whether the same be constructed as a part of the car, or merely put upon a flat with the running-gear, H, attached to the flat, and to be removed at will or pleasure, substantially as and for the purposes set forth.

72,896.—DINING TABLE.—Manuel Pirz, East New York.

I claim the arrangement of the grooved base, B, and top, C, with the table A, when the tablecloth is adapted to be spread over the table and beneath the base, B, in such a manner as to permit the top, C, to revolve without its rollers coming in contact with the tablecloth, as herein shown and described.

72,897.—GATE.—C. H. Platt, North Fairfield, Ohio.

I claim forming the notches, F, in two sides of the rear gate post E, for the reception of the supporting bar, C, substantially as herein shown and described.

72,898.—TOBACCO CUTTER.—E. L. Pratt, Boston, Mass.

I claim the throat piece or gage plate, d, made, held in position, and having provision for removal without starting its fastenings, substantially as set forth.

Also, providing the swinging lever or carrier, c, with scale marks, substantially as shown and described.

72,899.—MACHINE FOR HEADING BOLTS.—F. B. Prindle, Southington, Conn.

I claim the combination of the holding dies, e and e', and squaring dies, g and h, with the upsetting punce, j' and plunger or heading die, k, when they are constructed, arranged, and operated substantially as herein described and set forth.

72,900.—LANTERN.—E. T. Prindle and John Wellfare, Aurora, Ill.

We claim the arrangement of the case, A, the bull's eye, B, glass, C, and lamp, K, the case being provided with a lining, I, and with perforations, i, whereby a steady current of air is supplied to and in the direction of the lamp flame, substantially as and for the purpose specified.

72,901.—WAGON JACK.—R. B. Prindle, Norwich, N. Y.

I claim the notched rack bar, E, arranged and constructed in combination with the connecting link, f, fulcrum lever, D, bottom bar, a, and sliding frame C C, operating substantially in the manner as herein described for the purposes set forth.

72,902.—RAILROAD RAIL.—E. D. Pritchard, Boston, Mass.

I claim a railroad rail, formed with enlarged ends, as described, and mitred joints, when the small end of the joint is provided with shoulders, c, and connected together by means of bolts passing through elongated openings in the same, substantially as and for the purpose set forth.

72,903.—GUN WAD PUNCHER.—Ransom Rathbone, New York city.

I claim a wad punch, provided at or near its delivery end with lubricating ways or perforations, for operating in combination with an outside supply-chamber or box, from which the oil or grease is drawn or fed to the interior of the punch for greasing the edges of the wads as or before they are delivered from the punch, substantially as specified.

72,904.—DEVICE FOR SOLDERING SHEET METAL CANS.—Philip Rees, Bridgewater, Pa.

I claim the rod, B, the cylinder, C, radiating arms, f f, etc., hinged vertical plates, F F, etc., the compresser, D, the pin, d, the mortises, c c, the latch, A, and mortise, b, the disk, E, or their equivalents, constructed, arranged, and operated in the manner and for the purpose shown and described.

72,905.—ATTACHING ORNAMENTAL HEADS TO NAILS, SCREWS, etc.—Thos. C. Richards, New York city.

I claim attaching ornamental heads to nails and screws by means of a recess or groove to receive the head of the nail and screw, composed of a separate piece of metal attached to the under side of the ornamented head, as herein shown and described.

72,906.—MITRE BOX.—John W. Richardson, Boston, Mass.

I claim a mitre box constructed by combining with the piece sustaining the saw guideposts, stock guides separately pivoted, so as to be turned each on its own center with respect to said piece, and arranged to be held thereto, and adjusted by means of pivoted links, all substantially as set forth.

72,907.—COTTON-SEED PLANTER.—O. Richardson, Boston, Mass.

I claim, 1st, The combination and arrangement of the projection, I, and the two rotary agitators, K K, with the hopper and the seed-dropping wheel arranged therein as specified.

2d, Also, the arrangement and combination of the disks, g g, with the two agitators, K K, a series of blades, and their hopper.

3d, Also, the application of the plowshare and cover supporter or frame, L, to the carriage body, by means substantially as specified, whereby the adjustment of the plowshare may be effected, and the coverer be free to play vertically, in manner as explained.

4th, Also, the formation of each of the notches or cavities, d, of the seed-dropping wheel, E, hook-shaped, as represented, and to operate with the advance spout, and upon the seed, as specified.

5th, Also, the combination and arrangement of the deflector, T, with the hopper and seed-dropping wheel, the agitators, and the projection, I, arranged in such hopper, as specified.

72,908.—CLOTHESLINE HOLDER.—Peter Riordan, Washington, D. C.

I claim the device above described, consisting of the frame, A, clamp, C, and spool, R, when combined, constructed, and operating substantially in the manner as and for the purpose specified.

72,909.—SINK TRAP.—Jas. S. Rogers, Worcester, Mass.

I claim a trap for an iron kitchen sink, constructed with lugs, E F, or their equivalents, to secure the strainer or cover in position, so that the same may be removed without disturbing the waste-pipe coupling, substantially as described.

72,910.—HARVESTER REEL.—Wm. F. Rundell, Genoa, N. Y.

I claim the metallic elbows, E, constructed as described, in combination with the plates, B and D, constructed as described, as and for the purpose specified.

72,911.—TUMBLER WASHER.—E. W. Russell, Baltimore, Md.

I claim the tumbler washer, above described, consisting of the water pipe, B, cap, C, valve, D, and rod, E, all constructed, combined, and arranged substantially as and for the purpose specified.

72,912.—CIGAR PIPE.—E. Schlichting, New York city.

I claim the attachment, D, having the chamber, H, when attached to the part, C, having the chamber, a1, as herein shown and described.

72,913.—CONSTRUCTION OF DIKES, LEVEES, AND EMBANKMENTS.—J. C. Schooley, New York city.

I claim, 1st, The construction of an impervious and continuous core for dikes or levees, formed by pouring into a prepared channel any suitable material or mixture, in a heated or liquid state, that will become hardened when cooled, substantially as and for the purpose specified.

2d, Also, the construction and arrangement of the portable metal, earthen or wooden mold, when adapted to receive and deposit the core in its liquid state, in the prepared channel, and above it, in the manner and for the purpose specified.

72,914.—LOCK FOR TRAVELING BAG.—Carl H. Schubeus, Newark, N. J.

I claim the plate, O, knob, G, spring, H, bolt, K, and catch, E, substantially as herein described and for the purposes named.

72,915.—MECHANICAL MOVEMENT.—James M. Scott, Kinsman, Ohio.

I claim the feed shaft, E, slotted crank, D, and pin, c, in combination with the pitman, B, and shaft, A, arranged and operating in manner and for the purposes substantially as described.

72,916.—GUNPOWDER CANISTER.—Olin Scott, Bennington, Vt.

I claim as a new article of manufacture, a metallic gunpowder keg or canister, of hexagonal or polygonal form, with the sides and heads corrugated, the heads being secured by seaming, and one of the heads having an opening in it, near an angle, all constructed and arranged as and for the purpose herein shown and described.

72,917.—HEDDLE FOR LOOM.—J. Senneff, Philadelphia, Pa.

I claim, 1st, The heddles of looms, when constructed with the metallic clasps, C, or metallic eyes, B, and also with metallic eyelets, D, cast upon twine or wire, substantially as set forth.

2d, So constructing the removable eyelets, for attaching the heddles to the rods, that they may be clamped upon the same independently for the purpose of replacing a broken heddle, substantially in the manner set forth.

72,918.—BEEHIVE.—David Shaeffer and Aaron McCabe Shaeffer, Centreville, Iowa.

We claim the arrangement of the entrance, A, drawer, D, chamber, C, and removable boxes, G G1 G2, in connection with the inclosing box, E, and frame, A, substantially as described.

72,919.—ART OF MANUFACTURING AND UNITING ALLOYS OF METALS IN FORMING WATER PIPES AND OTHER ARTICLES.—William Anthony Shaw, New York city.

I claim, 1st, Covering the surface, either inside or out, or both inside and out, of an alloy of lead and antimony, or of lead and tin, or of lead, tin, and antimony, or their equivalents, for this purpose, with pure tin, when said alloy is made in a pipe or other article of manufacture, substantially as described.

2d, Covering the surface, either inside or out, or both inside and out, of an alloy of lead and antimony, or of lead and tin, or of lead, tin, and antimony, or their equivalent, for this purpose, when made into a pipe or other article of manufacture, with an alloy of cadmium and tin, or of cadmium, tin, and bismuth, or of tin, lead, cadmium, and bismuth, or of tin and nickel, or of tin, nickel, and bismuth, or their equivalents, for this purpose, substantially as described.

3d, Covering an alloy of lead with an alloy of tin, when made in a pipe or other article of manufacture, by first making the lead alloyed pipe or article, and then applying the tin alloy thereto in a state of fluidity.

72,920.—APPARATUS FOR COOLING MILK.—C. L. Sheldon, Lowville, N. Y.

I claim, 1st, The combination of the water receiver, a d, with the connecting arms, and the valve, r, attached to the plunger, k, as and for the purpose specified.

2d, The combination of the ratchet wheels, f f, the windlass, s, the spool, e, the tipping shelf, t, and weight, p, as constructed and arranged for the purpose of stopping the agitation at any given time.

72,921.—VISE.—Peter Shellenbock (assignor to himself and Milton Ralston), Middletown, Ohio.

I claim, 1st, The right and left screw, C, in combination with frame, A, and jaws, B, constructed, arranged, and operating in the manner and for the purpose substantially as described.

2d, The lever, E, with its slot, M, and detent, F, in combination with scalloped wheel, D, and screw, C, for operating the jaws, B, in the manner and for the purpose described.

72,922.—PLOW, POTATO PLANTER AND SEEDER COMBINED.—Solomon Shetter, New Cumberland, West Va.

I claim the endless carrying or distributing belt, H, provided with buckets, K, or forked projections, I, in combination with the hopper, D, tube or chamber, E, plow, A, and covering share, Jx, all arranged substantially as and for the purpose set forth.

72,923.—PRUNING SHEARS.—Joseph Sill (assignor to Drake, Sill, and Hutson) Montoursville, Pa.

I claim, 1st, The inclined socket, B', substantially as and for the purpose specified.

2d, The instrument above described, having the socket, B', and the curved and beveled blade, C, operating in combination with it, substantially as and for the purpose set forth.

72,924.—APPARATUS FOR DELIVERING GOODS.—James D. Sinclair, Brooklyn, N. Y.

I claim, 1st, The traps, D D, when pivoted at the angles of the zigzag way A, substantially as herein shown and described, for the purpose of arresting goods to be lowered, to prevent their descending with too great velocity.

2d, Providing the traps, D D, with adjustable backs, b b, substantially as described, and for the purpose of adjusting the device for goods of greater or less bulk, as set forth.

3d, The traps, D D, when arranged as described, in combination with the spring boards, d e, all made and operating substantially as and for the purpose herein shown and described.

72,925.—LAMP BURNER.—George Smith, Providence, R. I.

I claim, 1st, The construction of the wide and narrow openings, a a', through the burner case, with a lip, b, formed on the case, and arranged in such a position as to receive the flaring forked end, c, of the spring slide, G substantially as and for the purposes described.

2d, The construction of the spring slide, G, with a forked end, c, and a narrow tail piece, f, this slide being curved and perforated substantially as described.

3d, The manner of attaching the spring, J, to the wick tube, by a staple, g, substantially as and for the purposes described.

72,926.—PENCIL HOLDER.—Jonathan Smith, Tiffin, Ohio.

I claim the elongated tube, A, with an opening in its side, around which opening and tube is an India rubber band, G, said tube being provided with teeth, e e, for securing it within the garment, for holding a pen or pencil, as set forth.

72,927.—BOILER TUBE CUTTER.—W. Bell Smith, Charleston, S. C.

I claim, 1st, The hollow mandrel, D, cap plate, I, cutter bar, G, with the inclined extremity, b, and the feed screw, L, in combination with the cutter block, H, all constructed and operating substantially as and for the purpose described.

2d, The clamp, E, in combination with the box, C, for securing the machine to a boiler flue sheet, in the manner described.

3d, The gear wheels, M M', N N', the nut, P, the mandrel, D, and the cutter bar, G, combined, arranged, and operating as and for the purpose described.

4th, The pin, K, held by the spring, e, and working in the annular groove, d, in combination with the mandrel, D, and box, C, as herein shown and described, for the purpose specified.

5th, The combination of the clamp, E, the box, C, the mandrel, D, the cutter bar, G, the cutter block, H, the nut, P, and the gears, M M', N N', constructed, arranged, and operating substantially as and for the purpose described.

72,928.—SNOW SWEEPER FOR STREETS.—William W. Smith, Chicago, Ill.

I claim, 1st, The range of brushes, E, mounted on shafts, D, with universal joints, C, in combination with the yokes, F, all arranged and employed as and for the purposes specified.

2d, The construction of the brushes, E, by setting their wires in holes in the brush heads, and securing them with caps, S, applied as represented and described.

3d, The lever, M, chain, K, eccentric, I, and rod, H, in combination as and for the purposes specified.

4th, The wheel, I, in combination with wheels 2 and 3, and clutch, O, for the purpose of transmitting the power from one to the other series of brushes, as set forth.

72,929.—BUTTON.—D. M. Somers, Brooklyn, N. Y., and Walter S. Atwood, Newark, N. J.

We claim providing buttons with a hollow neck, N, to be compressed to fit the diminished form of central stem, S, as shown in figs. 2 and 3, at A, substantially as herein specified and described for the purpose set forth.

72,930.—INDICATOR FOR RAILWAY STATIONS.—Elihu Spencer, Ottawa, Canada.

I claim a case, A, having the cylinder, E, mounted therein, with the disk, d, and spring, I, arranged to hold it in position, and having the series of plates with the names of stations thereon, hinged together and arranged to wind over said cylinder to and fro, and fold up in the lower part of the case, substantially as shown and described.

72,931.—FURNACES FOR ROASTING AND TREATING ORE.—Charles Stetefeldt, Austin, Nevada.

I claim a furnace constructed with a shaft, B, the fall of the ore through which is retarded by the upward motion of the heated air and chloridizing gases, combined with a fireplace, J, opening into the canal, H', and below the flue, D, substantially as described and for the purpose set forth.

72,932.—MANUFACTURE OF OIL CLOTH.—John B. Stevenson, Jr., Philadelphia, Pa.

I claim the mode of manufacturing oil cloth by the means substantially as described.

72,933.—CAR COUPLING.—John T. Stoakes, Parish of New Church, England.

I claim, 1st, The construction and arrangement of the slotted pivoted bar, D, elliptic springs, C, and bumper bar, b1, substantially as described, for the purpose specified.

2d, The shoulder, b3, of the bumper head, with a link socket to receive the link of an ordinary car coupling, substantially as herein shown and described and for the purpose set forth.

3d, The combination of the two collars, H and I, with the vertical shaft, G, the said collar and shaft being constructed and arranged substantially as herein shown and described, so that the cars may be uncoupled and the brake applied by operating the same shaft.

72,934.—MARKING GAGE FOR SEWING MACHINES.—Wm. M. Stoddard, San Francisco, Cal.

I claim the device for marking for tucks, arranged in relation to the sewing machine substantially as described, and consisting of the adjustable guide bar, A, marker, G, having a slot, I', spring, a, and adjustable spring bar, J.

72,935.—FEED BUCKET.—R. C. Sturges, Barnstable, Mass.

I claim a feed bucket having an outer or grain containing chamber, and an inner or feed chamber connected together and supplied, the latter from the former, substantially as set forth.

72,936.—STRAW CUTTER.—Bernhard Suverkrup, Louisville, Ky.

I claim the combination of the crank, S, fly wheel, A, with adjustable knife, B, bevel wheels, E, F, G and H, slot, O, wrist, P, levers, K and L, ratchet, M, and spring catch, N, when constructed, arranged and operating in the manner and for the purposes set forth.

72,937.—COOKING STOVE.—Wm. B. Treadwell, Albany, N. Y.

I claim, 1st, The grated way, B, substantially in the manner and for the purpose herein set forth and described.

2d, Also the inclined plate, D, attached to the grated way, substantially as described and for the purpose herein set forth.

3d, Also the grate, C, the grated way, B, and inclined plate, D, in combination substantially as and for the purpose described.

4th, Also the grated way, B, the grate, C, the inclined plate, D, in combination with the coal box, E, the ash pan, F, constructed substantially as and for the purpose herein described.

72,938.—COOKING STOVE.—Wm. B. Treadwell, Albany, N. Y.

I claim, 1st, Grate, G, combined with plates, F and v, constructed substantially in the manner and for the purpose above described.

2d, Also grate, G, plates, F and v, in combination with plates d and e, for introducing air at m and n, constructed substantiallally in the manner and for the purposes above described.

3d, Also the fire chamber, constructed as above, in combination with the sifter, L, substantially in the manner and for the purposes above described.

4th, Also the sifter, L, in combination with the boxes, M and N, and the grate, G, substantially in the manner and for the purpose above described.

5th, Also the hearth, H, constructed substantially in the manner and for the purpose herein described.

72,939.—MARINE STEAM ENGINE GOVERNOR.—Edward M. Troth (assignor to himself and John A. Secor), New York city.

I claim the combination of the pendulum, I, with the slide valve, H, steam chest, L, steam cylinder, A, and piston, B, and with the piston rod, C, and connecting rod, D, all made and operating substantially as and for the purpose herein shown and described.

72,940.—FIELD THRESHING MACHINE.—A. W. Tucker, Waxahatchie, Texas.

I claim, 1st, Arranging a threshing cylinder above an endless apron, E, of a field threshing machine, in such a manner that the straw and grain emerging from the threshing cylinder, will fall upon the same apron by which they were conveyed to the said cylinder, substantially as herein shown and described.

2d, The apron, E, threshing cylinder, J, and roller, M, in combination with each other, all arranged and operating substantially as and for the purpose herein shown and described.

3d, The spirally flanged serrated take up roller, L, when made and operating substantially as and for the purpose herein shown and described.

4th, The hinged bars, c, in combination with the roller, D, apron, E, guards, N, and lever, H, all made and operating substantially as herein shown and described.

72,941.—CAR SPRING.—Richard Vose, New York city.

I claim the within-described improvement on the combination spring patented by me December 17, 1865, viz: placing a plain cylinder of sulphurized india-rubber or gutta-percha within the coiled metallic portion of the spring and then grooving said cylinder and more perfectly combining it with the said metallic portion of the spring preparatory to subjecting it to the requisite curing process, all substantially as herein set forth.

72,942.—ROLLER JOURNAL BOX.—Edward Wadhams, Yorkville, N. Y.

I claim the anti-friction rollers, E, for supporting the axle in its journal box, or *vice versa*, when said rollers are supported by pivots, C, in radial grooves or channels, b, in the side plates, B, substantially as shown and described.

72,943.—SPRING BED BOTTOM.—Alfred Walker, New Haven, Conn.

I claim providing the slat, E, with a socket corresponding to each spring whether the socket be attached to or formed in the said slat the two sockets opening in opposite directions and so as to receive and hold the two springs in the manner and for the purpose as herein set forth.

72,944.—TRAVELING BAG.—Zachariah Walsh, Newark, N. J.

I claim, 1st, The inner edge of the carpet-bag frame bent outward in such manner as to prevent contact with the cloth, B, whereby the chafing and wear of the latter are prevented, as herein shown and described.

2d, The frame of traveling bags secured to the cloth or leather by means of the eyelets, C, either with or without the closed end, c, as herein shown and described.

72,945.—STEERING APPARATUS.—Jacob H. Weaver, Maurlestown, N. J., assignor to himself and George Webb, Philadelphia, Pa.

I claim, 1st, The rudder post, a, with its toothed segment or pinion, k, and the toothed segment, h, in combination with the hand wheel shaft, c, its pinion, d, and the shaft, D, wheel, e, and pin, l, or their equivalents, the whole being constructed and operating substantially as described.

2d, The segment or pinion, k, secured to the rudder post when of greater thickness than the wheel or segment with which it gears, for the purpose specified.

72,946.—REVERSIBLE LATCH.—R. L. Webb, New Britain, Conn.

I claim the combination of the lock and latch when the latch bolt and its operative mechanism are arranged in a case or frame independent of the main case and constructed so that the latch bolt may be removed substantially as described without removing the said independent case from the main case.

72,947.—HORSE COLLAR.—Leopold Wegmenn and C. F. Diesel, Allegheny City, Pa.

We claim, 1st, The collar to be used without hames and dispensing with the rim having the curved pieces of wood, B B, and the blades, C C, forming a part of it, constructed substantially as and in the manner set forth.

2d, The metal blade, C, having the notches, f f, and the clasp, m, for the purpose set forth.

3d, The clip, consisting of the detachable link, a, plate, b, T-shaped portion e, constructed and operating substantially as set forth; and

4th, The combination of the clip, G, with the metal blade, C, as shown in the drawing, Fig. 3.

72,948.—COMBINED SASH AND SHUTTER FASTENER.—A. H. Wemple and Thomas D. Richardson, New York city.

I claim the jointed plate, A, having a bent extremity, e, and combined with the duplex hook, B, to form a blind and sash fastener, as herein described and represented.

72,949.—METHOD OF MANUFACTURING RIBS AND BOLSTERS FOR DOUBLE-BARRELLED GUNS.—D. W. Wesson and John H. Blaze, (assignors to Wesson Fire-Arms Company), Springfield, Mass.

We claim, 1st, Constructing "ribs" for double-barrelled guns from a metallic tube, substantially as set forth.

2d, Constructing a "bolster" or keel to be used in combination with a rib upon a double-barrelled gun from a collar fastened to or made a part of the metallic tube out of which such rib is to be formed, substantially as described.

3d, As an article of manufacture a rib for use upon a double-barrelled gun when formed from a metallic tube, substantially in the manner specified.

72,950.—BRIDLE BIT.—Richard P. Whelan, Leavenworth, Kansas.

I claim, 1st, The straight bar, A, having rings or bows, a a, the curved under bar or bow, B, with one or more rollers, b, as constructed with ornamental scroll side pieces, C C, diamond-shaped rings, E E, friction rollers, e e, when combined with single rods, G G, arranged and operating substantially in the manner herein described for the purposes specified.

2d, The combination of the bar, A, with the bar, B, the loops, a b, pulleys, I I, rings, E E, rollers, F F, and snaffle hook, g, when connected and arranged in the manner as and for the purposes herein set forth.

72,951.—MACHINE FOR GRINDING AND POLISHING ARTICLES OF METAL.—J. Albert Whelpley, Greenwich, New Brunswick.

I claim the combination of the two grindstones or polishing wheels, G G, rest, J, rock shaft, O, and arm, P, arranged and constructed as and for the purposes described.

72,952.—STEAM ENGINE LUBRICATOR.—J. L. Whipple and Adolphus Bonzano, Detroit, Mich.

We claim the combination of the perforated or indented rod, E, and oil cup, D, with the cylinder, A, and slide valve, B, substantially as described for the purpose specified.

72,953.—DITCHING MACHINE.—David Whisler, Union Township, Ohio.

I claim, 1st, The hinged platform, T, for regulating the depth of the furrow or ditch, substantially as described.

2d, In combination with the above, screw, h, and springs, t, substantially as set forth.

3d, Axle, B, wheels, C C, beam, A, platform, T, screw, h, springs, t, and vertical knife, P, all combined and arranged as and for the purpose set forth and described.

72,954.—BOLT CUTTER.—W. W. Worden (assignor to himself and Daniel Howell), Waukesha, Wis.

I claim eccentric lever, B, hook, E, roller, D, and cutting-knife, C, in combination, substantially as described.

72,955.—LACING DEVICE.—Alfred Young, Philadelphia, Pa.

I claim, 1st, The cleats, d d, attached to a shoe, or other article of wearing apparel secured by laces, at opposite sides of an opening or slit in the same, and arranged, in respect to the usual eyeleted openings, as set forth.

2d, The cleat, d, made in the form of a double hook, as and for the purpose specified.

72,956.—CASTER FOR TRUNKS.—W. H. Young and L. Young, Boston, Mass.

We claim the combination and arrangement of the several parts of the caster, namely, the bolt, c, with its wheel, f, the slot, d, the pin, e, and the spring, g, all in combination, and operating substantially in the manner and for the purpose above set forth.

72,957.—GATE.—Isaac N. Young, Swan, Ind.

I claim, 1st, In combination with a sliding gate, the arrangement of the pulley shaft, e', and crank shaft, H, the latter two connected together by the rings at their extremities, in the manner and for the purposes set forth.

2d, The sliding bars or arms, a a, in combination with the crank shaft, H, when used in connection with a farm gate, substantially as and for the purpose specified.

3d, The spring, O, when used in connection with the cord, c, upon a farm gate, substantially as and for the purpose specified.

72,958.—WATER METER.—Cyrus W. Baldwin, Boston, Mass.

I claim, 1st, The combination, in a meter such as described with the valve rods and valves for regulating the flow of the liquid through the meter, of the flexible diaphragm, and spring devices, or their equivalents, for operating the said valves, under such an arrangement that, while the valves and valve rods are partially actuated by the said diaphragm, they shall be caused to complete their movement in either direction by the action of the said spring devices, substantially in the manner set forth.

2d, The combination, with the flexible diaphragm, slotted forks, o o', and sleeves, r r', which carry the triangular wipers, of the valves, c c2, valve rods, s s', and spring devices for completing the movement of the said valves, in the manner and for the purposes shown and specified.

3d, The combination, with the flexible diaphragm, valves for closing the outlet ports, and mechanism for actuating said valves, of the vibratory arms, z z, and valve, n, for closing the outlet port, substantially as shown and for the purposes described.

4th, The combination and arrangement, with the valves, c c2 and n, and mechanism for actuating the same, of the ports for the admission and discharge of the liquid into and from the meter, substantially as herein shown and set forth.

REISSUES.

69,746, dated October 15, 1867; antedated September 17, 1867; reissue 2,821.—WINDOW-SASH FASTENER.—Hobart G. Arnold, Rochester, N. Y.

I claim a sash lock, composed of bolt, H, tumbler, G, and notched plate, the whole combined and arranged substantially as and for the purposes set forth.

69,755, dated October 15, 1867; reissue 2,822.—COMB.—Jas. H. Brines, Brooklyn, N. Y.

I claim the longitudinal flanges, b, on the metallic part, B, constructed as described, and fitting over longitudinal shoulders, a, in the part or parts, A, as herein set forth for the purpose specified.

69,181, dated September 24, 1867; reissue 2,823.—BUCKLE.—Ezra Cole, Fairfield, Mich.

I claim the buckle, constructed as described, consisting of the curved frame, A, having at one end the plate, C, provided with a downward projection or lug, D, in combination with the bail, E, whose pins, F, rest and slide upon the upper edges of the curved frame, A, as herein described, as and for the purpose specified.

52,945, dated February 27, 1866; reissue 2,824.—STEAM GENERATOR.—Charles E. Jouriet, Aurora, Ill., assignor to himself and A. J. Ambler.

I claim, 1st, A water bridge placed within the fire box, constructed in the form of a semi-tube, as set forth, flanged and riveted to the flue-sheet and side water legs, so as to afford an unobstructed communication with the side water legs, so as to afford an unobstructed communication with the back-water space and side water legs, said sheet being sustained by stay-bolts, substantially as set forth.

2d, The combination of the vertical stay-bolts, C C, and the through stay-bolts, I I, with the semi-tube water bridge and the outer jacket of the fire box, substantially as shown and for the purpose set forth.

52,945, dated February 27, 1866; reissue 2,825.—STEAM GENERATOR.—C. F. Jouriet, Aurora, Ill., assignor to himself and A. J. Ambler.

I claim a coal-burning locomotive, constructed with the following elements, viz: a water bridge constructed and applied substantially as shown, and with a series of air-jets, I I, through the several sides of the fire box, located and limited in their location around the fire box above the fire, and below the water bridge, substantially as shown.

66,035, dated June 25, 1867; reissue 2,826.—BOOT CRIMPER.—De Witt C. Mowrey, Milford, Mass.

I claim the combination, with the clasp and spreader, and the screw for operating the latter, of auxiliary or movable jaws, placed on each side of the spreader, and supported upon and depending from the said clasp, so as to be located and held at all times between the jaws of the same, in the manner described, so that when the spreader is lowered, the movable jaws shall approach each other and recede from the jaws of the clasps, as herein specified.

Also, the application of the auxiliary jaws to the clasp, by means substantially as described, viz: by the arms provided with ears, and by the slot having the supports arranged as set forth.

74,028, dated April 23, 1867; reissue 2,827.—APPARATUS FOR COOLING MILK.—Watson Peck, Babcock's Grove, Ill.

I claim the combination of a pipe, B, provided with a receiver, C, or its equivalent, with a cooling vat, A, arranged to operate substantially in the manner and for the purposes herein set forth.

61,956, dated Feb. 12, 1867; reissue 2,828.—COOKING STOVE.—J. J. Savage, Troy, N. Y.

I claim, 1st, The location of a fuel doorway or feed mouth, B, of stove furnaces, substantially below and forward of the combustion or flame chamber, C, thereof in such immediate or contiguous position to the fire box, A Y, thereof, as to admit of fresh fuel being fed thereinto, in manner substantially as hereinbefore described for the purposes set forth.

2d, Also the extension of the fire box, A, forward of the combustion or flame chamber, C, of stove furnaces, and immediately under or contiguous to the aforesaid located fuel doorway, B, thereof, in manner substantially as herein described, for the purposes set forth.

3d, Also a level feeder, F, substantially as described, when operated in combination with and through said located fuel doorway, B, of stove furnaces, in manner substantially and for the purposes herein set forth.

4th, Also providing a feed lever, F, with a fulcrum hook, c, or an equivalent therefor, when used in combination with a fulcrum ridge or bearing, d, arranged on the edge of the aforesaid located fuel doorway, B, of stove furnaces, substantially as and for the purposes set forth.

5th, Also in combination with the front plate, D, of stove furnaces, a fire or guard plate, E, when arranged in position above the aforesaid located fuel doorway, B, of the fire box thereof, and about opposite the combustion or flame chamber, C, substantially as and for the purposes set forth.

6th, Also the arrangement of the front plate, D, of stove furnaces, in an inclined or slanting position, in combination with the aforesaid located fuel doorway, B, such as to overhang the combustion or flame chamber, C, and fire box thereof, substantially as and for the purposes set forth.

7th, Also the combination of the aforesaid located fuel doorway, B, fire box, A Y, the combustion or flame chamber, C, and the lever feeder, F, as applied to stoves, to operate in manner substantially as and for the purposes herein described.

8th, Also the peculiar manner or method of feeding or introducing fresh fuel directly into the fire box of stove furnaces, by forming for its reception clear vacant room or places in, below and between ignited fuel or live coke therein, by the conjoint means substantially of a feed aperture or doorway, B, located as described, and of a feed lever, F, or equivalents therefor operating substantially as herein set forth for the aforesaid purposes.

21,029, dated July 27, 1858, reissue 2,829.—CLOTHES WRINGER.—Ann Jane Sergeant, Dayton, Ohio, administratrix of the estate of Isaac A. Sergeant, deceased, assignor to Sylvanus Walker, Newark, N. J.

I claim, 1st, The employment or use of a portable frame or yoke, B, with uprights, S S', or their equivalents, for supporting a clothes wringing mechanism in position on one side of a common wash tub, for the purposes set forth.

2d, The application of an adjustable clamping device, when employed to attach a clothes wringer to one side of a wash tub, substantially in the manner described and for the purposes set forth,

DESIGNS.

2,851.—SADIRON HANDLE.—Arad Barrows, Philadelphia, Pa.

2,852.—MOLDING FOR PICTURE FRAMES.—John H. Brown, Geneseo, N. Y.

2,853.—MOLDING FOR SHOW CASES.—Caspar Fersch, New York city, assignor to Hoffman & Fersch,

2,854.—TRADE MARK.—John Gorham Providence, R. I.

2,855.—PISTOL BARREL.—John Murphy, New York city.

2,856.—KEY TAG.—Arthur Stafford, Brooklyn, N. Y.

2,857.—REFLECTOR.—August Wilhelm, Philadelphia, Pa.

PENDING APPLICATIONS FOR REISSUES.

Application has been made to the Commissioner of Patents for the Reissue of the following Patents, with new claims as subjoined. Parties who desire to oppose the grant of any of these reissues should immediately address MUNN & Co., *37 Park Row, N. Y.*

69,062.—BOOK COVER PROTECTORS.—Charles L. Alexander and Victoria A. Osborn, Washington, D. C. Dated September 24th, 1867. Application for reissue received and filed December 19th, 1867.

1st. We claim the elastic or inelastic bands or straps, b b b b, connecting the folds, D D D D, by means of clasps or other devices, and applicable to any form of book cover, in such manner as to render it extensible.

2d, The elastic bands or straps, a a a a, to form an expansible connection for the two halves of the book cover protector, substantially as described.

3d, Such a book cover protector, or mode of covering books, as by reason of its expansibility and extensibility, may be adjusted to books of various sizes, substantially as described.

15,514.—FRUIT BOX.—Jabez W. Hayes, Newark, N. J.—Dated Aug. 12th, 1856. Application for reissue received and filed Dec. 20th, 1867.

I claim, 1st, A box or basket formed of veneers or lamina of wood, laid across each other and turned up to form the sides, substantially as specified, so that the bottom is made of two thicknesses secured together, and the sides of single thicknesses.

2d, Connecting the veneers, A and B, together at the bottom of the basket or box, substantially in the manner specified.

3d, A box or basket formed of veneers or lamina of wood, crossing each other at the bottom and turned up to form the sides, in combination with a cord or its equivalent, passing around the sides to hold them together, substantially as set forth.

4th, A box or basket in which one lamina of wood forms two of the sides and one thickness of the double bottom, substantially as set forth.

13,095.—SECURING CUTTERS TO ROTARY DISKS.—Nathan Stephens (assignee of Jonah Newton), New York city. Dated June 19th, 1855. Application for reissue received and filed Dec. 21st, 1867.

I claim, 1st, The employment and use of cutters for rotary disks, plates, or saws, composed of the segment of a ring fitted in recesses comprising a portion of a circle, and arranged as shown, or in any equivalent way, to admit of the adjustment of said cutters to compensate for wear, and also to admit of the ready detachment of the same for the insertion of new teeth when required.

2d, A rotary cutter, consisting of a disk having recesses, which represent the segment of a circle, and teeth adapted to and admitting of being adjusted in these recesses, substantially as set forth for the purpose specified.

3d, The tooth or cutter consisting of the segment of a ring having on its convex side a rib adapted to a groove in the above mentioned recess.

4th, The screw, h, and segmental nut, I, arranged for screwing the tooth or cutter to the disk or plate, as set forth.

65,917.—COVERING WHIPS.—Charles C. Pratt (assignee of Gamaliel King), Westfield, Mass. Dated June 18th, 1867. Application for reissue received and filed Dec. 21st, 1867. Div. 1.

I claim, 1st, A waterproof coating, consisting of the combined ingredients herein shown and described.

2d, The application of the dissolved caoutchouc, with or without the lead and oil, to a whip, substantially as and for the purpose shown.

65,917.—COVERING WHIPS.—Charles C. Pratt (assignee of Gamaliel King), Westfield, Mass. Dated June 18th, 1867. Application for reissue received and filed Dec. 21st, 1867. Div. 2.

I claim, 1st, The covering of the body of a whip with an inner braiding, d, substantially as shown and described.

2d, The combination of the inner and outer braidings, d f, with the varnish or coatings, c e, all applied in the construction of a whip, substantially as shown and described.

33,496.—HARVESTERS.—John F. Seiberling, Akron, Ohio. Dated Oct. 15th, 1861. Application for reissue received and filed Dec. 23, 1867. Div. A.

I claim, 1st, The combination, substantially as described, of a brace bar, F, pivoted to the inner rear corner of the main frame, and extending forward outside of and parallel to the inner driving wheel, with a coupling arm, F', pivoted to the main frame near its front outer corner, the brace bar and coupling arm being firmly united at the point of intersection for the purposes set forth.

2d, The combination, substantially as described, of the longitudinal brace bar with the transverse coupling arm, when the two are rigidly connected at their point of intersection, and vibrate on an axis diagonal to both (or passing through their respective pivots), whereby the coupling frame can play freely without cramping the joints, as set forth.

3d, The combination, substantially as described, of a shoe (to which the finger beam is attached), a coupling arm, pivoted at one end to the toe of the shoe and at the other to the main frame, and a brace bar rigidly secured to the coupling arm at one end and pivoted to the main frame at the other, with an intermediate coupling connecting the heel of the shoe with the coupling arm, for the purposes set forth.

4th, The combination, substantially as described, of a shoe extending behind the finger beam with a swiveling link converting the shoe and coupling arm, for the purpose of allowing the finger beam to fold horizontally.

5th, The combination, substantially as described, of a coupling brace and overhanging arm, F2, a shoe and swiveling link, b2, whereby the finger beam is allowed to swing both vertically and horizontally.

6th, The combination, substantially as described, with the right angled coupling frame, F F', of the lifting lever flexibly connected with the rigid angle of the frame, for the purposes set forth.

7th, The combination in a harvester of two wheels, an inside main frame, a rigid tongue, a brace bar, rigidly secured to a coupling arm, pivoted at one end to the main frame and at the other end to the shoe which carries the finger beam, a swiveling coupling between the brace bar and shoe, and a caster wheel to support the divider end of the finger beam.

8th, The combination, with a horizontally folding finger beam, of a caster wheel which, when the beam is folded, swings into a position where its face is parallel with the finger beam, and with the path of the machine, and sustains the finger beam in its folded position.

33,496.—HARVESTERS.—John F. Seiberling, Akron, Ohio.—Dated Oct. 5th, 1861. Application for reissue received and filed Dec. 23d, 1867. Div. B

I claim, 1st, A platform composed of slats supported at the end next the finger beam only, and arranged to drop the gavel directly behind the finger beam.

2d, The combination with a harvesting machine of a platform (to support the falling grain) made of slats arranged at an angle to the finger beam, and supported at the end next the finger beam only.

3d, The combination of a reel with a platform composed of slats supported at one end only.

4th, The combination of a reel, a slatted platform and a cut off, or device for receiving the cut and falling grain while the gavel is being discharged.

5th, The combination with a slatted platform, supported at the end next the finger beam only, of a device operated by the driver for discharging the gavel directly behind the finger beam.

6th, The combination of a platform, hinged at its front end only, and a vertically moving cut-off with a device operated by the driver, who by a single movement drops the gavel and interposes a cut-off to receive the grain, which falls during the discharge of the previously accumulated gavel.

33,496.—HARVESTERS.—John F. Seiberling, Akron, Ohio. Dated Oct. 5th, 1861. Application for reissue received and filed Dec. 23d, 1867. Div. C.

I claim, 1st, A cut-off composed of a bale or rod actuated by the tilting of the platform to discharge the gavel.

2d, A cut-off automatically operated by the dropping of the platform.

3d, The combination with a platform which drops the gavel directly behind the finger beam of a vertically moving cut-off.

4th, The combination with a slatted platform supported at the end next the finger beam only, of a cut-off moving in the arc of a circle, to receive the falling grain during the discharge of the gavel.

5th, The combination of a cut-off with a hinged finger beam and platform.

6th, The combination of a cut-off with a slatted platform and a hinged finger beam.

7th, The combination with a hinged finger beam of a reel and a cut-off.

8th, The combination with a hinged finger beam of a reel, a cut-off, and a slatted platform.

33,496.—HARVESTERS.—John F. Seiberling, Akron, Ohio. Dated Oct. 5th, 1861. Application for reissue received and filed Dec. 23d, 1867. Div. D.

I claim, 1st, The combination with a hinged finger beam of a platform supported at one end only.

2d, The combination with a hinged finger beam of a platform hinged at its forward end to said beam.

3d, The combination with a hinged finger beam of a platform composed of slats arranged at an angle to the finger beam.

4th, The combination with a hinged finger beam of a tilting platform.

5th, The combination with a hinged finger beam of a tilting platform and a reel.

6th, The combination with a horizontally folding finger beam of a platform so hinged as to turn up vertically, or nearly so, to enable the finger beam to fold close to the machine.

7th, The combination with a two-wheeled side draught hinge joint machine of a dumping, dropping, or tilting platform, connected with the main frame through the medium of the finger beam only.

8th, The combination in a two-wheeled side draught hinge joint machine of an adjustable cutting apparatus, a tilting platform and a lifting mechanism, in such manner that said cutting apparatus and platform can be raised for passing obstructions while the machine is in motion.

9th, The combination with a tilted slatted platform and a floating finger beam of a wheel supporting the divider end of the finger beam.

10th, The combination with a horizontally folding finger beam and tilting platform, and of a caster wheel supporting the divider end of the finger beam and platform.

67,954.—DEVICE FOR PREPARING PLATES FOR SPRINGS.—Jas. B. Cleveland, Hackensack, N. J. Dated Aug. 20th, 1867. Application for reissue received and filed Nov. 25th, 1867.

I claim forming the tapering ends or points of the spring plates, P P', figs. 1 and 2, into their proper widths and thickness, ready for use, without hammering, by means of concave dies, A A' and B B', which may be operated by any suitable device, for the purpose as above set forth.

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New York, Nov. 25d, 1867. 3 2

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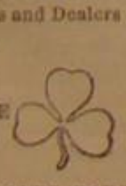
TRADE  MARK

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Device for Clearing Snow from Street Railways.

Those who habitually use the facilities offered by the street railway cars in our cities are frequently annoyed in the winter season by the occasional gliding of the car from the track, and the managers of these lines of communication are subjected to great periodical expense to free their tracks from accumulations of snow. During and after the late snow storms in New York city, travel by these lines was rendered difficult, and in some cases interdicted; relays of men, assisted by immense snow plows being required to free the track so that ordinary travel could be resumed. Except when a sudden fall of very heavy snow occurs, it would seem that some ready means might be employed to keep the track clear so that the cars could run without being thrown from the rails. This is the object of the snow plow shown in the engraving as attached to a street car.

SNOW PLOW FOR HORSE CARS.

The invention consists in mounting the plow forward of the wheels at each end, in such a manner that when in a position to operate it will adapt itself in respect to position and elevation from the track to the load in the car at the time; so that whether the car be empty or heavily loaded, the plow will be held in a proper position, and at a suitable distance above the rail. The plow is made of wrought and cast iron, with steel points, the form being suitable for lifting the snow and throwing it to one side of the track. It is made to fit all varieties of rail.

The position of the plow is determined by a rocker and vertical crank shaft connected by a chain, which, by being wound up by means of a brake, throws the plow into the desired position with its point near the rail. By reversing the motion of the crank the plow is brought high above the rail, by means of a spring in the side of the body of the car. If the plow should meet an obstruction, as a high joint, spike, or anything immovable on the track, it would, by a simple arrangement, be swung rearward until the obstruction be passed, and then be returned automatically to place. The driver puts the plows of the forward end down when starting, and they require no more attention until arriving at the terminus of the route.

The proprietors mention some of the advantages of these plows as follows: "They are always at hand, and during or after a storm, constantly keep a clean rail for the wheels to run upon to and from each terminus. They are not only valuable for removing snow, but other obstacles that obstruct the track. On some roads which are not paved the tracks are frequently covered with sand, mud, or stones, causing a jolting in the car which is very unpleasant for the passengers, and also tends to increase the wear and tear of the cars, and oftentimes throws them from the track. These plows will remedy that, and leave a clean rail, thereby also decreasing the draft on the horses. They have been found of very great service after a thaw or a fall of snow or rain during the day or night, making the streets wet and plashy, and afterwards clear off cold and freezing; the cars running continually will remove the water as fast as it freezes, and leave a clear rail. They will also be found useful in preventing the numerous accidents which frequently occur by passengers falling from the cars under the wheels, thereby endangering both life and limb." They can be manufactured by the railroad companies themselves, and are quite simple, cheap, and easily attached. They have been introduced into the cities of Providence, Worcester, Hartford, New Haven, Philadelphia, Troy, and Albany, and have given good satisfaction to the managers and passengers of the roads, having been severely tested during the winter of 1866–'7. All communications respecting rights to use, or manufacture, should be addressed to the American Snow Plow Company, Providence, R. I.

The Spruce Gum Business of Maine.

A correspondent of the Lewiston *Journal*, in a letter from Byron, Me., says: "The spruce gum business of this region is quite large. I am told that a merchant of Weld purchased in a single year $5,000 worth. A large number of men are engaged in gumming during the fall and winter months. Five and seven dollars a day is a common day's receipt. With such a stimulus the gum gatherer goes forth, equipped with a knapsack and hatchet. He commences his work, and by night, if he be expert, he will return to camp with fifty pounds of what is called hatchet and chewing gum. The former is worth nine or ten cents, the latter fifty cents, per pound; but a very small proportion is of the first quality. I have just met two men who have been on an eight days' cruise. They have gathered five hundred pounds; it will average ten cents per pound, netting them good wages, it will be seen. Some estimate the gum business of Maine at $50,000 a year in the raw material. I think it much more than that. In Franklin and Oxford counties, a very large quantity is gathered annually. It is taken to market from this region with four-horse teams. Last winter gangs of men were hired at $20 per month to gum."

WEIDENMAN'S PATENT STAY FOR RUBBER OVERSHOES.

Walking through mud and "slush" is always unpleasant, however well the feet may be protected; but when an overshoe parts company with the boot by reason of the persuasive influences of tenacious mud, it becomes decidedly unpleasant. This often occurs when the style of low rubbers, known as sandals, is used, and not seldom when the regular shoe is worn. The object of the device shown in the accompanying engraving is to prevent such annoyances. The figure marked A shows the ordinary rubber overshoe, as it frequently appears after the wearer has passed through a slough of mud, the dotted lines denoting the position of the boot. When once the overshoe has assumed this position it is more liable to slip, and in a short time contracts a permanent wrinkle, which ruins the fit and speedily destroys the shoe. B is the metallic stay which is the subject of this invention. It is inserted into the shoe in the process of manufacture, the upper portion overlapping the upper edge of the shoe, a yoke embracing the sides of the heel, and a foot passing under the heel. C exhibits an overshoe thus improved, the dotted lines showing the position of the stay and the outline of the boot. This appliance will not only prevent the slipping off of the rubber, but keep the shoe always in shape. Its cost is trifling, while its advantages are real, and obvious to all. It is quite an aid to the removal of the rubber, and can be applied to any style of shoe.

It was patented through the Scientific American Patent Agency, Nov. 19th, 1868, by J. Weidenman, who may be addressed Box 431, Hartford, Conn.

The Latest Pirate Treasure Delusion.

A correspondent of the Hartford *Times*, writing from Hazardville, Conn., Jan. 1st, says that great excitement exists among the Spiritualists in Scitico and Hazardville. One of the greatest spirit developments of the age, they believe, is about to occur, revealing to mortal man the hidden wealth and treasure which for three centuries has quietly rested in the earth, on the premises of Mr. Thomas Barrett, in the village of Scitico. The circumstances are as follows: A. D. Putnam, a lineal descendant of the revolutionary hero, who says he has recently been sent here from the State of California, through the influence of the spirit of Benjamin Franklin, has vigorously set to work three sets of men, night and day, paying at the rate of $3 per day, in digging a subterranean passage, which he claims to lead to a cave under a large hill, which hill is close to the bank of the Scantic river, a little west of the Scitico stockinet factory, where the spirit of Benjamin Franklin assures him he will find valuables in the shape of diamonds and bars of gold to the amount of five millions of dollars, (!) which was deposited by Spanish pirates three centuries ago, who, after being hotly pursued, burned their ships at or near the mouth of the Connecticut river, taking their small boats and coming up the Connecticut, being closely followed. They took the Scantic as far as Scitico Falls, calculating on taking an overland route to Massachusetts Bay, but being attacked by the Indians, and two of their number being killed, they deposited their booty in what was called a natural cave at that time, covering the mouth of the cave with stones. Mr. Putnam says he shall enter the cave, if filled with wolves, angels, or devils; and if he is as successful in dragging from this subterranean vault the five millions as his great-grandfather was in unearthing a she-wolf, clairvoyant mediums will be above par in this place. There are a large number of persons visiting the spot daily, from far and near. Strangers, and those coming from a distance, will be furnished with a guide by calling at the shoe store of Mr. Thomas Barrett, the owner of the land. The disposition to be made of the gold is as follows: Mr. Barrett, the owner of the land, has one fifth; the Governor of the State, one fifth, to be used for educational purposes; a gentleman in Boston, one fifth, to be used for the Catholic Society, as the Spaniards were Catholics; one fifth to the Spiritualists, and one fifth to Mr. Putnam.

THE packing of bottles, filled or empty, says an exchange, is now performed more safely, closely, and rapidly than heretofore, by means of rubber rings slipped over them. The rings cost only once, and can remain on the bottle as long as it lasts,

Correspondence.

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

SUB-AQUEOUS AND OTHER TUNNELS.

[Concluded from page 33.]

THE THAMES TUNNEL.

England is full of tunnels, and some are of wonderful length. Before the introduction of railways, when canal transportation was all the rage, the construction of tunnels through hills and mountains was very common. Among the most remarkable of these canal tunnels were those at Worsley, on the Bridgewaters Canal, which were eighteen miles length.

The most difficult and expensive tunnel ever constructed, considering its length and size, was the Thames tunnel. The time occupied in its completion was eleven years, and its cost was £454,714, or about $2,273,570. The total length of the tunnel, from shaft to shaft, is 1,200 feet. The immense difficulties experienced, and the great outlays involved in the construction, were not due to the hard nature of the soil through which the tunnel was laid. We have already described the previous construction of the drift way or small tunnel, which was readily carried through nearly the same route, at a small cost. We have also described several different plans which would have been much cheaper, quicker, and better. The Thames Tunnel Company deliberately selected at the outset the most ponderous, massive, costly, and difficult scheme of construction that could possibly have been chosen, and then adhered to their choice with a dogged pertinacity characteristic of John Bull. The company might have abandoned their plan for a simpler one at almost any stage of the work, and could have saved money by the change. But they stuck to it heroically until their treasury was exhausted; they then applied to government and obtained aid to insure the completion, or rather almost the completion; for the tunnel is still unfinished. Only one of its two divisions has been finished inside, and the spiral roadways for teams, in the shafts, have never been erected. Only foot passengers can pass through, and from these a small revenue is derived, little more than sufficient to pay the expenses of attendants, cleaning, and repairs. But this wonderful structure, solid and magnificent as it is, will not always remain an idle curiosity. All that is wanting to render it useful is the construction of proper and convenient approaches. The progress of metropolitan population and enterprise is so rapid that every possible avenue of communication will soon be overloaded, and the Thames Tunnel will probably become a great and important railway thoroughfare.

Mark Isambard Brunel was the projector and engineer of the present Thames Tunnel. He was the inventor and patentee of a novel shield intended to cover the head of the tunnel and protect the workmen while they excavated the earth under the bed of the river. The construction of the shield was such that as fast as the excavation was made the shield could be pushed forward and the masonry of the tunnel built up in the rear of the shield. The directors of the company appear to have been greatly struck with the merits and novelty of Brunel's shield. It was an immense machine. Its face was 38 feet wide and 22 feet 6 inches high. It was larger and heavier than many of our country dwelling houses; and the plan was to excavate an aperture under the river bed large enough to receive the structure and then move it through as the excavation progressed. It almost passes belief that such a huge, unwieldly machine could be pushed through the bowels of the earth, underneath a river, its waters pressing down with a force of 2,000 pounds to the square foot. But the feat was actually accomplished, though at snail pace, the annual average movement being only one hundred feet a year.

Mr. Brunel once stated before the Royal Academy of Sciences at Rouen that the idea of his *shield* suggested itself to him upon an examination of the insect called the Teredo, well known for its ability to bore through the largest timbers under water. Its head is protected from the water by a species of shield.

Dr. Tomlinson gives some interesting particulars concerning the building of the Thames tunnel. A vertical shaft of masonry, over 3 feet thick and 50 feet in diameter, was first sunk in the river bed, to a depth of 80 feet. This was a most laborious and expensive work. A similar shaft was subsequently sunk on the opposite side of the river, with which the tunnel connects. During the progress of the tunnel the river burst through between the brick work and the shield several times, and a number of lives were lost.

The excavation for the tunnel was thirty-eight feet wide, and twenty-two feet six inches high, and in order to leave a sufficient depth of ground in the middle of the river above the brickwork, the tunnel was formed with a declivity of two feet three inches in 100 feet. The ground above was supported while the excavation was going on by a shield, consisting of twelve massive iron frames, placed side by side, and capable of being slid forward, independently of each other, for a short distance, by means of screws abutting against the end of the completed brickwork, which followed closely on the excavation. The shield was supported on flat soles, capable of being easily moved foward; the top and sides were also closed in by flat plates, which were supported by massive framing, and also fitted close to the brickwork, by which means the soft earth was prevented from falling in. Each frame of the shield consisted of three stories, with a cell in each, in which one man could work; the front of each cell protected by a series of narrow poling boards, each of which was held in its place by an arrangement which allowed it to be fixed in a vertical line even with the face of the shield, or a few inches in advance thereof. Each miner began operations by removing the upper poling board in his division of the shield, and excavating the small portion of earth thus exposed to the depth of about six inches; he then replaced the poling board, and caused it to press, by means of jack screws, against the face of the excavation; he next removed a second board, whereby a fresh portion of earth was exposed and excavated as before. When all the poling boards in one frame of the shield had thus been advanced six inches, the frame itself was moved forward, and the same series of operations repeated. The frames of the shield were thus alternately moved forward, slowly and with great caution, the brickwork following close upon the shield, and inclosing two arched passages, twenty-six feet four inches in hight from the invert to the crown of the arch, and thirteen feet nine inches span at the springing of the arch. This shield was so damaged in the course of the work that it had to be taken down, and a new one raised. The arch, the invert and the curved side walls, are laid in concentric rings either a whole brick or a half brick in thickness, each ring presenting a plain face, no bond being employed between the successive rings. The tunnel is built with the hardest picked stock bricks; the first or inner ring of the arch is laid in pure cement, and the other portions of the work in half cement, and half clean sharp sand. The bricks for the semi-circular portion of the arch were molded to the true wedge form, so that the bricks radiated with parallel joints between them. The total thickness of the brickwork at the thinnest points where the inclosed arches approach nearest to the boundary of the rectangular mass of brickwork, is three feet. A solid wall, three feet six inches thick at the top, and four feet at the bottom, was constructed between the arches; small transverse arches being afterwards cut through it at intervals to form openings from one tunnel to the other. The whole of the brickwork is laid in Roman cement, and each archway is to be finished with a lining of cement, a carriage road, and a narrow footpath adjoining the central wall. Only one archway, however, has been thus completed. A brick drain is laid down from the center or lowest point of the tunnel, to the Rotherhithe shaft, by means of which any water that percolates through may be removed. The inclination of the roadway conducts the water from the other half of the tunnel into the drain.

THE SECOND THAMES TUNNEL.

A new, smaller, and cheaper, tunnel under the Thames is now in progress of construction by the Waterloo and Whitehall Pneumatic Railway Company. This tunnel is to be put down substantially on the Wyatt and Hawkins plan, heretofore described. That is to say, the tubes after completion are to be floated to the required line, then sunk in a ditch below the bed of the river. The tubes are built upon ways and launched like a vessel. The reader will find an engraving of one of these tubes taken from a photographic view as it appeared before launching on page 165 of this paper, Vol. 16, March 16, 1867. The tunnel is to be composed of a series of ¾-inch boiler iron tubes, each 221 feet long, covered and lined with brick work. The extremities of the tubes are to be sustained in massive iron cradles, sunk in the river below its bed, upon foundations of masonry. The internal diameter is to be 12 feet, 9 inches.

THE WEYMOUTH TUNNEL.

This tunnel is 450 feet in length, excavated under the bed of the Backwater at Weymouth, England. It was commenced by sinking a shaft 50 feet through gravel and clay, of 14 inch brickwork, laid in hydraulic cement; the tunnel then strikes off horizontally a distance of 450 feet with a gentle rise to the other end. The tunnel is 7 feet high, 4½ feet wide. For fifty feet near one end where the clay is strong and retentive the walls are only nine inches thick. The opposite shaft is forty feet deep. The depth of water over the tunnel is 13 feet at high tide, 7 feet at low tide. There was but little leakage.

The construction of small tunnels under rivers is a very easy and comparatively cheap work. It is only when we come to gigantic structures of immense weight, such as the Thames tunnel, that the costs and difficulties become serious. The Weymouth tunnel was begun in 1834 and completed in a year.

PROPOSED TUNNELS BETWEEN NEW YORK, BROOKLYN AND JERSEY CITY.

An organization has been made for the purpose of procuring legislative authority for the laying down of tunnels upon the general plan just described between the cities of New York, Brooklyn and Jersey City. The proposed tunnel will be cheap in construction and is to have an interior diameter of about eight feet. The New York termini are intended to be at or near the City Hall Park, the terminus in Brooklyn being at or near the City Hall or the junction of Fulton and Court streets—a distance of less than two miles. Trains of passenger cars will pass through this tunnel from end to end in one minute and may be propelled by atmospheric pressure. The cars will be of about the same dimensions as the ordinary street passenger cars, will be brilliantly lighted, and run with very little noise or vibration. Experience has shown that air pressure is preferred as a motor to locomotive or horse power, as all jerking is avoided and the atmospheric car glides along with a smoothness resembling that of a vessel upon the water.

The number of passengers now annually carried upon the ferry boats between New York and Brooklyn is 40,000,000, being an average of 110,000 per diem, or 10,000 passengers per hour, reckoning the day at eleven hours during which period the great majority are at present carried.

In the transport of passengers through the proposed Brooklyn tunnel trains capable of carrying 1,000 passengers will be started from each terminus every five minutes. 24,000 passengers will thus be carried every hour, which is more than double the amount of transportation now required.

The area of the cross section of this tunnel would be about the same as the Croton Tunnel or Aqueduct, which is 53½ square feet. The Croton Aqueduct from the dam to the reservoir is 40½ miles long, built of brick and stone. The whole cost, including dam, land, right of way, bridges, reservoir, etc,, was $12,500,000. Of this amount nearly $2,000,000 was for distributing pipes. The time occupied in construction was only five years.

THE CHICAGO TUNNEL.

Probably the longest sub-aqueous tunnel in the world is that at Chicago for supplying that city with pure water. It extends for a distance of two miles under the waters of Lake Michigan. This tunnel illustrates the cheapness and rapidity with which tubular structures of small dimensions may be cut in easy soil. The problem was to go horizontally through a strata composed chiefly of clay. The original contract price for the entire work was $315,000. But in consequence of the sudden great rise in prices the amount proved inadequate. Changes were also ordered in the construction of the piers and vertical shafts to give them greater solidity, and the contractors are understoood to have received much more than the contract price. Perhaps the largest share of the whole cost was involved in the construction of the two vertical shafts, as the horizontal tunnel was easily made. The outer shaft is 66 feet deep, 9 feet in diameter, composed of cast iron, set within a coffer dam which is 90 feet in diameter and 45 feet deep. The interior space between the dam and shaft is to be filled with solid stone work, and the pier thus formed is to be surmounted with a light house. The horizontal tunnel two miles in length was constructed in a little more than one year. It is 5 feet in diameter, composed of 8-inch brick laid in the best cement.

TUNNEL UNDER THE CHICAGO RIVER.

The tunnel under the Chicago River, Washington street, is now progressing rapidly and favorably. The contractors are Lake, Clark and Farwell. There is every prospect that the tunnel will be completed during 1868, when the people of Chicago will enjoy uninterrupted communication with the opposite bank. The whole length of the work from the center of Franklin street to the center of Clinton is 1,605 feet of which 932 feet is the length of the tunnel; the remainder consists of the open approaches.

TUNNELING THE TEES.

A late number of *Engineering* describes a plan proposed by Mr. Head, of Middlesboro', England, for tunneling the river Tees for the purpose of connecting Middlesboro', with Norton Junction by rail. He says:

"I propose that it should be a single wrought iron tube, but divided into two passages by a water-tight web or bulkhead. This division should be strong enough to resist the pressure of the water, and preserve, at least, one side for traffic in case of accident to the other.

"As to the construction of the main tube, I would recommend something on the same principal as that exhibited in the hull of the *Great Eastern* steamship, *i. e.*, an outer and inner shell, for security and strength. The bottom should be made flat, or slightly arched downward. The whole section would thus resemble that of a gas retort or culvert.

"The best plan for placing the tube in position seems to be as follows: As near as possible to the point of crossing it should be constructed by the river side, in a temporary dry dock formed by earthern embankments, and at such a level that the tide would float it, if admitted by the removal of a dam. The tube should be erected upon timber balks placed crosswise at intervals of 5 feet, and bolted to the structure.

"These would be floated away with it, and afterward serve as sleepers.

"Meantime, the groove in which it was intended to lie would be cut across the channel of the river by dredgers. It is no new thing to dredge to an increased depth of 30 feet. It is, in fact, the cheapest method of excavating in all cases where it can be applied. The new Suez Canal has been greatly indebted to the use of dredging in the formation of its approaches. Dredgers have even been made to cut their way into the solid shore, the water following to float them as they made a channel for it.

"In the bottom of the groove so prepared concrete must be tipped from barges, and spread to a level by the aid of diving bells.

"When the tube was completed it would be necessary to cover over the ends temporarily to make it water tight. It would then easily be floated out of the dock to its permanent position. To let in sufficient water to sink it would not occupy many minutes more. The interval between the ebb and flow, which at spring tides is about an hour, would be ample to accomplish everything necessary. Concrete might then be teemed at the sides and over the top, and in this way, assisted by the natural tendency to silt up, it would soon become permanently fixed. Embankments of clay would now be thrown out from the shore on each side of the line of the approaches, and would join across the end of the tube. As soon as they were made water tight with clay puddle, the water between must be pumped out and the approaches built in the intervening space.

ROWLAND'S PLAN FOR SUB-AQUEOUS TUBE.

Mr. T F. Rowland of Greenpoint, N. Y., is the inventor of a method of construction which has the merit of strength and solidity. A strong tube is first made of boiler iron, which is covered and protected by means of blocks of hydraulic cement, of segmental form, fifteen inches thick. These blocks are secured by means of screw bolts to flanges upon the ex

terior of the tube, the arrangement being such that the bolts and iron work are wholly covered by the cement and carefully protected from the corrosive effects of the water. The exterior of a tube thus made would present a solid surface of hydraulic cement.

EDITORIAL CORRESPONDENCE.

Moorish and Spanish Andalusia—Cordova and its Christianized Mosque—Seville, its Cathedral and other sights—Malaga, its Climate, Beggars and Dry River—A Trip to Granada in a Dilligence—Curious Sights—Splendid Scenery—The Alhambra.

MALAGA, Dec. 14, 1867.

Andalusia, about which poets have sung and historians have written so much, comprises eight of the principal provinces of Southwestern Spain, and contains its most ancient and interesting cities. The country is also most oriental in its character, and possesses some fine scenery, and luxuriates in an abundance of tropical productions. The venerable olive with its scragged trunk and pale green leaves, the orange, the lemon, the graceful palm, the mournful cypress, and the mulberry, impart to the whole country a charming variety and loveliness. The aloe and cactus are abundant, and are planted in hedgerows along the railways, and sometimes for the division of farm lands. The valleys are sheltered by ragged, desolate mountains of gray granite, treeless and shrubless, and by brown hills, with intervening gullies, which often resemble vast buttresses or ridges of dirt thrown up by human hand to support some structure or earthwork. The vine is extensively cultivated upon these hills, and what adds much to the picturesque character of the scene are the white houses of the peasants, which are often perched upon these ridges like a dovecot upon the top of a barn. The villages are usually built upon a steep hill, or rugged crag, with moldering battlements and ruined watch tower, within which the people, in olden times, congregated for mutual protection in times of civil wars or against the roving bands of freebooters which, unhappily, are not extinct to this day. We have been in Spain upwards of a month, during which time it has rained but two days and one night. The sky is usually cloudless, resembling in color that our of beautiful October. The sunrisings are exquisite; the sunsettings brilliant beyond description. To compensate for the absence of rain, which rarely ever exceeds thirty-five days in a year, the nightly dews are said to be abundant, especially near the Mediterranean, and the land is channeled into watercourses for irrigation, and irrigating wells, worked by mules, are very numerous. The water is usually raised into tanks by the rudest possible contrivances, and then emptied into conduits, which are frequently built up of brick or stone, on an incline, and carefully cemented, so that the water can easily be carried to refresh any part of the land. The labor connected with this general irrigation of land is prodigious, but without all this care, Andalusia would soon become a sterile waste—forsaken and tenantless. Barns are seldom seen in Spain as there is but little hay raised. The land is chiefly devoted to the raising of grain, which is threshed upon a circular brick or stone threshing floor, by means of a heavy wooden boat or drag having pieces of flint inserted in the bottom. This machine is dragged about over the grain by mules, and thus, by the joint operation of stone-boat and mule's feet, the grain is got out, and afterward winnowed by natural currents of air.

The Moors once inhabited this whole region, and there still exist abundant evidences of their taste, civilization, and learning. They came over from Africa upwards of a thousand years ago, and expelled the Goth from the land, driving him Northward, so that at one time even Madrid was an outpost of the conquering Arab.

The dull old city of Cordova may possibly contain forty thousand inhabitants, but what must it have been in the days of its pomp and pride as the Moorish capitol! History, or tradition—which is often a clue to correct historical data—says that in the 10th century, under the dynasty of the Moorish princes, Cordova and its suburbs contained 300,000 inhabitants, 600 mosques, 50 hospitals, 800 public schools, 900 baths, and a library of 600,000 volumes. The arts and sciences were cultivated with assiduous care, and Moslems though they were, they never practised the *auto de fe*, nor encouraged the horrors of Inquisition. On the contrary it was their custom always to respect the liberty of religion, and to inscribe upon the doorpost the declaration of "impartial justice." The Cathedral, or more properly speaking, the Christianized Mosque of Cordova is doubtless the finest specimen in Europe of the true temple of Islam. Its proportions are vast, massive, simple, elegant, and impressive. It has not the overpowering sublimity of Gothic Cathedrals, owing to the fact that all Moorish structures were intended to impress a lowly humility upon the minds of its believers, and as a natural consequence, this cathedral mosque, though covering more ground than St. Peter's, at Rome, resembles a vast undercroft to some gigantic building above it. The interior is divided into nineteen naves, resting upon one thousand variegated marble columns, which support the Moorish or horseshoe arches. Spanish daub and whitewash have obliterated much of the rich Arabesque ornamentation, but enough still remains to testify to the exquisite taste and skill of the Moorish artificers. There are forty-five chapels in the cathedral, but the only ones worthy of notice are those that were left by the exiled Moors. The Sanctuary of the Mosque still remains, and its marble pavement mutely bears witness how faithfully the the Moslem performed his religious vows by going around it upon his bended knees. Recently a most touching scene occurred in this little sanctuary, on the occasion of a visit of a Prince of Morocco, who went on his knees seven times around it, praying, and weeping like a child. The gorgeous workmanship of his ancestors had been stripped of its brilliant decorations by a people who could not even read the Arabic inscriptions. The cathedral is surrounded upon three sides by some ecclesiastical buildings and a high wall, inclosing a fine large court which contains some beautiful palms, and a grove of noble orange trees, upwards of three hundred years old, and now fruitful even in their old age. In the center stands the very cistern that was used for ablutions by the Moors in the 10th century. Every day this beautiful court is thronged by priests, who smoke, and sun their sleek black garments, and by hideous beggars who watch and wait and annoy all visitors by their piteous cries and dissembled prayers. Such beggary and distorted misery I never before saw in any other country; and who can wonder that it should be so, when so many idle, well dressed priests are permitted to eat up the substance and hard earnings of the people. The revenue of the Cathedral of Seville supports, as I was informed, over one hundred priests, with a correspoding heavy distribution among the other twenty-six churches of the city. The Archbishop lives like a prince, and the poor people support all this idleness and extravagance in the name of religion. The streets of Cordova are very narrow, and the houses are usually two stories high, having patios or interior courts, paved with marble, after the Moorish style, provided, also, with galleries and fountains to shelter and cool in warm weather. Oranges, lemons, bananas, and rare plants and flowers are usually cultivated in these courts, and are always to be seen through grated iron doors—a most cheerful and refreshing sight. Moorish mills and other remains abound in Cordova, but their glory has departed, never to return. The beautiful Guadalquiver runs under an old stone bridge, the piers of which were built by Octavius Cæsar.

It is five hours' journey by rail from Cordova to Seville, which is perhaps the most interesting city in Spain. It stands upon the Guadalquiver, and the surrounding plains teem with the luxurious productions of the country. Like Cordova, it is ancient and Moorish; but by reason of its commerce, Seville appears to be an improving, busy, prosperous city. The chief attraction of all Spanish cities seems, first, to center in the old Cathedrals, and in this particular, Seville stands unrivalled in Spain, and second only to Rome, which disputes all competition. The Cathedral of Seville occupies the spot where the ancient Romans once had a Temple to Venus. This was substituted by an elegant Moorish Mosque, of which nothing now remains. The present edifice is Gothic, of the best period in Spain, and combines majesty, simplicity, and and elegance. I always make it a rule to visit the Cathedral at the hour of Morning Prayer, when the first light of heaven begins to stream through the richly painted windows, and the incense from the altars is diffusing its cloudy vapors. At such an hour there is present a sort of mysterious influence which increases the effect upon the mind to a wonderful degree, and especially so in the Cathedral, the interior of which is truly vast in all its proportions of length, breadth, and hight, and where unity and harmony seem to pervade every part. The only apparent defect—and it is a serious one—is that the high chapel and choir have since been built in the central nave, thus breaking the view and sadly marring the interior effect. People who do such things are unworthy to have so fine an edifice. The pavement of the church is laid in black and white marble, and beneath a large monumental slab is buried Fernando, a son of Christopher Columbus, who bequeathed a splendid library to the city, and was esteemed a man of piety and much learning. There are also some splendid pictures by Murillo, who lived and died in Seville, but, most unfortunately, their beauties are partially concealed by the sombre walls of the cathedral chapels. The Sacristy of the church is by far the richest in Spain, and contains valuable paintings, besides tons of silver and gold and other precious relics, some of which put the faith of skeptics to a pretty severe test. St. Ferdinand, the king who expelled the Moors from Seville, Beatrix, his wife, Alonzo, the Learned, and Donna Maria de Padilla, the celebrated mistress of Don Pedro, the Cruel, are buried in the chapel. The Moorish Giralda, or tower stands separated from the cathedral, and is a most exquisite structure. Its ascent is easily made, up thirty-four inclines, which a horse could easily traverse, and from the top the view of the city, plain, and distant mountains is truly glorious. Seville has a fine Moorish Alcazar, or Calif's Palace, which, in spite of the tinkering of Spanish Kings, still retains much of its former splendor, and certainly nothing can exceed its charming oriental gardens with their loaded orange and lemon trees, rare flowers, fountains, and long Moorish galleries which overhang them. The Alcazar is now the property of the Duke of Montpensier, son of Louis Phillipe, who has a splendid palace and orangery adjoining. The residence of the late Barber of Seville is pointed out, but the goodwill of his business seems to have departed with him, as the house is now occupied for domestic purposes. The famous *roué*, Don Juan, of Lord Byron's voluptuous pen, also lived here and died in the hospital La Caridad, which was built by Don Mauara, a wealthy profligate young nobleman. It is said that Don Juan died a "perfect example of piety, humanity, and abnegation." His frail humanity lies buried in in a room adjoining the chapel, where are preserved a model of his head, also, his sword, spoon, and fork; and upon a marble slab, over his remains, are inscribed the words, "Here lies the body of the worst man that ever lived. All pray for me." A sad inscription and a sad commentary upon an ill-spent life. The chapel of La Caridad contains the masterpieces of Murillo: Moses smiting the rock, and Christ feeding the multitude. Also, a most extraordinary picture, painted by Valdes Leal, called the "Dead Prelate." When Murillo looked at it, he said to the artist, "One cannot look at your picture without holding his nose;" to which the artist replied, "You have taken all the flesh and left me to work on bones." It is a curious picture to adorn the walls of a church, but it possesses a religious idea in the prelate's hat and robes, and that is enough to inspire the reverential awe of these benighted people. The small picture gallery has several fine Murillos—all religious subjects, and it is a pity that so many of this master's great works should be buried up in old Spanish towns, where few can ever see and appreciate them. An Englishman, who was here with us, said that he intended to propose to his government to swap off Gibralter for the works of the Spanish Masters. He thought it would be a profitable bargain to give up a big rock of expense for something really worth having. The ideal God of Spain, however, would depart with these truly noble pictures.

The Government Tobacco Factory, in Seville, employs 5000 women. The sight is the most singular spectacle of humanity to be met with anywhere. The girls earn about 50 cts. per day, and are supplied with a dinner in the building at a cost of four cents per head. They are of all ages and colors, and work chiefly in one immense hall. There were little babies lying in tobacco baskets; some were nursing, others being attended by larger children. Also, pet dogs and cats, and a general jumbling up of all sorts of things. The snuff is pounded in a wooden mill that resembled an old-fashioned fulling mill, and worked by mules blindfolded, possibly to keep the snuff out of their eyes, or to prevent them from being frightened by the ugly old mill which they are employed to grind. Persons fond of tobacco (and these girls are fond of it), may here see how their favorite weed is prepared, and of what stuff it is made. It is said that a very romantic marriage of love took place a few days ago—the union of an old tobacco maker of 102 with a tobacco damsel of 15 years. The centenarian had saved a little money, and was at a loss to know how he could bestow it in case he should ever die, therefore he fell in love with the maid and she fell in love with him—no doubt.

Near to Seville there are remains of a ruin where the three Roman Emperors, Trojan, Adrian, and Theodosius were born, besides many other things of substantial or vapory interest. But I must leave Seville after mentioning a single fact or two. It is the custom, in some of these old cities to employ a species of Nocturnal Muezzin to patrol the streets at night and call out the time and situation of things. They perform their duties in a sort of sing-song style which is often quite musical. Not knowing exactly what was going on under our window, we half imagined that we were being serenaded once in fifteen minutes; but, after a while, we found out what it all meant, and moreover, that our "Muezzin" was frequently employed to alarm the house whenever travelers wished to to get off early to the cars. The Spaniards are slow, but somehow their trains all start early. One night there was a sick person in the house, and a band of religious singers, bearing the crucifix and some banners, came under the windows and sung a sweet, plaintive song, or prayer, for his recovery. It was most singularly touching, and it is to be hoped that the pious exercise, so carefully performed, reached the ear of heaven.

We left Seville with some regret. It is a beautiful, balmy spot, and we much enjoyed its delicious sunshine under the orange groves in the public plazas. To reach Malaga from Seville it is necessary to return to Cordova and thence proceed by rail on a branch line. It is a good day's work, but some portion of the route passes through a country quite remarkable for its savage grandeur. The Sierras are several times pierced by tunnels, and the valleys are crossed by high embankments, the road descending by heavy gradients to the segmental shaped valley which lies back of the city of Malaga. Here the Mediterranean first appears to us, calm and beautiful as a lake upon a summer evening and, here also is found a climate more uniform than that of any other part of Europe. The thermometer in mid-summer rarely ever rises to 85°, while in winter it seldom sinks below 45°, the mean annual range being 49°, which is many degrees less than any other city on the continent. For example the mean temperature of Pau is 68°, Rome, 62°, Nice, 60°. Malaga is therefore a resort for invalids who require a uniform temperature, but to my mind existence might become a serious burden if it had to depend upon a permanent abode in a place so far out of the way of every body and every thing. The city though possessing upward of 90,000 inhabitants contains very little to interest a stranger, while to add to the discomfort, the hotels have more show than substance and their open doors are thronged by beggars who never give up their importunities so long as you are in sight. Just on the outskirts of the city there is a well kept and well arranged Protestant cemetery—to us a sort of hallowed spot of kindred dust, as it contains the remains of some of our countrymen who have either been wrecked upon the coast or have come hither to seek for the healing gilead which they vainly sought for elsewhere.

Malaga is cut in twain by a most extraordinary river called the Guadalmedina which, according to the map, has a tail up in the Sierras and a mouth in the sea. The river is carefully walled in and spanned by fine bridges, and is navigable for omnibuses and other wheeled vehicles up for a considerable distance. It is as dry as the Valley of bones depicted by the prophet Ezekiel. Nevertheless it is subject to fits, and upon one occasion when in a paroxysm of fury, the floods came down so violently that a number of houses were carried away. Just how all this came to pass is one of those Spanish riddles which sadly puzzles the unlearned traveler. Spanish rivers, like Spanish towns, are usually either dried up or are in very reduced circumstances.

Our trip to Granada partook very much of a warlike expedition. We started off in the morning at 6 o'clock upon an old dilligence, drawn by six mules and two horses on the lead. A heavy broad-beamed Wall street banker had se-

cured in advance the four seats upon the top or *banquette*, and three gentlemen of our party were invited to share with him the privilege, and how four of us contrived to sit within such confined limits is still one of the mysteries connected with the laws of compressibility and elasticity of matter. The seats on the inside were arranged on the sides like those in a city omnibus, and were occupied by three ladies, four gentlemen, beside two Spanish brutes, dressed like gentlemen, who, regardless of the comfort of others, insisted upon smoking their dirty cigarettes. One of the leading horses was skillfully ridden by a lively little Spaniard who guided the team, and sounded the horn to warn our approach. Another lively young Spaniard armed with a heavy cudgel, fulfilled the office of team whipper, and most unmercifully did he perform his duty. I never before saw such cruelty, and as I witnessed the brutal and continued flagellations to which the toiling animals were subjected, I sighed for our own benevolent Bergh, and wished that he might be here to apply the workings of his Humane Society to inhuman Spaniards. The chief driver occupied a seat below us, and his duty seemed to consist in uttering a very peculiar yell which alone would have frightened even a lazy mule. At his side sat a dark-visaged man in uniform who had a pair of revolvers stuck into his russet top boots; and behind, standing upon the step, was planted an armed guard.

Thus wedged and discomforted, we started on our expedition, "armed and equipped as the law directs," the mules upon the keen jump, horn blowing, cudgel flying, guard yelling, we whipped around the street corners, up the mysterious dry river to the foot of the Sierra, whence we began to ascend its steeps by winding and devious paths. I imagine that even Don Quixote and Sancho Panza would have fled at our approach. The road was patrolled by armed guards, and even the workmen employed to keep it in repair were fortified with gun, cutlass and ammunition. Travelers on horse and mule back, carried guns strapped across their saddles, and everything betokened some real or imaginary danger; but we pursued our journey in peace, and for some hours in sight of the city of Malaga and the Mediterranean. From our elevated position we beheld the full glory of one of those Spanish sunrisings, which are said to exceed in splendor those seen in any other portion of Europe. For ten hours we traversed mountain, hill, and valley. No trees, no fences, but the whole scene most extraordinary, curious,—often wild, savage, and desolate. The roadway was lined with heavily laden mules and donkeys, sometimes with camp chairs strapped upon their backs, for women to ride, the meek little beast led by some modern Joseph on a flight toward Egypt, and women with water jugs upon their heads like those carried by Rebecca when she went to the well.

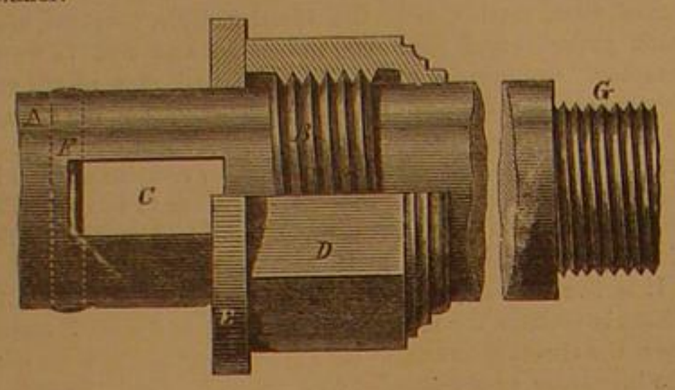
The costume of the men peasants of Audalusia is very peculiar. The hat is conical shaped, with a wide rim rolled over to form a sort of concentric channel, which would certainly be an awkward thing in a rainy country. The jacket is usually short, and made up sometimes of velvet, but more frequently, like Joseph's coat, of many colors. The breeches worn at this season of the year are of sheep skin, wool side out, and tied together by tapes, with a red flannel bandage wrapped about the waist, and over the shoulders they wear a heavy, fancy colored manta, or shawl, with the fold almost invariably thrown across the right shoulder. The leggins are of russet leather, nicely laced about the calf, and as for shoes, it is difficult to describe them. Most generally the shoe is simply a sandal made of canvas, with a braided mat for the sole, fastened to the foot by black lacings, and worn without stockings; but the poor classes tie their feet up in pieces of old hats, rags, carpets, and possibly cabbage leaves, for certainly I never before saw such a combination of material applied to human feet.

In ten hours we reached the old town of Loja, having in the mean time changed our animals three times. Here we took an inland railway, and after a ride of two hours across the splendid Vega, we reached the old city of Granada, and lodged ourselves under the very walls of the Alhambra—the Hotel of Seven Floors. We saw the Alhambra by moonlight, as Irving described it, also the Sierra Nevadas, lifting their sparkling, snowy crests high above this ancient city of the Moors. The sight was glorious indeed, and a visit to this historic and legendary spot, filled full of glorious deeds, "a sad but elegent memento of a brave, intelligent, and graceful people, who conquered, ruled, and passed away." The Alhambra of Irving is so familiar to all readers that I forbear to attempt even a feeble description; but I will say, to the shame and dishonor of the Spanish Government, that this beautiful gem of Moorish pride and consummate art will soon be reduced to a shapeless mass, unless the long projected restoration is at once carried forward. Granada is full of old Moorish habitations and remains. Its Gipsies still burrow like rabbits in the hillside. Its old Cathedral, a noble pile, contains the remains of Ferdinand, Isabella, Philip le Bel, and Crazy Jane, and, *sic transit gloria*, there is also the Cartuje, a vast monastery, which occupied the skill and labor and begging of three hundred monks for a period of thirty-six years,—now empty, save by a single old skeleton monk, who feebly answers the bell, the sound of which rings through those vast halls and corridors, like the curfew that tolls the knell of departing time. As we passed into the chapel, there sat the poor old monk, gazing as if in sad memory over the departed and departing glories of this beautiful monastery. The gilding, the sculpture, the precious marbles, the highly polished agates, the exquisite inlaying of silver, pearl, tortoise shell and ebony, together with the magnificent "Holy of Holys," all done by the exiled monks, is a combination of interior finish and skill which has no superior.

We left Granada and returned by the same route to Malaga, and on our arrival we were notified by the landlord that we could only stop one night, as all his house was taken for the next day, to accommodate the Archduke of Austria and suite; therefore, making a virtue of our seeming necessity, we are to be up and off the next morning for Valencia, with the prospect of a thirty-six hours ride. S. H. W.

Securing Cutters in Boring Bars.

MESSRS. EDITORS:—I noticed on page 408, No. 26, Vol. XVII., an article on an "Improved Method of Securing Cutters on Boring Bars." I herewith inclose a device which I consider superior to the one illustrated in the above-named paper. It consists of the usual bar, A, with a thread, B, cut thereon, directly above the slot, C, which receives the tool. On this thread a hexagonal nut, D, is screwed, which reaches nearly to the slot. A ring, E, bored sufficiently to slip over the bar easily, is slipped close to the nut, and is of such thickness that the outer edge reaches a little beyond the top of the slot. Through the bottom of the slot a steel pin, F, is passed, at right angles to the direction of the slot, one-half of the pin projecting above the bottom of the slot. The pin answers to the point of a set screw, which being backed by the ring and nut, holds the tool as firmly as in a lathe or planer.



After a little use without the pin the bottom of the slot would be likely to become uneven, or a little unevenness in the forging of the tool would give the tool a tendency to cant. The nut being squared on the arbor, the ring evenly turned, and the pin inserted, the tool will always be held firm and true. The use of the ring prevents the bottom edge of the nut from becoming jammed and uneven, which could not be prevented if allowed to come in contact with the tool; the ring to remain stationary and the nut to turn upon its upper face, which will always keep the nut true. If in use the ring should become uneven, it can easily be replaced. The pin can be hardened, and the ring, and the bottom of the nut case-hardened. A thread, G, may be cut on one end of the arbor, that it may be used in the spindle of an upright drill, or it can be used with a dog in a lathe. In the one referred to above, the tool requires two notches, which prevent the tool from being used except for a given size; also the edges of the nut when set against the tool will soon become uneven, which prevent the tool from being held true and firm.

In the one herein described the tool can be raised to suit conveniences. Where a tool is required for certain jobs, a notch may be cut in the bottom of the tool and fitting the steel pin, which will always bring it in the same position. It will also be less liable to break than if a square notch were cut. The position of the nut, D, is such that the diameter of the ring, E, appears more than that of the nut, but the diagonal of the nut is equal to the diameter of the ring.

JOHN A. BROWN.

Boston, Mass.

Steam Expansion.

MESSRS. EDITORS:—The expansion of steam is in proportion to its temperature above 212° heat. Any good engine working steam to a quarter of stroke, cutting off and expanding to near half stroke, will form a vacuum on the steam side of the piston the remainder of the stroke. Steam cannot exist in a temperature below 212°. Steam cannot expand below 212° heat, when it instantly changes to vacuum, and then goes lower down the scale of temperature. I affirm that steam of 75 lbs. of pressure cannot expand to twice its bulk without going below 212° heat. The temperature which corresponds to 75 lbs. of steam is about 304°. Expand this temperature to double its bulk, and you have 152°, which is below the atmospheric line of 212°. Divide the steam cylinder in the middle, divide half the cylinder into 152 parts by lines representing the degrees of heat, count down from 304 until you hit 212, and you cannot expand any further. You have expanded $\frac{92}{152}$°, and left 60 which are below the line of 212. This is the correct theory of the expansion of steam. But air expands under an entirely different law. A small percentage of air mixed with steam in a high pressure engine helps its expansion. But in a condensing engine it does more hurt than good, for it goes to the condenser. My assertions are that steam of 75 lbs. pressure will expand to $\frac{92}{152}$ of its bulk, and all other pressures expand according to temperature above 212°.

By publishing this you will cause many engineers to examine their cylinder cocks at different grades of cutting off, and thereby explode the old theories. GEORGE B. SISSON.

Buffalo, N. Y.

Safeguards to Railway Travel.

MESSRS. EDITORS:—Among the many suggestions now put forth to avoid such accidents as lately occurred at Angola, I see a double track advocated, with a double tread to the wheels, the flange being in the center of the face. The objection to this plan is the inevitable packing of earth, snow, etc., in the narrow space between the rails, thus increasing the danger it is proposed to obviate. Permit me through your columns to suggest the use of a double-flanged wheel, which will be much cheaper than the double-tread wheel, and require no change in the track. Each wheel should have a flange on the outside of the rail, as well as on the inside, and with such cars the entire flange might be broken from each side of every wheel on one side of the train, and the train would still be as safe as the ordinary single-flange wheels. The absence of a piece of the flange six inches or less in length from an ordinary wheel would certainly throw the car from the track whenever the centrifugal force in turning a curve should throw the car to that side of the track on which the defective wheel was running. With the double-flange wheel, one sound wheel on each axle is enough to insure the safety of the train. An obstruction which causes one wheel to mount the rail may throw off a single-flange car, but could do no harm to the double-flange wheels.

In regard to heating cars by hot water, would the flood of scalding water from the broken pipes have been any more merciful to the victims of the Angola holocaust? I admit that the bodies would have been recognizable, and perhaps a few might have been saved, but cannot something better be invented?

Knowing that the ventilation of such subjects through your widely circulated journal has the effect of stimulating invention, and ultimately of accomplishing the desired result, I take the liberty of making the above suggestions, which to me are new, but I hardly dare hope to be patentable.

Buffalo, N. Y. CALVIN E. TOWN.

On the Day Line Question.

We are in receipt of a number of communications on the "day line," a subject that must become of some importance to us in a national point of view, in regard to our recent acquisition of territory on the north-western coast of this continent, and which will undoubtedly receive the attention of congress. Among some half a dozen letters, some facts contained in one from J. M. C., of Ohio, may be presented. He says:—

"The first English missionaries to Tahiti passed round the Cape of Good Hope to the east, and the American missionaries to Hawaii passed round Cape Horn to the west. As a necessary consequence there was a difference of one day and night in the reckoning of time; and hence for over fifty-five years there has existed, and still exists, in the Pacific Ocean this singular fact: two groups of islands, lying on nearly the same degree of longitude, and not further apart than New York and London, whose inhabitants, although christianized, continue to observe the Christian Sabbath on different days of the week.

"This singular fact is thus explained: The succession of day and night is caused by the revolution of the earth on its axis from west to east. Now if a person should travel round the earth in the direction of its motion, he would gain an *apparent* revolution of the sun, or exactly one day and night. But if he should go in the opposite direction, he would *apparently* lose one day and night. Therefore, if two persons should start from the same point and travel round the earth in opposite directions, and meet again at the point from which they started, they would differ exactly two days in their reckoning of time, the one being one day ahead and the other one day behind those who had remained stationary.

"There are some additional facts connected with islands in the Pacific ocean. If you go west to the Sandwich Islands, you will find them keeping the Sabbath on the same day with yourselves. If then you pass almost directly south to the Society Islands you will find that their Sabbath had occurred the day before yours. But if you should go east round the earth to these islands the case would be reversed. How these islands will ever be made to observe the same day for Sabbath is a question yet unsettled. However, I think the above is sufficient to show that the 'day line' is in the Pacific Ocean."

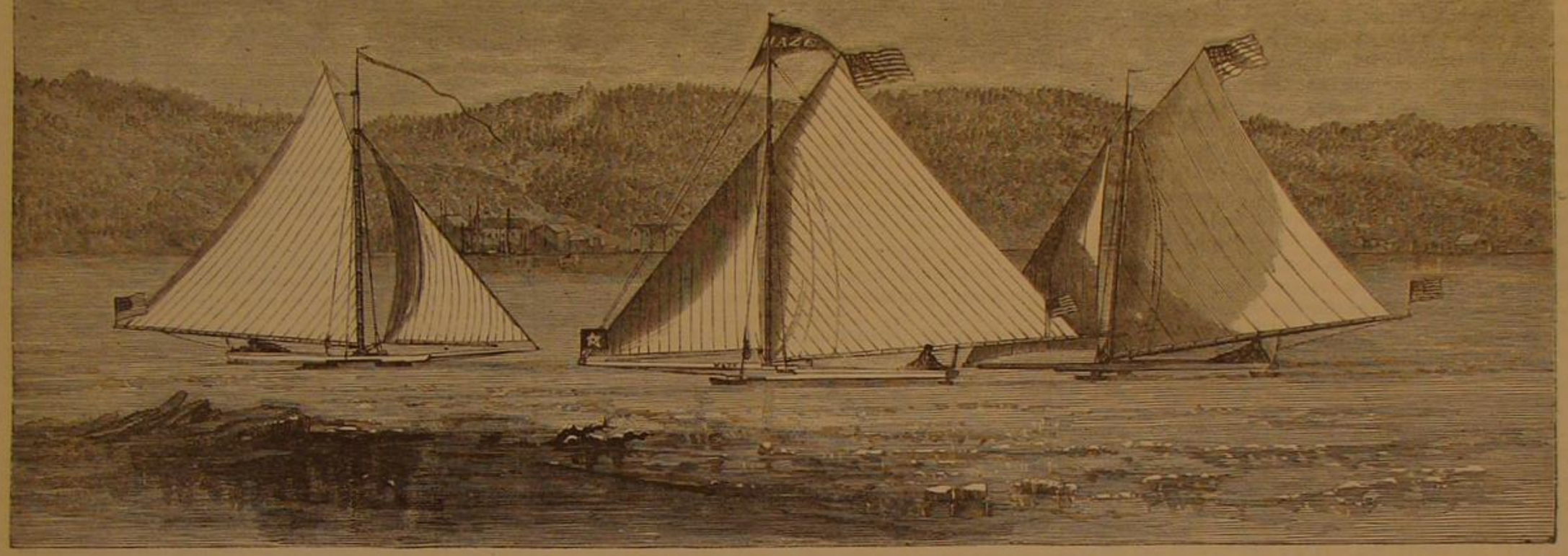
Singular Discovery.

A singular discovery has just been made at Chagny, France, by some workmen engaged in digging the foundations of a railway shed. At the depth of about nine meters, in a stratum of clay and ferruginous oxides, remains of proboscidians (elephants, rhinoceroses, etc.), were brought to light, comprising several black teeth and a formidable tusk in large fragments, which, on being put together, constituted a length of seven feet. The depth at which this was found was still six meters higher than the level of the most considerable inundations of the Dheune, and in an undisturbed stratum. *Galignani* says: "So far there is nothing absolutely extraordinary; but who would have thought of finding, underneath the bed containing these fossils of the tertiary period, an aqueduct of the most primitive kind and of human workmanship? Yet such was the case, the only instance of the kind on record. It is explained by M. Termaux, who relates the circumstance, by supposing, what seems indeed to have been the fact, that the tertiary fragments above alluded to had been washed into the trench by a violent inundation, and thus filled up the aqueduct. The latter is about eighty centimeters in depth, sixty centimeters broad at the bottom, and only forty in breadth at the upper surface. It is not easy to account for this principle of making the conduit narrower at the top than at the bottom; at all events, the small dimensions of the cavity were evidently caused by the want of proper tools, as to this day the negroes of Africa, in their miserable attempts at what might be termed public works, remove as little earth as possible. However that may be, the discovery of this aqueduct does not by any means authorize us to carry the antiquity of man as far back as the tertiary period; for, although the aqueduct lies under a stratum of tertiary materials, this stratum does not belong to the place, but was transported thither later."

Navigating the Ice---Exciting Winter Sport.

Ice sports are not limited to the pastime of skating; sailing over the glassy surface where there is plenty of "sea room" and wind, is not less exciting than skating, and entails none of its labor and after weariness. The speed that can be attained by ice boats is something marvellous; a rate of over 60 miles per hour being not uncommon. A year ago one boat on the Hudson made eight miles in less than six minutes. The ice boat is exceedingly simple in construction and the hull can be built at a merely nominal cost; but in fittings and decorations there is ample room for expenditure and show, and some of those on the Hudson are marvels of beauty and very costly.

A boat, however, can be made of a few planks, three skate irons, a mast and sail, at a cost of a few dollars, which will carry the navigator at a speed rivaling that of the swiftest birds and far outstripping the locomotive. The boat is V-shaped, composed of three planks, two forming the arms of the V and one connecting them at the wide end. Under the two ends are skate irons hung on pivots to allow swing, and another at the intersection of the two arms. By the latter the craft is steered. The rigging may be of any style desired; usually sloop or yacht rig. These boats sail admirably on the wind, their broad base holding them up almost into the "wind's eye." They may be numbered on the Hudson by scores; something over a hundred being owned by the various clubs and private persons. Very exciting regattas take place on this river during the winter season when the condition of the ice and state of the wind invites. Attempts have been made, we believe, to utilize these ice boats for passenger and freight travel, but we are not aware that they have as yet been successful, although we see no reason why they may not be made so.



VIEW OF ICE BOATS ON THE HUDSON RIVER.

Facts for the People About Gas.

Under this heading a late number of the *American Gas Light Journal* furnishes some practical advice concerning the management of gas, and some simple facts the knowledge of which may save our readers much dissatisfaction, annoyance and useless expense:

"It is a common occurrence for consumers to complain of the excessive cost and deficiency of light. To the inaccuracy of the meter they generally attribute the first, and to the poor quality of gas the latter condition is usually charged; when, in reality, the fault will generally be found to rest with the consumers themselves, through their own ignorance and mismanagement.

"Whenever light is obtained from gas at a greater cost than necessary, it is just as much a loss as to permit any other valuable commodity to run to waste. And a proper knowledge of the conditions that cause unnecessary loss, will place in our hands the means requisite to avoid and prevent it.

"BURNERS.—There is no part connected with the consumption of gas, whereby the best results are obtained in the quality of light and economy of gas, of more importance than the burners.

"It would be difficult to convince the majority of gas consumers, who have not given the subject attention, how remarkably the light derived from gas is reduced by improperly constructed burners; or where the pressure or the flames are unsuitably adjusted. Owing to these circumstances, the amount of gas consumed is disproportionate to the light obtained, and the account of the consumer is much increased. In fact, there is no exaggeration in stating that a large proportion of the consumers, through their own mismanagement, pay twice as much as there is any occasion for, considering the amount of light obtained, all of which could be saved by using a proper burner, and a correct adjustment and control of the pressure.

"The most important requisites for good burners are that the orifices where the gas issues should be perfectly regular in size, and of a proper size to permit it to issue with a very low pressure. And these conditions should be adhered to, whatever the kind of burner may be, whether the argand, bats-wing, fish-tail or single jet, etc.

"If the orifices are too small a high pressure is required to expel the gas, and the light is diminished just in proportion to the increased pressure. In such burners the flame will have a blueish tinge, and the lower part will be of a deep blue color, giving but little light in proportion to the gas consumed. As an example, an argand of fifteen holes passing five feet of gas at 1·10th pressure, yielding a light of 12 candles will, if the orifices are reduced, to pass the same amount of gas per hour at 5-10ths pressure, only give the light of six candles—a loss of 30 per cent. Hence we see that the light to be obtained from a given quantity and quality of gas is entirely dependent on the burner employed. This demonstrates the necessity of having proper burners, and shows clearly how by negligences on this point, the consumer may find his gas bills increase, in what appears to him a very mysterious manner.

"SIZE OF FLAME.—It is a mistake to suppose that the amount of light obtained will be in proportion to the quantity of gas issuing from a burner. There is a particular point in the consumption of any class of burner where the maximum of light is derived, and any deviation from this entails loss.

"As an example, if an argand burner consumes five feet per hour, giving the light of 12 candles, be reduced, so that only three-fourths of that quantity is burned, then the light instead of being equal to nine candles, the theoretical proportion, will be six candles only, being a positive loss of 36 per cent. This reduction may be continued with even greater proportionate losses. A five-feet bat-wing or fish-tail burner will give a maximum of light in proportion to the gas consumed, compared with any less sized burner, and it will be found in practice the larger sized burners are the most economical. The large sizes giving as high as 200 to 300 per cent advantage in light as compared with the smallest sizes.

"As an example; a bats-wing burner consuming two feet per hour gives the light of two and a quarter candles only, while a burner consuming seven and one half feet per hour gives the light of twenty-two candles, the pressure being uniformly four tenths of an inch.

"The knowledge of these facts is of importance to the consumer, who may, in his endeavor to economize, obtain results directly opposite to his anticipations. It is more economical to have one good large gas light than several small ones.

"GLOBES, GLASSES, ETC.—Although chimneys are essential to argand burners, and globes also in many places where fish-tail burners are used, and the ornamental effect is pleasant, still they are detrimental to the diffusion of the light of gas. A clean glass globe obstructs about 12 per cent; A clean globe engraved with flowers about 24 per cent; a globe ground all over about 40 per cent; an opal globe about 60 per cent.

Hence is apparent the folly of using elaborately engraved and ground globes or shades, where it is desirable to economize. If engraved at all, the upper portion should be embellished, while the lower part should be left clear for the free passage of light.

Curious Facts About Spiders.

Some very curious observations regarding spiders have lately been communicated to the French Academy of Sciences by Father Babaz, who has been fifteen years engaged in these researches. It happened one day, as he was reading in a garden, that a small spider suddenly lighted upon his book, and crawled over the very line he was reading. He tried to blow it away, but instead of letting itself be carried away by the blast, it raised its abdomen, and swung itself up to a leaf overhead. This appeared strange, as there was no thread to be seen. Our observer caught the spider again, put it upon his book, and repeated the experiment, which ended in the same result. He caught it once more, and this time placed himself directly in the sun, with the insect on a level with his eyes. In this position he at length discovered the evolution performed by the little creature. On receiving the blast, it raised its abdomen, and in so doing projected a thread of inconceivable tenuity to a considerable distance and, raising itself in the air, disappeared from view. This unexpected discovery induced Father Babaz to examine the question thoroughly; every spider that came in his way had to contribute something toward his researches, and in this way he at length ascertained a fact hitherto unknown to naturalists, viz: that most spiders possess not only the faculty of spinning a thread, but also that of projecting one or several, sometimes of a length of five or six meters, which they use to traverse distances with, and affix their thread to a second point for the support of their web. They even seem to have the power of directing the extremity of the ejaculated thread to a given point; they seem to feel for the place where is most desirable to fix it. Certain spiders, the Thomisa Bcfo, for instance, will eject a bunch of threads which curling up in the air, and shining in the sun with various hues, give the insect the appearance of a peacock displaying its tail. But this is not all; spiders can fly and swim in the air, though they are heavier even than alcohol. To perform this feat they turn their back to the ground, and keep their legs closely folded up on their body, and in this posture sail about with perfect ease. Their flight is often very rapid, especially in the beginning, and they will sometimes escape from the observer's hand quite suddenly, and soar up high in the air.

How to Shave Without a Razor.

In looking over some old English patents, we came across the following amusing document, to which we suppose the Great Seal of the realm, consisting of a pound of beeswax, was attached, by means of red tape, in the usual manner. The inventor ought to have included the right to clean hogs before killing, in this manner.

Specification of the Patent granted to Marcus Hymans, of Exeter street, Covent Garden, in the county of Middlesex, England; for a Composition for Shaving without the Use of Razor, Soap or Water. Dated February 7, 1804.

To all to whom these presents shall come, etc. Now know ye, that in compliance with the said proviso, I, the said Marcus Hymans, do hereby declare, that the said composition for shaving, as aforesaid, is prepared and used in the manner following—that is to say: Mix one pint and a half of clear lime-water, two ounces of gum-arabic, half an ounce of isinglass, an eighth of an ounce of cochineal, a quarter of an ounce of turmeric-root (made into powder), an eighth of an ounce of roach allum, an eighth of an ounce of salt of tartar, and an eighth of an ounce of cream of tartar, together; boil them for one hour at least (stirring up the mixture during the whole time of boiling, and being careful not to let it boil over), clear it through a sieve; then add two pounds and a half of iron pumice-stone, finely pulverized; mix the whole together, with the hands, into one cake, by the assistance of the white of two eggs, well stirred up. Then divide the cake, so made, into twelve smaller cakes; dry them in the open air for three days; put them into an oven of moderate heat for twenty-four hours, when they will be completely dry and fit for use. Apply them with a gentle friction to the beard, and they will produce the complete effect of shaving

In witness whereof, etc.

EIGHTEEN million letters were collected from the lamp-post boxes of New York last year, and about the same number were delivered by carriers.

THE black pepper tree has been successfully raised to bearing maturity in many parts of California.

Editorial Summary.

BEET SUGAR IN GERMANY.—A German agricultural journal gives an interesting account of the beet sugar business in that country. Fields of beets of from two to three hundred acres are often seen there. The beets are drilled in rows about fifteen inches apart and the whole labor of cultivation performed by the hoe. The women and men work in gangs of twenty or more. The men get from sixteen to nineteen cents per day and the women from thirteen to fifteen—working fourteen hours. The manufactories for this sugar are on a correspondingly large scale, some of them employing a thousand hands. The beets are brought from the field and elevated to the upper story of a high building, where they are cleaned, crushed, and filtered, the juice descending from story to story, undergoing a refining process by the way till it reaches the lower one in the shape of a sugar cone two and a half feet in length. It is a very nice article and worth at the factory about ten cents per pound. It takes eight days from the time of crushing the beets till the sugar is dried sufficiently for market. One of these establishments turned out six millions of pounds last year with the help of six hundred hands.

THUNDERBOLTS AS REMEDIES.—An English writer argues that several physical maladies can be cured by lightning. The doctrine that "like cures like," holds good, he asserts, in the case of maladies to which the destructive element gives birth; whether the fright, or some proper action of the electric fluid works the cure, it is hard to say, but the fact is incontestible. Several cases are reported where individuals paralyzed from their youth have recovered complete use of their limbs by lightning strokes in after years. A country clergyman in Kent was paralyzed by apoplexy in 1761, and struck by lightning about a year after, when all traces of the paralysis left him. A man who had lost the use of both arms was guarding some animals in a field; lightning fell upon him, and when he came to his senses he found that he could use both arms and hands. These are but a few out of many recorded instances. A variety of ailments besides paralysis have been cured or ameliorated by the same agency, even blindness; for one Gardley, some time an actor at the Surrey Theater, who had been for many years blind of one eye, had his sight quite restored by a lightning flash.

POWER OF A GROWING TREE.—Walton Hall, England, had at one time its own corn mill, and when that inconvenient necessity no longer existed, the mill stone was laid by in an orchard and forgotten. The diameter of this circular stone measured five feet and a half while its depth averaged seven inches throughout; its center hole had a diameter of eleven inches. By mere accident some bird squirrel had dropped the fruit of the filbert tree through the hole on the earth; and in 1812 the seedling was seen rising up through that unwonted channel. As its trunk gradually grew through this aperature and increased, its power to raise the ponderous mass of stone was speculated upon by many. Would the filbert tree die in the attempt? Would it burst the mill-stone? or would it lift it? In the end the little filbert tree lifted the mill-stone, and in 1863 wore it like a crinoline about its trunk; and Mr. Waterton used to sit upon it under the branching shade.

PRESERVATION OF BUILDING STONE.—An Illinois architect has invented a process for preserving from decay and disfigurement the beautifully colored stone called "Athens marble," which is now used very extensively at the West for building fronts. This stone is composed principally of carbonate of lime, carbonate of magnesia, and silica, but among the minor ingredients, protoxide of iron pervades the whole mass, giving the characteristic blue-greenish tint, the main cause of its beauty, but the cause also of its decay, as exposure to the atmosphere converts the protoxide into hydrated sesquioxide of iron, or iron rust. To remedy this action the stone is coated with a soluble glass, made by melting a mixture of fifteen parts of silica, ten of soda, and one of charcoal, until it forms a glass which is reduced to the liquid form by boiling in water. This solution permanently fastens itself to the surface and protects the stone from the atmosphere, smoke, and dust.

PHYSIOLOGICAL ACTION OF ALCOHOL.—The same observer has propounded a physiological law relative to alcoholic fluids, which is to the effect that the period of time required by these bodies to produce their effects, and the period of time required for recovery, turned altogether on the boiling point of the fluid used. This is so certain that the boiling point and action of one fluid being known, the action of any other fluids might be predicted from their boiling point. The explanation is simply that the alcohols taken into the body are not changed in their chemical composition, and their evolution and time of evolution are the mere matter of the expenditure of force, caloric, to raise them and carry them off. The practical lesson to be drawn is, that in case of alcoholic poisoning of the human subject, the most important condition for recovery is a high temperature.

EXTRACTING INDIGO FROM RAGS.—A French patent has been allowed for a new method of recovering indigo from cotton or woolen rags which have previously been dyed with that substance. The inventor places the rags in a boiler provided with a double bottom and saturates them thoroughly with a solution of caustic soda of 1° Baume. After this the rags are kept for five hours under the action of steam at 45 pounds pressure. By this treatment the indigo is reduced, and dissolved, then precipitated from the soda solution, and finally collected in as pure state as the best sorts in commerce.

DEATH BY FIRE DAMP.—Dr. B. W. Richardson, F. R. S., in investigating the physiological action of the methyl compounds, has particularly observed the action of the hydride of methyl, which occurs naturally in the form of fire-damp in mines, and as marsh gas on land. Seeking first to ascertain what percentage would prove fatal in the air, he found that even pigeons could live in an air charged with thirty-five per cent of the gas, for half an hour. When death finally ensued, it came as a sleep, so gentle that it was determined with difficulty when either circulation or respiration ceased. From these observations he concluded that the victims of a mine explosion die an easy but prolonged death, and while the knowledge of the first of these truths should inspire thankfulness, the latter should encourage the rescuing party not to abandon their exertions even for days after the accident has occurred.

THE RAMIÉ PLANT.—We have received from Mr. A. B. Bacon, chairman of the Section of Agriculture, New Orleans Academy of Science, a specimen of fiber made from this plant, which is beautifully white and fine, and certainly very strong. The accompanying circular asserts that the plant may be started with root cuttings, and will flourish in any climate where the ground does not freeze over a foot deep, and never needs replanting. Well rooted plants will produce from two to five cuttings of the stalk in a year, each giving 150 pounds of fiber to the acre. A native of Java, the plant has been domesticated in Mexico by D. Benito Roezl, a Belgo-Austrian botanist, who has also invented a machine for cleaning it. Any further information may be obtained from Mr. Bacon, at the *Picayune* Office, N. O.

MOCK SUNS.—The inhabitants of Lee county, Va., were lately much excited over the rather uncommon spectacle of apparently three suns rising at the same time. The central orb was encircled by a beautiful iris, surmounted by the fragment of another one, which extended on either hand above the attendant suns. After a brief space, these latter dissolved, leaving the only original Sol in the enjoyment of his full glory. The phenomenon, while it lasted, was a subject of dismay and affright to the ignorant populace, who considered it as certainly portentious of coming evil.

A NUMBER of illustrations of excellent inventions, intended for this issue, are necessarily left out to make room for our Spanish correspondent's letter, and other interesting matter, which could not be deferred.

How Muskrats Swim Under the Ice.

Muskrats have a curious method of traveling long distances under the ice. In their Winter excursions to their feeding grounds, which are frequently at great distances from their abodes, they take in breath at starting, and remain under the water as long as they can. They then rise up to the ice, and breathe out the air in their lungs, which remains in bubbles against the lower surface of the ice. They wait till this air recovers oxygen from the water and ice, and then take it in again, and go on till the operation has to be repeated. In this way they can travel almost any distance, and live any length of time under the ice. The hunter sometimes takes advantage of this habit of the muskrat in the following manner:—When the marshes and ponds, where the muskrats abound are first frozen over, and the ice is thin and clear, on striking into their houses with his hatchet, for the purpose of setting his traps, he frequently sees a whole family plunge into the water and swim away under the ice. Following one of them for some distance, he sees him come up to renew his breath in the manner above described. After the animal has breathed against the ice, and before he has time to take his bubble in again, the hunter strikes with his hatchet directly over him, and drives him away from his breath. In this case he drowns in swimming a few rods, and the hunter, cutting a hole in the ice, takes him out. Mink, otter, and beaver travel under the ice in the same way, and hunters have frequently told me of taking otter in the manner I have described when these animals visit the houses of the muskrat for prey.—*Trapper's Guide.*

MANUFACTURING, MINING, AND RAILROAD ITEMS.

The largest pumps ever made in the United States have just been completed for the San Francisco Dry Dock Company. The castings of the pumps are ten feet in diameter. The weight of the material in each pump is 75 tuns. They are calculated to raise 504,000 cubic feet, or 16,150 tuns of water, and free the dock in two hours.

Something entirely new in the manufacture of porcelain has been introduced in a Philadelphia factory. The new material is called "hot-cast porcelain," for while containing the ingredients of which porcelain is composed, it is worked like glass, and like the latter it can be blown, pressed, or rolled into any desired shape.

The experiment of laying steel rails on different sections of the New York and New Haven railroad, has been so satisfactory that the whole line is to be relaid with them, and as a beginning, an order has been sent to a firm in England for two thousand tuns. Several new passenger coaches, of the English pattern, are now building in Springfield for this line, and will be put upon the road during the present month. Each carriage will have five apartments, separately accommodating seven passengers, and the method lately introduced for heating cars by circulating hot water in pipes, will be adopted on these coaches. It is not a little singular that while we are introducing these apartment carriages, some of the English roads are, or contemplate doing the same with our long American cars.

Philadelphia modestly claims to have the largest military goods manufactory, the largest chemical factories, the largest bookselling house, and the most extensive locomotive works and machine shops in the United States In the year 1865 her factories produced over $200,000,000 of staple goods. Philadelphia is now the commercial center of 260 cotton and woolen factories, and has besides several thousand hand looms, of which the yearly product, it is asserted, is equal to that of seventy additional mills of average size.

It is stated that arrangements have been made for a projected railroad from St. Paul, Minn., to the western extremity of Lake Superior, distant one hundred and fifty miles in a nearly direct line. Seventy-five miles will be completed this year, and the whole by the end of 1869.

The Panama Railroad, during the twelve years of its existence, has transported only 396,632 passengers, but the treasure carried during that period exceeded $500,000,000 in gold, $147,000,000 in silver, $10,000,000 in currency, and $5,000,000 worth of jewelry. The tunnage of general merchandize exceeded 600,000,000, but it appears that the increase in outlay which this heavy traffic required, for wharves, rails and locomotives, has caused a falling off for the past year in the proportion of nett receipts, as compared with previous years.

The Moscow *Gazette* publishes a telegram from M. Bogdanywitch, a prospector now making a journey of exploration in Siberia, to look into the expediency of building a railway in that immense province. The adventurer is very favorably impressed, and asserts that information he has gathered shows by facts the brilliant future reserved for the Siberian railway. It is now announced that on the commencement of spring, operations will begin upon the first division of the great Russia-China-Taschkent Railway.

SHIP LEAKING INDICATOR.—Shaler's patent bilge water indicator, with Brevoor's improvement, was recommended by the commission appointed a few months ago to investigate the appliances for saving life at sea. It is very simple in construction, and operates on the same principle and by nearly the same means as an ordinary steam gage. A dial plate, over a box resembling a steam gage, shows an index pointer which is operated by the compression of the air in a tube. From the valve inside the case one or more pipes, either flexible or rigid, descend to the bottom of the vessel and terminate in a lead or iron pipe of larger diameter, the bottom of which reaches nearly to the skin of the ship. The rise of water compresses the air in the tubes, and, by means of the valve inside the case and simple connecting mechanism, operates the index, thus denoting by figures on the dial the depth of the water in feet, inches, and their fractions. An independent pointer outside the glass of the dial serves to denote the relative increase or diminution of the water in pumping. One single instrument, located in the binacle or pilot house, will, by means of branch pipes, denote the state of the water in two or more portions of the ship.

Recent American and Foreign Patents.

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

SNOW PLOW.—Chas. Lusted, New York city.—This invention relates to a new plow for cleaning railroad tracks from snow, and consists in the use of an oscillating plowshare, which throws off the snow that has been raised by it, so as to prevent the accumulation of the snow upon the share. The oscillating share is hinged to a stationary lower share, and is connected with a crank on the axle or the truck, to which the device is secured. By means of a clutch arrangement the connection between the axle and the share may be established or interrupted at will, so that the upper hinged share may remain stationary if desired.

SCRAPER ATTACHMENT TO CARS.—E. B. Wells, Northampton, Mass.—The object of this invention is to provide railroad cars with a device for keeping the track clear of snow, mud, and other obstructions. The device is chiefly applicable to street or horse-cars and consists in the use of scrapers or plows, one in front of each wheel, which are suspended from powerful springs, that are attached to the underside of the car platform, which are operated by levers arranged at each end of the car.

CULTIVATOR.—Edwin Doolittle, Pawnee, Ill.—This invention has for its object to furnish an improved cultivator, simple in construction, effective in operation, and which may be easily and conveniently guided when at work.

KNITTING MACHINE.—John Chantrell, Bristol, Conn.—This invention relates to a new knitting machine in which a flat web can be knit by the aid of two sets of hooked needles, and by suitable sinkers playing up and down between the horizontal needles. The yarn is taken from one single spool, and is, by a suitable carrier, laid over the bodies of the horizontal needles, and is then between the needles depressed by the sinkers, the loops thus formed are cast off over the ends of the vertical needles upon loops held between the vertical and horizontal needles, and are thus locked. The invention consists chiefly in the peculiar manner of forming the loops by the two sets of needles and by the sinkers, and in the construction and arrangement of the devices by which the yarn guide, the needle carriers, the pressers, and sinkers, are set in motion in the required order and succession.

WATCH.—Geo. A. Bowen, Trenton, N. J.—This invention relates to a new device for protecting the drum in which the mainspring is contined and also the adjoining gear wheels and pinions from being injured by the breaking of the mainspring.

COMBINED FODDER CUTTER AND CORN SHELLER.—C. R. Hewett, Waupun, Wis.—This invention has for its object to furnish a machine by means of which corn may be shelled or fodder cut, as may be desired with equal facility.

BROOM OR BRUSH HOLDER.—Anthony G. Davis, Watertown, Conn.—This invention has for its object to furnish a neat, cheap, simple, convenient and effective device for holding a broom or brush suspended when not in use.

PLOW.—James Urie, Evansville, Ind.—This invention has for its object to furnish an improved plow simple in construction, effective in operation, which can be manufactured at small expense, and any part of which can be easily renewed when worn without its being necessary to send the entire plow to the manufactory to have the renewed part fitted.

HAY CUTTER.—J. F. Hammond, North Sudbury, Mass.—This invention has for its object to furnish an improved hay cutter which shall be self-feeding and double-acting, and which will do its work quicker and better than the hay cutters now in general use.

MARKER FOR SEWING MACHINES.—Joseph P. White, Savannah, Ga.—This invention consists chiefly in a new manner of attaching an adjustable cloth presser to an adjustable gage, so that the same can be set more or less to the front as may be desired, and so that the presser can be raised and lowered at pleasure. The invention also consists in a new manner of constructing a hemmer and of attaching the same so that it can be moved to form the gage, as may be desired.

FEED GUIDE FOR PRINTING PRESSES.—C. Potter, Jr., Westerly, R. I.—This invention relates to an adjustable feed guide for printing presses, and has for its object the facilitating of the adjustment of the guide, one screw only being manipulated in order to admit of the guide being adjusted in two different directions which are required.

CYLINDER PRINTING PRESS.—C. Potter, Jr., Westerly, R. I.—This invention consists in hanging or arranging the cylinder of that kind of printing presses known as the "drum cylinder," in such a manner that the cylinder may be raised, at the will of the operator, so as to be inoperative or incapable of giving any impression. The object of the invention is to give the operator or attendant entire control over the pressure cylinder, so that, in case of a sheet of paper being improperly set or presented to the cylinder, or the failure of a sheet being presented to it at all, the pressure cylinder, by being raised, will obviate many difficulties attending the above-mentioned contingencies.

PAD CRIMP OR PRESS.—George Kennedy, Clarksville, Iowa.—This invention has for its object to furnish an improved instrument by means of which the back pads of harness may be easily and accurately formed, so that the pad may be stitched with as much readiness as a piece of plain leather.

MACHINE FOR SAWING LATHS.—Emery T. Wheeler and Wm. H. Vaughan, Cannelton, Ind.—This invention relates to a new and improved machine for sawing lath, pickets, and strips for wheel spokes, chair stuff, etc., directly from the circumference of the log, without waste.

HAND LEVER SEWING MACHINE FOR PATCHING BOOTS, ETC.—David Forest, Eastport, Me.—The nature of this invention consists in a device for sewing patches on boots and shoes, and other similar articles, by means of a hand lever to work the needle.

TIRE SHRINKING MACHINE.—James Elliott, Milford, Wis.—This invention relates to a device for tire shrinking, and consists of a platform and bed piece, the latter supporting two sliding carriages carrying a notched or toothed flange, against which the tire to be shrunk is set, and held in place by two notched or ratchet cam levers, mounted on the same carriages, which are pressed together by one or two other cam levers, hung on vertical axes on the bedpiece, thus shrinking the tire.

LOW WATER ALARM.—F. S. Davenport, Jerseyville, Ill.—This invention relates to a new and improved device for ascertaining the hight of water in a steam boiler, and it consists in operating a valve by a float, whereby an alarm is given when the water in the boiler falls below the required quantity.

MIXING STEEL AND IRON.—James Cartwright, Youngstown, Ohio.—This invention relates to a new and improved method for combining steel and iron, whereby a greatly improved article is produded, as regards its tenacity, flexibility and strength.

HAY FORK.—Joseph H. Walker, Grand Rapids, Mich.—This invention relates to a new and useful arrangement, whereby the labor of handling hay is greatly lessened, and it consists in a fork of peculiar construction, which is attached to an irregular shaped frame, and so arranged that the position of the fork can be varied.

GRAIN MEASURING APPARATUS.—E. O. Melvin, Brooklyn, Wis.—In this invention the main feature is a lubricated shute provided with a gate which alternately closes one or the other branch of the shute, and which is connected with a registering apparatus that records the number of times the gate has been opened and closed.

SHINGLE MACHINE.—David L. Peacock, Rockport, Ind.—In this invention the shingle is split from a block, and planed while passing through the machine.

PRESERVE JAR.—F. J. Shefferly, Detroit, Mich.—This invention relates to a new and improved method of manufacturing jars for preserving fruits and other articles of diet of a similar nature, and it consists in the novel and improved method of sealing or securing the cover of the jar to the neck.

BOLT CUTTER.—E. A. Sloat, Theresa, N. Y.—This invention has reference to a new and improved method of cutting off the ends of bolts and rivets, an operation which has hitherto been performed by means of a cold chisel and hammer, and the invention consists in the arrangement of two cutters, the edges of which are operated in regard to each other like shears, but upon one of which cutters a compound lever purchase is obtained.

SPRING BED BOTTOM.—Gottlieb Koenig, Plymouth, Mich.—This invention relates to a new and improved method of constructing the bottom of spring beds, and the invention consists in an arrangement of bars and springs within the bottom, whereby the action on the springs serves to expand them instead of compressing them, thus preserving their elasticity and usefulness for a long period.

HAY KNIFE.—Charles A. Fisher, Geneseo, Ill.—This invention relates to a new and improved method of constructing or shaping knives for cutting hay, whereby the same are rendered more convenient in handling and more effective in operation than hay knives have hitherto been.

HORSE POWER HAY FORK.—Charles E. Gladding, Troy, Pa.—This invention consists in attaching to the handle and to the bait of the fork a jointed connection, formed of different parts or sections, which in the different positions the fork assumes as it is used in elevating and discharging the hay, places it entirely under the control of the operator, and greatly increases the value and usefulness of the invention.

SPRING BED BOTTOM.—S. J. Wingate, Decatur, Ill.—This invention has for its object to furnish an improved spring bed bottom, simple in construction, not liable to get out of order, and which may be readily attached to and removed from the bedstead.

CULTIVATOR.—C. A. Harper, Wheeling, Ind.—This invention has for its object to furnish an improved cultivator, so constructed and arranged as to remove the clods and rubbish in front of the plow, so that they may not be thrown against or upon the small plants being cultivated, and which will enable the plows to be much more easily raised to pass over stumps and other obstructions, and to be more easily transported from place to place.

LOCKING CAR SEATS.—Geo. R. Bayley and Jno. McCluskey, Algiers, La.—This invention relates to an improvement in locking and unlocking the reversible seat backs of railroad passenger cars, whereby all the seat backs on one side of the car can be locked or unlocked simultaneously.

DOOR HINGES.—Charles Dunré, Louisville, Ky.—This invention relates to an improvement in door hinges, and consists in a metal plate countersunk in the door, coinciding at the top of the door with a similar plate in the rabbet of the door frame, each furnished with projecting arms or ears connected by a pin; at the bottom of the door is a similar eared plate. A screw passing through the ear into a socket completes the hinge and renders the door adjustable in place.

TIRE SHRINKER.—Edward B. Decker, Bedford, Ill.—This invention has for its object to furnish an improved machine for shrinking tires, which shall be simple in construction, convenient to be used, and powerful in operation.

JOURNAL BOX.—Geo. H. Henfield, San Francisco, Cal.—This invention relates to improvements in the construction of bearings for railroad car axles or other journals, and consists in forming a brass or other metal attachment in connection with a cast iron box or shell, in such manner as to hold securely in place sections of Babbit or other soft metal for the bearings.

THREE-HORSE CLEVIS.—E. M. Potter, Kalamazoo, Mich.—This invention consists of a clevis provided with two grooved pulleys cast together and of unequal diameters; the chain from the doubletree winding on the smaller pulley, and that of the singletree winding upon the larger one, by which means a compensatory action is set up which enables three horses to be worked abreast in plowing or other equivalent work.

UTERINE ELECTRODE AND ABDOMINAL SUPPORTER.—A. J. Steele, New York city.—This invention relates to the application of electricity to the uterus and vagina when the latter are in different pathological conditions. It consists of insulated wires bent in suitable shapes and covered with a sponge or other equivalent substance for providing a medium of conduction from the insulated wire to the diseased part.

ICE SLEIGH.—John Rancevau, Carthage, N. Y.—This invention has for its object to furnished an improved ice sleigh, so constructed and arranged as to be propelled rapidly and conveniently over the ice by those riding in said sleigh.

TINMAN'S FORMING MACHINE.—Wm. Stine, Elmore, Ohio.—This invention relates to an improvement in a tinman's forming machine, and consists in a gage attached thereto for flaring cylinders or tubes at the end.

BAG FASTENER.—Daniel Overholtzer, Polo, Ill.—This invention relates to an improved device for fastening the mouth of a bag of grain or other commodity, and consists in an iron hook pivoted to a link, and so arranged in connection with another link through which it passes that by moving in one pivot the bag is fastened with a cord attached to both links, and by moving in the opposite direction the bag is unfastened.

ENDLESS CHAIN REVERSIBLE POWER FOR DRAWING CARS, ETC.—W. McCreery, Pittsburgh, Pa.—The object of this invention is to move cars or other heavy objects in and out of a depot or storehouse where steam power is located, by attaching a reversible gear to be connected when required with the thing to be moved.

MACHINE FOR BRAIDING WHIP LASHES.—Phineas L. Slayton, New York city.—This invention relates to an improved machine for braiding whip lashes, of any required number of strands, and it consists in a stationary hollow sphere open at top and bottom and supported between top and bottom plates by standards, which hollow sphere is cut up into segmental pieces or sections with channels or open passages between them to serve as guideways for a series of fingers that are moved around to lay the strands by means of segments of an external sphere or shell, which revolve on their own independent axes on opposite sides of the internal sphere, in pairs at angles to each other.

BUCKWHEAT HULLING MACHINE.—Joseph Bayzore, Freeport, Ill.—This invention relates to improvements in a machine for hulling buckwheat or other grain.

BORING AND FITTING THE FELLIES AND SPOKES OF A WHEEL.—Albert Brush, East Constable, N. Y.—This invention relates to an improved mode of boring the fellies of a wheel.

SPOOLS OR BOBBINS.—A. P. Holmes, Great Falls, N. H.—This invention consists in loading or weighting a wooden spool or bobbin such as is used in cotton and woolen mills, by applying a metallic sheathing to the cylinder, or an equivalent thereof.

FLOURING MILL.—Wm. Craig, Uniontown, Pa.—The object of this improvemen, in the construction of flouring mills is to dispense with the heavy, complicated, and expensive machinery in general use in small country mills, and provide a complete mill with two run of stones for both merchant and custom work, the machinery of which shall be simple and direct in its operation.

GRAIN THRASHING MACHINE.—John F. Skinner, Brasher Iron works, N.Y.—This invention relates to a new and improved means for operating or giving motion to the shoe which contains the grain screen; to an improvement in the construction of the grain and straw carrier; to an improved arrangement of a belt with a pulley and spring arranged in such a manner as to render a single belt efficient in driving the straw and grain carrier face and beater cylinder; and to the employment or use of friction rollers in connection with the peculiarly constructed grain and straw carrier, said parts being all so constructed and arranged as to possess important advantages.

HORSE RAKE AND TEDDER.—Frederick E. Nearing, Brookfield, Conn.—This invention relates to a combination of a horse rake and tedder, and it consists of a peculiar construction and arrangement of parts, whereby the device may, by a very simple manipulation, be readily converted from a rake into a tedder, and *vice versa*, and rendered capable of operating in either capacity equally as well as if made specially for either purpose.

BUCKLE.—Louis Elsberg, New York city.—The principal objects of this invention are, first, to unite the two loops of the buckle, the one for the attached strap, and the other for the buckling strap in such a manner that traction on them in opposite directions draws the bar of the tongue and the buckling loop into closer contact, and thereby holds the buckling strap the more firmly.

CULTIVATOR.—Joseph Widman, Panola, Ill.—This invention relates to a cultivator of that class designed more especially for cultivating corn and other crops, which are grown in hills or drills. The invention consists in a peculiar construction of the machine, whereby it may be readily converted from a riding or sulky cultivator into a walking cultivator, or one without a driver's seat, and a very simple and efficient cultivator obtained.

EXTENSION AND CLAMP CLOTHES POST.—George Dittenhaven, Napoleon, Ohio.—This invention relates to an improvement in clothes posts, and consists in a post working in a groove, and of a clamp for securing the line.

CORN PLOW.—S. H. Cox, and W. H. Pence, Mattoon, Ill.—This invention has for its object to improve the construction of corn plows or cultivators so as to make them more simple and durable in construction, and more convenient and effective in operation.

CULTIVATOR.—John W. Doud, Forestville, Iowa.—This invention has for its object to furnish a simple, substantial, durable, and cheap cultivator for putting in all kinds of grain sown broadcast, and for preparing the ground for winter wheat, which shall be so constructed as to economize time, labor, and seed, in putting in the grain, the machine destroying the weeds, and covering the grain uniformly, so that it can all come up.

WINDOW BLIND AND NETTING.—John R. Wharry, Moundsville, West Va.—This invention relates to a new and useful improvement in the construction of window blinds, and in the construction, attachment, and arrangement of netting frames to the window casing, whereby the movable slats of blinds are more neatly connected, and more conveniently operated, and whereby the netting frames are more convenient, and more effectually prevent the intrusion of insects.

FRUIT JAR.—J. M. W. Kitchen, New York city.—The present invention more particularly relates to that class of fruit jars provided with a screw thread for receiving the top or cover.

RAILROAD SWITCH.—W. L. Rogers, North Cornwall, and W. E. Crane, New Britain, Conn.—This invention relates to a railroad switch of that class which are commonly termed self-acting, and which are operated by the cars. The invention consists in a peculiar mechanism employed to serve as a stop to prevent the casual movement of the switch, and in a mechanism employed for moving the switch.

GATE.—G. P. Stebbins, Sparta Centre, Mich.—This invention relates to a gate of that class in which certain appliances are used to admit of them being opened or closed under the weight of the vehicle which passes through them, and which are commonly termed self-acting. The invention consists in the peculiar means employed for operating or opening and closing the gate.

ATTACHMENT FOR PLOW.—William Bennett, Rushville, Ind.—This invention relates to an attachment for corn or cultivator plows, for the purpose of preventing the mold board or share from casting clods of earth upon the plants during the process of plowing the same.

SAW.—George Walker, Middletown, N. Y.—This invention relates to an improvement in saws, both reciprocating and circular, whereby fixed teeth are made to possess all the advantages of the insertable teeth which are now coming into general use, and with far less expense, both as regards the first cost of the manufacture of the saw and the expense of keeping the same in perfect working order.

ENVELOPE.—F. Marion Shields, Macon, Miss.—The present invention consists in so forming an envelope that after having once been used it is susceptible of again being used by properly folding it therefor.

WHIP.—J. S. Cook, West Groton, Mass.—The present invention consists of an attachment to a whip stick for receiving and holding the lash portion of the whip, whereby the lash can freely turn upon the whip stick without winding around the stick as is now the case with the lash when secured to the whip stick by a string or strap.

STRAW OR HAY CUTTER.—A. J. Bell, Bloomingburg, N. Y.—The present invention relates to that class of hay or straw cutters the cutting blade of which is carried by a frame arranged to have an up and down motion in a vertical plane.

AUTOMATIC WATER GATE.—H. Besse, Delaware, Ohio.—This invention relates to a gate provided with certain devices which shall accomplish its opening and closing by the water of the stream which it spans.

DISH LIFTER.—D. E. Roe, Elmira, N. Y.—This invention is for the purpose of lifting hot plates or dishes from the top or oven of stoves. It consists of two wire claws affixed to a short wooden handle, one claw being made stationary and the other to yield against the tension of a spring.

SHINGLE MACHINE.—H. Woodman, Saco, Me.—This invention relates to a machine for sawing and planing shingles, and it consists of a rotary feed table, circular saw, and rotary planer, all arranged and combined to perform the desired work in a satisfactory manner.

HAY ELEVATOR.—Harvey McCown and Luther M. McCown, Little Beaver, Pa.—This invention relates to a device for elevating hay from wagons and depositing it in bays or mows, in bars or upon a stack. The object of the invention is to obtain a device for the purpose specified which will admit of the hay not only being elevated with facility but also being conveyed, after it reaches its highest point, over the spot where the hay is to be discharged.

WATER WHEEL.—George W. Wheeler and George V. Allen, Hartford, Vt.—This invention relates to an improvement in that class of water wheels which are keyed on a vertical shaft and work horizontally within a suitable case. The invention consists in a peculiar construction of the wheel and arrangement of the buckets, whereby a large percentage of the power of the water is obtained.

Business and Personal.

The charge for insertion under this head is one dollar a line.

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Manufacturers of Sorgo Mills please send circular and cash price immediately. Address V. Weiss & Co., Beaumont, Jefferson county Texas.

W. R. Norris, Swanton Junction, Vt., wants the best Brick Machine, and Machines for jointing and crozing flat barrel staves.

Parties who are now, or have been, selling our machines in this State will please send their address to us. Shaw & Clark Sewing Machine Co., 1201 Broadway, New York.

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All carriage manufacturers in the Middle and Western States please send address to John R. Linton, New Bedford, Mass.

Parties having Rubber Machinery for sale please send particulars to H. A. Brown, Waltham, Mass.

An excellent business for male or female, requiring no capital. Address, with stamp, Cook & Wilson, Kirkville, N. Y.

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 $1 00 a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

H. A. M., asks "if the electric current produced by a Faraday magneto-electric machine will excite magnetism in a common electro-magnet formed of coils of wire around a horse shoe of iron." The common machines of this class give to and fro currents, that means the currents go (for every revolution of the coil) alternately in opposite directions and therefore produce only shocks, but neutralize the magnetic and chemical effects which electric currents moving in one direction only may produce; if, however, the magneto-electric machine is furnished with a so-called commutator, which is a contrivance reversing one current, and thus bringing them all in the same direction, it will magnetize a horseshoe, provided the wire in the coil producing the currents is not much thinner than that around the horseshoe. This principle has lately been applied in producing startling results in electrical science.

A. W., of Ind.—"How is the power of the wind estimated on a wind mill; by the actual weight of the air or the momentum? For instance, the wind is moving at the rate of 16 feet per second and strikes a surface of one foot square; would the mechanical effect be one lb. or 16 lbs.?" It would be neither. Wind moving at 32 feet per second exerts a force in pounds per square foot of 1.107.

J. S., of Miss.—It you wish to prepare your copal varnish so that it will be colorless, a little extra trouble will accomplish your object. Upon each piece of copal, drop a little rosemary oil, and select only such pieces as become soft on contact with the oil. These pieces are ground and passed through a fine sieve so as to be reduced to powder, which must then be placed in a glass and a corresponding volume of rosemary oil poured over it. After stirring the mixture it is transformed into a thick liquor, and after standing two hours a few drops of rectified alcohol is added and intimately mixed. Repeat the operation until the varnish is of the right consistency; finally decant the clear liquid. This varnish is adaptive to either wood or metals.

P. S., of Mass.—In the multitude of counsellors there may be wisdom, but when we receive in two weeks six communications on the "heptagon in a circle," five on "tides and their causes," eleven on the "solution of plane triangles," and thirteen on the "day line," we may be excused if we do not see the propriety of absorbing the room necessary to publish each one. We are grateful to our correspondents for their promptness in responding to suggestions made through our columns. We are always glad to receive them, but if their articles are not always published it should be attributed to the limits of our columns and not to boorish discourtesy.

A. J. H., of Mass., wishes to know how to galvanize cast iron. He treats his iron with acids to obtain a clean surface, and then plunges it in melted zinc, but is unsuccessful. There is some difficulty in galvanizing cast iron because of its irregularity of surface. Where the work is intended to be perfect and permanent, a deposit of pure iron by means of the battery is first given the casting. We presume that an ordinary coating may be obtained by simple immersion in the melted metal which, however, should not be zinc only, but be composed of 262 parts by weight of mercury to 1·29 of zinc.

S. B., of N. Y., finds difficulty in tempering dies for a power hammer and asks how to make them stand. The dies should be of the best steel, and instead of being heated in an open fire should be packed in a cast-iron box with ground bone and heated gradually to a red, plunged into cold water, and drawn to a deep red inclining to blue. "Ede on Steel" is the best treatise we know of on hardening and tempering. It can be obtained at Appleton's, 445 Broadway, New York city.

S. W., of Conn., is making a lot of hollow steel punches, the hollow extending from the end up about seven eighths of an inch. He finds nine out of ten crack in hardening. Of course they will. The remedy is to drill a pin hole transversely across the body of the punch to meet the top of the hollow. This allows the steam to escape, and will entirely prevent the cracking while it will not materially weaken the punch. Indeed, all similar articles should be so treated before being hardened.

M. F. W., of Pa., cannot make a large pulley hold on the shaft. The key, although of steel and seated in a key-way or slot, "cuts into slivers" and allows the pulley to turn on the shaft. Our advice is to discard the key altogether, bore and tap one, two, or three holes through the hub, fit steel cup-ended screws, and no more trouble need be apprehended. These screws have a recess drilled at the end and the outside turned down on a bevel to the edge of the hole, making a circular edge. Then harden the end and insert the screw.

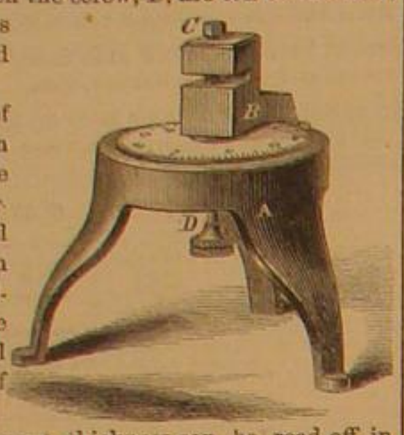
J. G. P., of N. Y.—The eccentrics of marine engines are secured to the shaft by three keys hollowed on the shaft side to fit the roundity of the shaft. They pass through key-ways in the hub, and are held to the shaft by set screws passing through the hub and bearing upon the top of the keys. The keys are driven home and the screws set down on them. It is an easy matter to move eccentrics thus secured.

A. M. G., of Ark.—Raw hide is one of the most tenacious substances known. It is extensively used for pickers for looms, and in some parts of South America, where the climate is very dry, is preferred to iron for tiring wagon wheels. A recent application of it for window cords and dumb waiters manufactured by a firm in Williamsburgh, N. Y. is proving a success.

BROWN & SHARPE'S IMPROVED SHEET METAL GAGE.

The gages commonly used in measuring the thickness of sheet metal are not always accurate. Even if the fixed slots which determine the sizes were not subject to wear, the proper gage could be only approximately determined, as the edges of sheet metal are often imperfect—thinner or thicker than the body—and as their depth is very slight it is difficult to ascertain the actual thickness of the metal. The gage shown in the engraving is intended to give the thickness of metal up to one quarter of an inch, in thousandths of an inch, at some distance from the edge.

The stand, A, supported upon three feet, with an upright, B, is a single casting. In this upright is a space or slot. Above this space, in the upright, is an adjusting screw, C. Fitted into the lower part of the upright is a screw, D, with a milled head on the lower end. Attached to this screw and revolving with it is a German silver dial. The graduations on the edge of this dial are read off from an index point. The upper and lower screws are exactly in line with each other, and their points, which are hardened, meet in the space between the two. The threads upon the screw, D, are ten to one inch, and the edge of the dial is divided into one hundred parts.



With this explanation of the position and relation of the several parts of the gage, it will readily be perceived that when the metal to be measured is placed in the opening in the standard, and the screw, D, made to revolve until the metal is held between the ends of the screws, D, and the adjusting screw, then the exact thickness can be read off in thousandths of an inch at the index point. Should any wear of the points of the screws take place the point, "O" on the dial can always be kept exactly opposite the index point by means of the adjusting screw. A small binding screw with a piece of brass under its point serves to hold the adjusting screw firmly in its place when it is set correctly. The accuracy and simplicity of this gage will commend it to those who desire to obtain uniformity in the thickness of sheet metals or in thin material of any kind. It will be particularly useful to machinists, silversmiths, sheet brass and iron rollers and workers, and for many other purposes. J. R. Brown & Sharpe, of Providence, are the manufacturers.

A Naval Vessel Disinfected by Steam.

The Navy Department has received dispatches from Commander Chandler of the United steamer *Don*, dated Vera Cruz, Dec. 16. He states that the yellow fever broke out on board of his vessel on the 25th of November. It proved to be of a most malignant type. He was ordered to the above port, and on arriving there the ship was anchored with a "spring," and was always broadside to the wind. The sick were at once landed and their clothing and bedding aired. The ship was thoroughly impregnated with yellow fever. Commander Chandler caused the hatches of the berth-deck and ward-room to be securely closed. One joint of the steam-heater on the berth-deck was disconnected, and the same operation performed in the ward-room. A thermometer was lowered through a small slip in the tarpaulin, and, after two hours' steaming in the ward-room, it indicated 205 degrees, and on the berth-deck 170 degrees. The hatches were then opened, decks dried down, joints of steam heaters replaced, and in two hours more there was no indication of the extreme heat to which those places had been exposed. No cases of fever occurred afterward. We had 23 cases on board, and seven men died. Commander Chandler informs the Department that he is fully persuaded that heat eradicated the disease as effectually as a severe frost could have done.

Hardening Files.

A correspondent asks how to temper files without cracking. We cannot do better, unless some practical file maker comes to our aid, than to quote from Tomlinson's Cyclopedia:

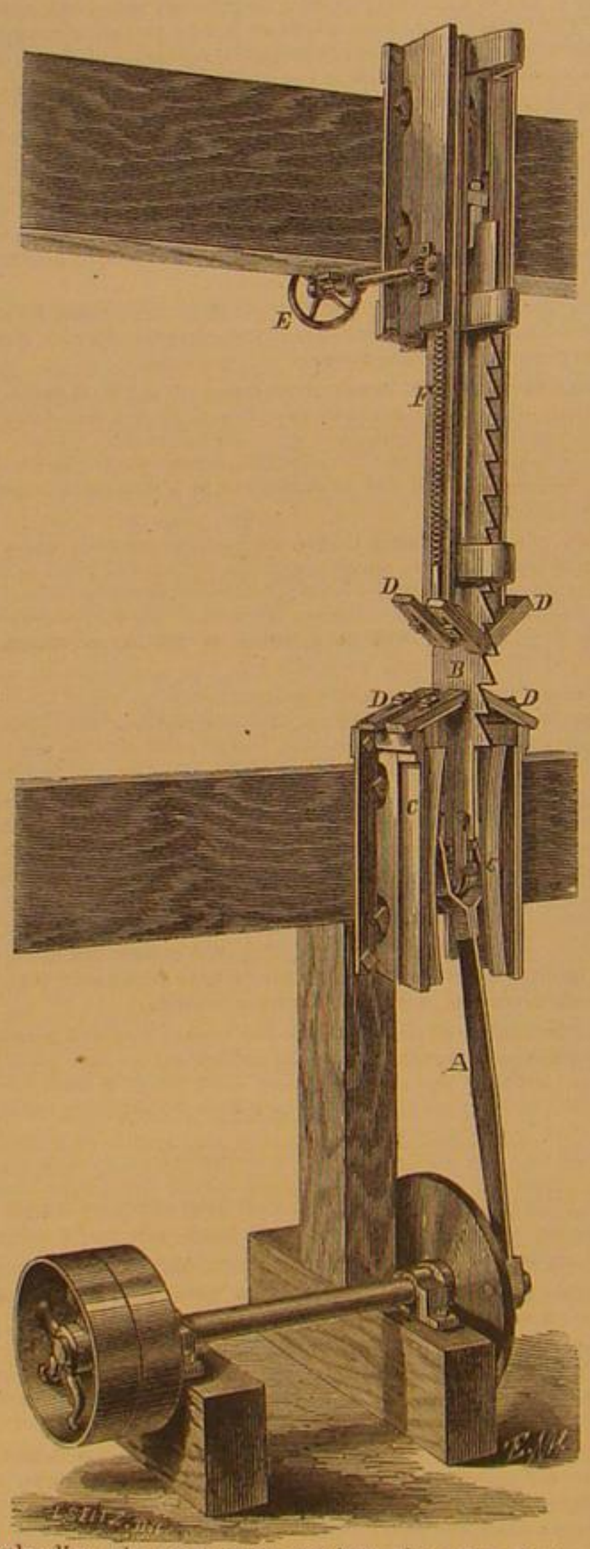
"Before being hardened the files are drawn through beer-grounds, yeast, or other adhesive fluid, and then through common salt mixed with roasted and pounded cow's hoof; the objects of which are to protect the teeth from the direct action of the fire and the oxidizing influence of the air; to afford an index of temperature, the fusion of the salt showing when the hardening heat is attained; and to lessen the tendency of the files to crack on being immersed in water.

"The files in the process of cutting become slightly curved, and it is necessary to straighten them before the hardening is completed. Some forms of file are apt to become curved in the act of hardening; such, for example as the the half-round file, which sometimes becomes hollow or bowed on the convex side; hence to produce a straight file it is purposely bowed, while soft, in the reverse direction. Most of the other forms of file are gradually heated to a dull red, and then straightened by striking them with a leaden hammer upon an anvil of the same material. A warped file is also in some cases straightened by being inserted between a couple of iron bars, fixed parallel a short distance apart, and then pressed in an opposite direction to the bend intended to be corrected. After the straightening, the file is placed in the fire again and heated until the salt fuses upon its surface; it is then immediately removed from the fire and plunged into a cistern of cold water. The method of plunging it into the water is of importance: it is held by the tang with a pair of tongs, and immersed quickly or slowly, vertically or obliquely, according to its form; that method being adopted which has been found by experience best calculated to keep the file straight. It is, however, very difficult to prevent some degree of set or curvature in quenching the files. Each file is therefore narrowly watched, and after being plunged once into the water, if any bending is observed, it can be remedied before the file is cold, by inserting it between the bars before mentioned, pressing upon it with considerable force, and lading the water upon it with the hand: considerable curves may be corrected in this way. It is, however, in some cases necessary to reheat the files, for which purpose they must not be placed in the forge fire, or the teeth would be injured now that the smearing has been washed off; they are therefore held over a clear fire, or placed on a heated iron bar or over a hooded gas flame, and when straightened are quenched in oil to prevent the teeth from becoming rusty. After the hardening, the tang is tempered by immersing it in molten lead, for if the tang were left as the file, it would be liable to snap off during use.

"The files are next scoured with scrubbing brushes dipped into sand and water or coke dust and water; they are next put into lime water, and left for some hours in order to get rid of every particle of salt. They are then thoroughly dried at the fire, rubbed over with olive oil containing a little turpentine, and are now considered as finished."

ANDERSON'S IMPROVED METHOD OF HANGING SAWS.

A large portion of the power employed in driving muley saws is absorbed by the friction of the blade in the log during its upward or non-cutting stroke. Where the saw, as is usual, traverses, in upward as well as downward stroke, a perpendicular line, the teeth wear against the edge of the saw kerf and are compelled to lift the cuttings or sawdust to the top of the log. When the feed is continuous and constant the friction and wear are greatly increased. A remedy for these difficulties is intended by the device seen in perspective in the engraving. The pitman, A, is not connected as in the ordinary method directly to the saw, B, but the fork extends above the buckle which connects the saw, B, and pitman, A, to pivots on the blocks that traverse the slides, thus making the pitman a lever having a long and short arm. This arrangement compels the lower end of the saw to be vibrated back and forth as the lower end of the pitman describes a circle. But the proper action of the saw requires that in making the downward cut or stroke it should descend in nearly a right line, while its movement in this respect in the returning stroke is immaterial. It is evident, however, that if the lever action of the pitman, as connected in this engraving, was allowed its natural play, the motion of the saw in both strokes would partake of the form of a parabola or curve. This would compel the saw, when arrived at its half stroke, to do a largely increased amount of work to that performed in any other part of the stroke. The inventor of this device exhibits his ingenuity just here. It will be noticed in the engraving that the slides, C, for the lower boxes are curved. The design of this beautiful mechanical arrangement is at once apparent. The convexity of this curve agrees exactly with the difference between the long and short arm of the lever, (pitman) A. In sawing, the downward stroke is performed by the movement of the crank from the upper center forward, and when the fulcrum, (upper) of the pitman in its descent passes the center of the curved slide it begins—following the sweep of the slide—to be carried forward, and with it the lower end of the saw; but just as it arrives at the center the lower end of the pitman is turning the forward quarter of the crank and is being carried backward. The curve of the slides and the difference of leverage in the pitman being the same—as before noted—the result is a nearly direct vertical motion. Thus the saw makes a direct downward movement in cutting (except just sufficient lead to insure each tooth a portion of the work) and as direct an upward movement on the return stroke. But after making the cut the saw is carried back from the kerf edge and rises in a part of the kerf unclogged by sawdust. When it begins to cut it is carried forward and cuts another stroke, carrying down all the sawdust made by the previous cut. The advantages of this arrangement are too palpable to require further elucidation. The saw has comparatively no friction in its upward strike and all the dust is sent under the log. With the old method a large log cannot be sawed without clogging, because a large proportion of the saw's length is continually in the log and the feed must be stopped occasionally to allow the saw to clear out the dust. With this, however, the saw makes the cut and then as it begins to rise recedes from the cut and rises where all is clear. The forward or increasing cut of the saw is another advantage compelling each tooth and every working part of the saw to perform its share of the labor. The adjustable guides, D, on the lower slides and the upper frame are to prevent the saw from "buckling." The upper set can be lowered by the rack, pinion, and hand wheel, E, to suit the diameter of the log to be sawed. The slide in which the frame and feed rack, F, traverses, as it is raised or lowered, overhangs toward the tooth edge of the saw, so that at whatever height the upper frame and guide may be fixed, the overhang of the saw will be always adapted to the diameter of the log to be sawed.



These combinations make a very perfect arrangement for saw hanging. This device has been very thoroughly tested within six years past. Over five hundred are in operation in the Middle and Western States. The inventor claims that they will cut—according to size of timber—from 10 to 100 per cent more than the ordinary muley saw and with less power.

Patented January 17, 1867. Further information may be obtained by addressing Leonard Anderson, or Coe & Wilkes, Painesville, Ohio, or F. Muzzy & Co., Agent, Bangor, Maine.

Speculation not Necessarily Invention.

We frequently receive letters, ostensibly on scientific or mechanical subjects, that do not contain a single statement, fact, or even suggestion which can be made of the slightest use. The writers seem to suppose that words without ideas possess some intrinsic value. Speculation on future improbabilities—if such a term may be allowed—is the form many of these communications assume. Such writing is the easiest of all possible styles, and the most nonsensical and unprofitable. Suggestions of mechanical improvements may be valuable. If the writer does not see their possible tendency some wide awake mind may seize upon them, and make them practical, living realities. But speculations on what could be possible only if man were almighty, and the laws of nature could be defied or abrogated at will, are a useless waste of mental power, or rather of words.

Such we regard the communication of a correspondent, who says:

"You complain of steam, and not without cause. I have an ideal future, in which steam has but little to do; would you like a peep at it? There you would see the Niagara, and other falls, improved water powers, driving armatures which generate currents of electro magnetism; these currents conducted all over the country by insulated wires, each workshop, factory, and even private dwelling, thus supplied with motive power. The magnetic engine is everywhere, steam has fled! Another peep; further still; changed again! Niagara rolls in its ancient grandeur, and turns no noisy wheel. The network of wires is gone, but the busy hum of the factory is as loud as ever. There must be a motor, certainly; don't you admire its beauty? Gravitation, and one or two of nature's simplest laws, are working in concert, and produce, inexpensively, all the power required. There is no troublesome shafting—little wires to each bench prove themselves equal to the work; and fully as effective at the furthest point as at the nearest.

"How do you like it? Is it impossible? If any one thinks so, let him study, carefully, the points to him most improbable; and if still incredulous, state his reasons fully to me, and I will demonstrate to him not only its possibility, but the probability of my ideal soon becoming the actual real."

[Our correspondent queerly unites the "busy hum of the factory" with the absence of shafting. His "demonstration" of its possibility would not be less surprising than his bare statement.—EDS.

THE CANADIAN MONSTER CHEESE, having survived a course of exhibitions at agricultural fairs in the United States, we find from a notice in a Liverpool paper, has safely crossed the waters and is now being gazed upon by the curious in that city. The cheese is of factory make, is about eighteen months old, and weighs 7,000 pounds.

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NEW YORK, SATURDAY, JANUARY 25, 1868.

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HEAT POWER---ITS VALUE AND WASTE.

Our mechanics are becoming convinced that a broad field for improvement is opened to them in providing against the enormous waste of force caused by the insufficient means by which we generate motive power from heat. To this end the attempts of our inventors are directed in the various forms of steam generators, which so frequently become the subjects of patents. Heat is the best reservoir of power yet known to the mechanical or the scientific world. But the larger proportion of the heat evolved in the combustion of fuel is lost or wasted, whether that combustion is employed in generating steam for boilers or warming the atmosphere of rooms. In our best steam generators the percentage of heat force rendered available as a motive power, compared with the amount of fuel consumed, and the amount of latent heat force known to reside in the fuel, is ridiculously small. We seem to be, in regard to the utilization of the products of combustion under our steam boilers, but a trifling degree removed from the attempts of the last generation to heat their dwellings. From the old-fashioned fireplace, with its heap of wood burning at the base of a capacious chimney, which exacted the larger part of the heat, to the elegant heat-saving stoves, furnaces, and ranges, supplied with every appliance to extract the largest possible amount of heat in its passage from the fire to the outer atmosphere, is a large remove. In this direction a great deal has been done, and our dwellings are warmed and our dinners cooked with a tithe of the fuel which was required twenty-five or thirty years ago.

It may be doubted if so much progress has been made in this direction by our mechanical engineers. To be sure, there are instances where a steam generator of an improved style has shown marked advantages over those of the old make in the saving of fuel. But there is still room for much greater improvement in this direction.

The next great radical invention must be, it seems to us, something which shall enable us to use the means which nature has placed within our reach for the production of power, without letting eighty or ninety per cent of it slip through our fingers in the using. One obstacle to this is the attachment to old styles of boilers, which in the days of our fathers seldom exploded, simply because the internal pressure was but little above that of the atmosphere externally. To confine heat, or to rapidly generate heat in a reservoir, at a degree which shall render it the most effectual for the production of power, requires, not only a strong vessel (boiler), but knowledge of its powers and skill in its management. If these are wanting it is useless for inventors to exert themselves in contriving more efficient steam generators only to be blamed for the results of the carelessness of ignorant or underpaid employés who pay with their lives for the cupidity of employers. We need a steam generator which shall yield in available power at least the larger percentage of the heat employed for its production, and we believe this is within the bounds of mechanical skill and the limits of scientific knowledge.

ARE MODERN MECHANICS INFERIOR?

Not only in the social and the political world, but in the mechanical world, there are to be found many croakers, who are forever disparaging the present and praising the past—who are forever regretting the "good old times," and belittling the progress of the present. If they are directed to the progress made in the mechanic arts by the present generation, they will, at once, point to the vast improvements made in tools and labor saving machinery as the reason for that progress, without considering that these very improvements refute their statements, and render untenable their position. The saving of manual labor, the economy of time, and the perfection of results, are the objects aimed at by our present generation of mechanics, and they deserve as much credit for their attempts and successes in this direction as those who went before them do for their surprising patience and skill in manipulation. Taking the steam engine as an example of improvement, it is useless to deny that a first class machine of the present day is not a very superior machine to the best constructed under Watt's personal supervision. The principle may be the same, the motive power and its means of generation similar, but the results are widely different. The steam engine has become an economical machine, not merely a motor which could be used advantageously only where other power could not be made available, but one that stands in the front rank for economy, facility of handling, and regularity of speed under the most rigorous tests. The improvements to which this result is due are evidences of the inventive genius, patient investigation, and constructive skill of our modern mechanics.

The machines most used in iron manufactures are also illustrations of the fidelity of our present race of mechanics to their business. All of them, without exception, and almost every hand and bench tool, have been improved so as not only to facilitate the progress of work, but to add greatly to its accuracy. The turning lathe of only twenty-five years ago would be regarded now as a relic of comparative mechanical ignorance. The "shears," or frame of timber, with the ways of cast iron, mortised in, and planed or filed by hand; the hand chaser for screw cutting, followed by the hand-worked slide rest; these contrast strangely with the elegant engine lathes which turn a shaft, bore a pulley, or cut a thread, involving changes, which, however, may be made in a moment. The upright drill for boring holes through the hubs of heavy pulleys and gears, requiring only to be seated and trued on the revolving bed and chucked as nicely as though swung in a lathe, had no counterpart in the wearisome hand labor of hand boring, equaled in its monotousness and weariness by the convict's treadmill. The planer, obeying the will of the operator, who merely directs the work, is not much like the wearisome chipping and filing of the hard working mechanic of thirty years ago.

So we might go on citing cases innumerable to show that the mechanics of the present day are not a whit behind their predecessors in their attachment to their business and their anxiety to produce good work.

There are some virtues, however, possessed by our predecessors, we might do well to imitate. They worked in consonance with the maxim that "what was worth doing at all was worth doing well," one which, judging by some of the half finished jobs which sometimes vex the eye of the mechanic, we would do well to imitate. Another is that tenacity of purpose and patience of performance which after weeks of monotonous mechanical labor found its reward in a consciousness of a job well done. Still another is that determination to become a master of the business, by repeated and continued trials toward perfection in the use of tools, which left the mechanic master of the field.

Such a man was the late Ebenezer Winship, whose death we noticed in the closing number of the last volume. To him young mechanics resorted for instruction, especially in difficulties. His mechanical knowledge was not so much the result of his fifty years experience, as his frequent and perhaps compulsory requirement of meeting mechanical difficulties with what many present mechanics would deem insufficient means. He was a man for emergencies, and really it is in emergencies that the value and character of the true mechanic shine most brightly. These virtues, added to our superior facilities, ought to make our mechanics the equals of any who have preceded them, and examples to those who may come after.

THE "ANGOLA" ACCIDENT.

From a correspondent who signs himself "F. D. A., an employé of the Lake Shore Road," we have received a communication in which he states that it was a part of his business to make an examination into the cause of the late deplorable accident, and that contrary to our statement on page 25, No. 2, current volume, there was no broken flange on any of the wheels, but that a bent axle was the cause of the accident. He says that the engineer did not know the condition of the train, but obeyed the signals of the conductor in a proper manner. He thinks also that any safety brake, worthy the name, should be one which could be operated under the whole train at once, either by the engineer, conductor, or brakeman, as circumstances might determine, and concludes with the statement that the Lake Shore road employs as experienced and faithful inspectors as any road in the country.

To all of which we yield a hearty assent. But we did not state that a broken wheel was the cause of the accident, only that this was one of the causes assigned by others. When the article to which our correspondent refers was written the verdict of the coroner's jury that the accident was caused by a bent axle had not been rendered; that fact was published on page 41 of the succeeding issue of the SCIENTIFIC AMERICAN. We are not aware that any brake has yet been invented to act simultaneously on all the cars in a train and be operated by a person at any point on the train. We have cast no reflections on the management of the Lake Shore road; having traveled on it many times we have a high opinion of its condition and management.

Death of an Inventor.

Mr. Samuel Nicolson, inventor of the "Nicolson pavement," an improved steering apparatus for vessels, and several other inventions, died at the United States Hotel, Boston, on the 6th inst., after a brief illness, at the age of seventy-six years. He was a native of Plymouth, Mass. He held the office of superintendant of the Milldam Corporation, and secretary of the Water Power Company, for several years; was a useful member of the Boston Common Council of 1852-3, and was truly a thorough gentleman of the old school. The pavement named after its illustrious deceased inventor is becoming so popular in our cities that his name is likely to be known to posterity, as his memory will be respected by the present generation.

REPORT OF COMMISSIONER WELLS.

The second annual report of Hon. D. A. Wells, the Special Commissioner of the Revenue, contains facts and makes some recommendations which will be found worthy of note. Mr. Wells strongly urges a reduction in the expenditures for the army and navy and in other departments of the public service, and recommends that no money be appropriated for the further purchase of foreign territory. He says:

"With the substantial adoption on the part of Congress of an economical policy as above indicated, the ordinary expenses of the government might, it is believed, be immediately reduced to one hundred and forty millions per annum, which amount would even then be an excess of over 100 per cent on the ordinary expenditures of the fiscal year 1861. With a saving of from fifty to sixty millions per annum thus effected, a reduction of taxation to an extent sufficient to afford an immediate relief and stimulus to the industrial interests of the country, becomes at once practicable; and this even on the assumption that no increase of the Internal Revenue is likely to accrue from any improvement in the method of assessing and collecting taxes, or from the progress of the country in wealth and population. Thus, for example, a reduction in the annual expenditures of the War Department from $83,841,555, as in 1867, to sixty millions of dollars would allow a reduction of over 26 per cent on all the taxes now levied on manufactured products, exclusive of liquors, tobacco, and a few other articles generally classed under the head of luxuries, and still leave to the credit of this department for its increased necessities, growing out of a change in the circumstances of the country, a sum 260 per cent in advance of what was required in 1861. In like manner a reduction in the expenditures of the Navy Department from thirty-one millions, the requirements of the last fiscal year, to fifteen millions, would supplement all the present revenue derived from the following articles, and allow the taxes on the same to be entirely dispensed with:—All fabrics and manufactures of cotton; all manufactures of wool, including carpets and hosiery; or, all manufactures of iron and steel, including machinery, steam engines, &c.; together with hats, leather, and all manufactures of leather including boot and shoes, saddlery, harness and trunks; with paper of all kinds. Or, to put the case differently, if a reduction could be effected, of thirty millions in the expenditures of the War Department, of fifteen millions in those of the Navy Department, of fifteens millions in those of the Civil Service, with a discontinuance of any further appropriations for what may be called extraordinary expenditures, it would permit the removal, substantially, of nearly all of what are understood to be industrial taxes, and also offset the amount derived during the last fiscal year from the tax upon raw cotton.

In regard to the industrial condition of the country the Commissioner remarks that "immigration continues to flow with uninterrupted volume, at the rate of over 300,000 per annum; making a positive yearly addition to the wealth and producing capacity of the country of not less than one hundred and fifty millions of dollars: A continued increase in the invention of machinery, and the perfecting of processes for improving and cheapening products; as is more especially made evident by the returns of the Patent Office—the whole number of patents issued for the eleven months ending Dec. 3, 1867, being 10,907, as compared with 9,100 issued during the corresponding period of 1866, 6,320 for the entire year 1865, and 4,637 for the year 1864. This very remarkable increase must not, however, be accepted in its fullest apparent extent, as illustrative of substantial progress. It is so, undoubtedly, in great part; but, on the other hand, the real value of many patented improvements, as additions to the substantial wealth of the country, may well be doubted: An increase in the capital invested, and in the number and capacity of establishments for manufacturing purposes. In order to obtain some certain information on this subject, the Commissioner, at the commencement of the last calender year, instituted measures for collecting and recording such data relative to every department of industrial progress as were available. The results thus obtained would require a volume for their publication; and, although somewhat imperfect and miscellaneous in their character, they establish, nevertheless, beyond a doubt and in a most curious and interesting manner, the fact that great and substantial progress in manufacturing industry has been achieved in nearly every section of the country.

"In the manufacture of cotton, the amount of machinery at present in the country, and which is substantially engaged in the work of production, is from 15 to 20 per cent more than existed at the beginning of the war; while the export trade in coarse cottons, formerly (before the war), large, but afterward almost entirely lost, is now recovering with gratifying rapidity. In the department of woolen industry, notwithstanding the recent unusual depression of this interest, the erection of new mills has continued, with a reported general improvement in the character of the products.

"In the department of iron industry, the number of blast furnaces for the manufacture of pig iron, in operation during the past year, has been in excess of that of any former period while an unusually large number of new furnaces are now in process of construction.

"During the same period the rolling mills of the country

were generally in continuous operation: new establishments of this character, and new and extensive works for the manufacture of Bessemer steel have also been erected; while a marked increase in the American product of ordinary steel is reported.

"The Commissioner would also, in this connection, call attention to the fact that, notwithstanding the almost continued reported depression of the iron interest in the United States, the average annual increase in the domestic product of pig iron is remarkably uniform, and greatly in excess of the ratio of the increase of population; the annual ratio of increase of pig iron, from 1850 to 1866, having been in excess of eight per centum, while that of population from 1850 to 1860, was about 3½ per cent; or, stated differently, the increase in the production of pig iron, from 1810 to 1866, was 2371 per cent, while that of the population was 410 per cent. The annual ratio of increase in the product of pig iron in the United States since 1855 has also been greater than in Great Britain.

"The increase in the production of anthracite coal (which may be taken as a measure of the production of all American coal), during the year 1866, was about three millions of tuns over the product of 1865, on a gross return for the former year of 12,899,747. This extraordinary increase was referred at the time, in part, to a speculative revival of trade and industry succeeding the termination of the war; and also to the stimulus of very high prices. These stimulants, however, if they were really influential, have clearly not operated in any degree during the past year, and yet the gross product of anthracite coal sent to market has not materially dimished; the deficiency up to the 30th of November, 1867, in the aggregate of coal sent eastward from Pennsylvania, having been only 170,041 tuns, as compared with the movement of the corresponding period of 1866; while the stock on hand at the various markets available for consumption, at the close of the season of 1867, was estimated at less by 250,000 tuns than the stock on hand at the close of the two preceding years. It seems, therefore, certain that the conditions of ability to consume—which conditions are mainly industrial—have not become impaired during the past year; or, in other words, the industry of the country has developed during the past year to such an extent as to render what in 1866 seemed abnormal and uncertain, now legitimate and permanent.

"The record of the export trade in petroleum for the last three years, has also been very similar to that of coal. Thus, for the years 1864 and 1865, the annual report of petroleum, with an advantage of a high premium of gold, averaged about thirty millions of gallons; but during the year 1866, the exports suddenly rose to an aggregate of over sixty-five millions; and this extraordinary increase, which originally might have seemed speculative and temporary, has during the past year been substantially maintained."

On comparing the financial condition of this nation with that of other governments, Mr. Wells gives the gratifying information "that the United States is the only one of the leading nations of the world which is, at present, materially diminishing its debt and reducing its taxes; and the only one, moreover, which offers any substantial evidence of its ability to pay its debt within any definite period, or even anticipates the probability of any such occurrence."

The language of the Report, with the very encouraging facts presented, which are fortified by detailed statements, will serve to inspire renewed confidence in an early return to a solid business prosperity, and incite to the development of enterprises which have been deferred only from the timidity of their projectors. We may have occasion hereafter to advert again to this document.

Finding the Deviation of the Compass.

The *Mechanics' Magazine* describes an invention designed to simplify the process for finding the error on the common steering compass, or, in other terms, the deviation of the magnetic from the true meridian. It has been patented by Major General Shortrede, of Lee, who attains his object by making some additions to the steering compass as usually made, by which it becomes virtually an azimuth compass, without interfering with its ordinary use in steering. One way of effecting this is by attaching at opposite sides to the rim of the cover a semi-circular arc or band of a convenient width, having along its middle a narrow slit, by means of which it may be directed to the sun or other heavenly body; or through which the sun's light shining over the center and on the edge of the card, shows by a bright streak on a dark ground the compass bearing by observation. This being compared with the bearing, determined astronomically, gives a difference, which is the error or deviation of the compass from the true meridian. On a surface projecting from the rim of the bowl, or on the rim of the cover, are graduations, which are read as usual by a zero mark on the other rim. When the sun's light is too faint to give a distinct streak, or in observations of moon, star, or planet, the object may be viewed through the slit, either directly, or as reflected from the glass of the cover beneath the slit. In such cases the observation is made by taking the usual reading of the card at the lubber line, and also the reading on the rim giving the angle between the lubber line and the object. According to their position, the sum or the difference of these readings gives the compass bearing of the object; and this compared with the true azimuth gives the error or deviation from the meridian

As a high wind acting on the continuous arc may cause the compass to have a tremulous motion, in order to avoid or lessen this inconvenience in such cases, the arc is removed and replaced on the side towards the object by a short piece about an inch high, and on the other side by a shorter piece, each piece having in it, as in the arc, a narrow slit. The piece towards the object being fitted with a reflector, which may be either of the usual sort with a hinge so as to be turned according to the altitude of the object, or it may be a portion (about an octant) of a glass cylinder fixed horizontally, the object reflected in either of these ways may thus be viewed through the slit or hole on the opposite side. There is yet another way of attaining the end in view. Graduate a rim of the bowl or cover of the common binnacle compass, putting a proper zero mark on the other rim, by turning the cover so as to bring a bar of the roof into the shadow of the opposite bar, the zero mark indicates the angle between the object and the ship's head. This with the azimuth of the object and the usual reading of the card suffices, as above shown, to give the true meridian, and the deviation of the compass from it.

Corrosion of Cast Iron.

It has been often stated that cast iron, when exposed to the action of sea water or to atmospheric influences, under certain conditions becomes "rotten," an expression which is intended to indicate a loss of strength or cohesion without a corresponding alteration of volume or size. This phenomenon is entirely different from common oxidation, or rusting, which latter process shows itself by attacking the surface, and gradually reducing the size of the article, which, so far as it remains intact by this external reduction, does not seem to lose its qualities, so that the reduced strength of a rusted bar is simply proportionate to the reduction of its original section. The state of corrosion which would justify the term "rotten" is a reduction of cohesion without any apparent removal of material, and is not easily recognized externally. The nature of this change has for a long time remained unexplained, until some very interesting experiments established its scientific *rationale*. We believe that this scientific discovery is due to Mr. Crace Calvert, F.R.S., of Manchester, who some years back carried out a series of very interesting experiments on this point. Mr. Calvert immersed cast iron cubes, made of Staffordshire cold blast iron, and cast one centimeter in dimension into acidulated water. Each cube was placed by itself in a corked bottle with eighty cubic centimeters of a very diluted acid. Amongst the acids tried were sulphuric, hydro-chloric, and acetic acid; their action upon the iron was very slow, and it required a long time to show any change whatever. After three months of contact Mr. Calvert found that, although the external appearance of the cubes was not changed in any way, some of the cubes, and particularly that in contact with acetic acid, had become so soft externally that a knife blade could penetrate three or four millimeters deep into the cube. The solutions were then removed and replaced by fresh acid of the same kind in each bottle, this removal being continued every month for two years. After this period changes had been effected in almost all the cubes, only the penetration was more or less complete according to the nature of the acid. Acetic acid had acted most energetically of all; next came hydrochloric and sulphuric acid. Phosphoric acid showed no similar action. The result of the action of the acid was a complete change of the nature of the metal, without any alteration of its bulk or of the appearance of its surface. The cubes of gray cast iron, which originally weighed 15.324 grammes each, weighed only about 3½ grammes at the end of two years, and their specific gravity was reduced from 7.858 to 2.751. The iron had been gradually dissolved or extracted from the mass, and in its place remained a carbon compound of less specific weight, and very small cohesive force, which occupied the same bulk as the original cast iron. The composition of the cast iron and of the carbon compound which remained in its place after two years of contact with acetic acid was found by Mr. Calvert as follows:

	Original Cubes.	Carbonaceous Substance.
Iron	95.413	79.960
Carbon	2.900	11.070
Nitrogen	0.790	2.590
Silicium	0.478	6.070
Phosphorus	0.132	0.059
Sulphur	0.179	0.096
Loss	0.108	0.205

Acids, like hydrochloric, sulphuric, and acetic acid, are to be found in water under a great variety of circumstances. Sea water contains these, or at least the elements from which they can be formed by decomposition of the organic or unorganic matter contained in them; they appear in the air, and are carried by the rain or snow down to the surface, particularly in the vicinity of manufacturing localities. The gradual deterioration of cast iron when exposed to actions of that kind—a change which is all the more dangerous, as it is not immediately apparent to the eye—may therefore be considered as a possibility, and in the presence of acidulated water or sea water may be even called an established fact. It is probable that a coating of the metal or paint, in so far as it is impervious to water, may prevent, or at least lessen this injurious action, but this has not as yet been established by direct experiment. There are many engineering structures relying for their safety upon the strength of cast iron in contact with sea water, and the chances of injury from this action should never be lost sight of during the periodical inspection of such works.—*Engineering.*

Petrified Forests.

The process of isomorphism, the formation of what is usually termed a petrifaction, and some few other similar subtle operations of nature, have never been completely fathomed and satisfactorily accounted for by either the practical man or the theorist. There exists in the vicinity of Cairo, although but little known to European visitors, and still less to the Arabs in general, a petrified forest, which presents features of great attraction to the geologist and antiquary. Owing to the intense heat of the sun the expedition to this curious natural feature of the country is best made at night time. Leaving the city by the Gate of Nasr, and traveling in an easterly direction, the tourist reaches the "Tombs of the Caliphs." These sepulchres are small mosques, furnished with a minaret and cupola, and are designed in the purest style of Arabian architecture, a style especially delighting in those multitudinous vagaries of delineation which have given rise to the term arabesque. Unfortunately these unique relics of bygone splendor are left altogether to the ravages of time, and it is lamentable to predict that in a short time they will disappear forever. After passing them a brief interval reveals to notice here and there fragments of petrified wood, the advance guard of the forest, which, however, is still some distance off. Bearing uniformly to the east, and surmounting and descending numerous sand hills, the promised land is gained at last, and a land more desolate and more barren it would be difficult to conceive. The term "petrified forest" may perhaps seem a misnomer when it is stated that there are neither trees nor leaves. The fragments, to all appearance, are stones, only outwardly resembling wood, and in myriads of pieces are scattered, half buried in the sand, like "the ocean witnesses." One of the most remarkable circumstances is that the most accurate search, the most rigid scrutiny, fails to detect the least vestige of arable land, the smallest oasis, which could have afforded an origin to these mutilated relics of timber. Occasionally a trunk is found riven in two, as if split by the heat. The largest of these specimens measures ten feet in length, and has a diameter of twelve inches. One would naturally expect that the species or description of timber to which these petrifactions belonged would be identical with that met with at present in the country. The reverse is the fact. The oak, the beech, the chestnut, and others, are distinctly recognized, but scarcely a single specimen can be discovered of the palm, the sycamore, or the fig-tree. Not only does the specific gravity of the specimens vary, as is always the case with timber, but the original color is well preserved. All the tints are plainly perceptible, from the light Naples yellow to the deep red, brown, or even black. The perforations produced by the passage of insects through the bark are clearly visible, and a gummy secretion has been found in some of the holes made in this manner. It would be idle to attempt at present to offer an explanation of this curious phenomenon, but it is to be hoped that geologists will ultimately solve the problem.—*The Engineer.*

New Anæsthetic, Bichloride of Methylene.

Methylene is a fluid like chloroform in appearance and odor, but differing in its boiling point and its specific gravity. It boils at 88° Fah., and has a specific gravity of 1.34; chloroform boils at 142°, and has a density of 1.49. This substance has chemical relations also with tetrachloride of carbon, the anæsthetic properties of which are known. Chemically speaking, the bichloride of methylene is constructed from the organic radical, methyl, represented by $C H^3$, by the withdrawal of one atom of hydrogen, giving methylene $C H^2$, and the addition of two of chlorine—thus, $C H^2 Cl^2$. The composition of chloroform is $C H Cl^3$. It differs from the bichloride of methylene in having one atom of hydrogen less and one atom of chlorine more in its composition. The radical methyl may enter into composition with chlorine, giving rise to the to the chloride of methyl, $C H^3 Cl$, which was discovered in July to have gentle anæsthetic properties by Dr. Richardson. We have, then, a series of compounds,

C H H H Cl, Chloride of methyl,
C H H Cl Cl, Bichloride of methylene,
C H Cl Cl Cl, Chloroform,
C Cl Cl Cl Cl, Tetrachloride of carbon.

All of these compounds are anæsthetic, Dr. Richardson having discovered the anæsthetic properties of the first of these in July last, and of the second in August. That gentleman has experimented on himself and on animals with these new anæsthetics; and two cases of ovariotomy in the practice of Mr. Spencer Wells have apparently proved satisfactorily the anæsthetic power of the bichloride of methylene, which, as it is intermediate in composition, Dr. Richardson regards as also intermediate in strength between chloride of methylene and chloroform. Dr. Richardson has drawn the following conclusions:—

"In its action the bichloride of methylene is more gentle, but as effective as chloroform; it produces less struggling and less vascular excitement. Its narcotic effects are equally prolonged. It acts very uniformly on the nervous centers. It sometimes produces vomiting. When it is carried so far as to kill, it destroys by equally paralysing the heart and the respiration. It interferes less than other anæsthetics with the muscular irritability."

Dr. Richardson expects that it will prove less fatal than chloroform, which causes death, he estimates, once in fifteen hundred cases.—*Chemist and Druggist.*

ANTIDOTE FOR EXTERNAL POISONING BY CYANIDE OF POTASSIUM.—This substance is extensively used in electroplating and other arts, where its external poisoning effects produce many painful and troublesome ulcers on the hands of the workmen. The foreman of the gilding department of the American Watch Works writes to the Boston *Journal of Chemistry* that experience has taught him the most effectual remedy that can be employed in such cases, which is the proto-sulphate of iron in fine powder, rubbed up with raw linseed oil.

THE *Journal of the Telegraph* is the name of a neat little semi-monthly paper, devoted to Electrical Science. Published by James D. Reid, 145 Broadway.

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office,

FOR THE WEEK ENDING JANUARY 7, 1868.

Reported Officially for the Scientific American.

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72,959.—CHURN.—Henry W. Adams, Milton, Pa.

I claim, 1st, The construction and arrangement of the two dashers, D D, in combination with the churn, B, substantially in the manner and for the purposes described.

2d, The rockers, R R, in combination with the churn, B, when connected and operated substantially in the manner and for the purposes herein set forth.

72,960.—ICE HOUSE FLOOR.—Joseph Barbian, Chicago, Ill.

I claim an ice house floor, composed of the grooved zinc plate, F, strips, C C, and strips, E, connected by metallic bands, D, all constructed and arranged substantially as described.

72,961.—FASTENING FOR SHOES.—John Barbier, Boston, Mass.

I claim the bent arms or plates, C, when constructed and attached as set forth in combination with the entire strips, B, as herein described, as and for the purpose set forth.

72,962.—WELL.—Samuel W. Barr and Edwin McGuire, Beloit, Wis.

We claim the combination and arrangement of the well tube, soldered filter, and drill point, all substantially as and for the purpose set forth.

72,963.—BOOT AND SHOE HEEL.—George Beaty, Middlebury, Ohio, assignor to W. W. Kitchen, West Union, Iowa.

I claim constructing a metal boot heel hollow, when its upper face is beveled, so as to form a broad bearing for the shoe to rest in, and also having a series of spikes arranged in the center thereof, as herein described, and for the purpose specified.

72,964.—FIRE KINDLING AND FUEL.—Ira Bicknell, Cincinnati, Ohio.

I claim the fuel combination, using for that purpose the aforesaid compound of rosin or pitch, fine coal, sawdust, and coal oil, or any other substantially the same, and which will produce the same effect.

72,965.—BAGGAGE CHECK.—Virgil W. Blanchard, Bridport, Vt.

I claim, 1st, The circular plate, A, with the names of the stations of any particular railroad stamped upon its surface, near its periphery, with notches or recesses, cut in the periphery of a circular opening in the central portion of said plate, said notches or recesses corresponding with the names, figures, letters, or other symbols stamped upon the surface of the plate, near its periphery, in combination with the bolt or dog, D, for the purpose of fixing the pointer, B, at any particular name, station, or symbol, on the outside of the plate.

2d, Also a plate, bearing the number of the check, attached to the plate bearing the pointer, the circular plate having the names of the stations of any particular road stamped upon its surface, near its periphery, revolving between them, when not locked by the bolt or dog, for the purpose specified.

3d, Also, a bolt or dog, playing freely in a recess between the plate bearing the pointer and the one bearing the number of the check, in combination with the notches or recesses cut in the periphery of the circular opening in the central part of the circular plate, for the purpose of fixing the pointer at any particular name, number, or symbol.

4th, Also, a bolt or dog in combination with a slit or opening cut in the plate bearing the pointer, and the one bearing the number of the check, so arranged, with a strap connecting the check to the baggage or freight, that when the strap is withdrawn from the said slit or opening, the weight of bolt or dog will cause it to fall into said opening or slit, relieving the circular plate, so that the pointer may be turned to any particular name, station, or symbol, when the pointer may be locked in its place, by passing the strap through the opening or slit, and attaching it to a piece of baggage or freight in the usual way.

72,966.—MODE OF REMOVING BURRS AND OTHER VEGETABLE MATTER FROM WOOL.—John W. Boynton, East Hartford, Conn., and John A. McGaw, Newark, N. J.

We claim the employment of chemical vapors in the process of destroying burrs and other foreign vegetable substances in wool, substantially as described.

Also, the employment of steam as a joint agent in diffusing the vapor and heating the apartment to produce the result described.

Also, the process of destroying burrs or other foreign vegetable substances in wool, substantially as set forth.

72,967.—HARNESS FOR LOOM.—Darius C. Brown, Lowell, Mass.

I claim hanging the heddles in their frame at one end to a common bar, but at their opposite ends to two or more bars, substantially as and for the purpose described.

72,968.—MODE OF FASTENING ARTIFICIAL TEETH.—T. Yardley Brown, Reading, Pa.

I claim the attachment of artificial teeth to swaged plates by means of a fusible metal or alloy, as herein described.

72,969.—BILLIARD CUE RACK.—Emanuel Brunswick, Chicago, Ill.

I claim the revolving billiard cue rack, constructed and operating substantially as and in the manner herein described and specified.

72,970.—TABLE LEAF SUPPORT.—Daniel Bull, Amboy, Ill.

I claim, 1st, The combination of a link, A, a recessed bar, D, provided with a spur, f, and a movable stop bar, E, arranged and operating substantially as and for the purposes herein set forth.

2d, Also, the combination of the bar, D, or its equivalent, provided with the spur, f, and the movable bar, E, provided with the prong or fork, g g, arranged in the manner and for the purposes described.

3d, Also, the recess, l, in the bar, D, and the projection, m, on the bar, E, arranged substantially as specified, to prevent the longitudinal displacement of the bar, E, as described and shown.

4th, Also, providing the bar, D, with slots, d d, to admit of the adjustment thereof, as and for the purposes specified.

72,971.—SEED PLANTING MACHINE.—Henry Bundel and James Williams, Dayton, Ohio.

We claim, in combination with the lifting bar, D, for raising, supporting, or lowering the shoes, the arms or brackets, c b, for forming its hinged connection with the main frame, substantially as and for the purposes herein described and represented.

72,972.—MECHANICAL MOVEMENT.—H. C. Burk, Mineral Point, Ohio.

I claim the combination of the main wheel, A, spur-wheel, B, with its pitman, E, and pinion-wheel, C, all arranged to operate substantially as and for the purpose set forth.

72,973.—MATCH SAFE.—P. D. M. Carmichael, Le Roy, N. Y.

I claim the propelling arm, B, constructed substantially as described, in combination with the actuating lever, e, spring, f, and mouth, k, arranged and operating substantially as and for the purpose set forth.

Also, in combination therewith, the dog, g, and spring, arranged and operating substantially in the manner and for the purpose specified.

72,974.—SEWING MACHINE.—Wm. Chicken, Chelsea, Mass.

I claim, in combination with a disk, provided with gear teeth, and having a cam for working in connection with a stationary plate cam, as described, a pinion, which meshes into the teeth of the disk, and on which pinion a friction clamp or gripe operates to impart intermittent rotative movements to said disk, for the purpose of giving movement to a stock or cloth clamp, substantially as described.

72,975.—CULTIVATOR.—Daniel Churchill, Ionia, Ill.

I claim, 1st, The plates, I and F, when constructed and arranged to operate substantially as described.

2d, The plates, J, provided with the studs, c, for securing and holding the beams to the main frame, and having also the slots for adjusting them, as set forth.

3d, The combination of the bent rods, T, and cross-rod, H, pivoted to the main frame, and arranged to operate as described.

72,976.—FARM GATE.—William D. Clark, Ottawa, Ill.

I claim the peculiar and particular arrangement of the guides and rollers described, when attached to the gate, operating and constructed as set forth.

72,977.—COMPOSITION FOR ROOFING.—Allen Cody, James Bardett, and Henry M. Jones, Ukiah city, Cal.

We claim a compound cement for roofing purposes, prepared and applied substantially in the manner and for the purposes set forth.

72,978.—EYE GLASS.—E. Merritt Cole, Southbridge, Mass.

I claim the arrangement and application of the tenon and mortise with the lips, and with respect to the joint screw or pin of the spectacle or eye-glass frame, substantially as specified.

72,979.—ANIMAL TRAP.—William Cover, Jenner's Cross-Roads, Pa.

I claim a trap, consisting of a box, A, having one part closed by a cover, and a partition, B, having an opening through it, and with the revolving wire cylinder, C, mounted in the open portion of the box, A, all constructed and arranged for operation, as shown and described.

72,980.—METHOD OF ROASTING METALLIC ORES.—Francis W. Crosby, Toledo, Iowa.

I claim the method, substantially as herein described, of obtaining a porous disposition of pulverized ores within the reducing chamber of a furnace, for the purpose set forth.

72,981.—COMBINED SULKY PLOW AND CULTIVATOR.—William G. Crossley, Shellsburg, Wis.

I claim, 1st, The arrangement and combination of the beam, C, rod, I, spring catch, y, and lever, h, for regulating the position of plow, E, substantially as and for the purpose set forth.

2d, The combination of rod, S, having a lever, S', with arms, Q Q, elbows, T T, loops, P P, and shanks, M L, arranged to raise and lower shoes, f f f f, and hold them in position as described, in conjunction with bars, O O, as set forth.

3d, The loops, K H, in combination with a movable brace, G, having the plate, J, arranged so as to fit either loop, as and for the purpose set forth.

72,982.—CARTRIDGES FOR SMALL-ARMS.—Thomas Cullen, San Francisco, Cal.

I claim the method and arrangement of securing the metallic base or cap, a, to the paper tube, d, which holds the charge, by means of the nipple, c, screwing into the interior washer, b, as substantially herein set forth and described.

72,983.—SAW.—James Davis, Buffalo, N. Y.

I claim, 1st, Making the saw teeth above and below the center line, fig 2, with their cutting edges toward said line, and the rake or set above the reverse of that below the center line, in the manner and for the purpose described.

2d, The projection, D, at the point of the saw tooth, for the purpose set forth.

72,984.—CAR BRAKE.—Fred. Dengler, North Vernon, Ind.

I claim, 1st, The lever, B, and roller, C, acting on the curved lever, A, all combined and operating substantially as described.

2d, Also, the wheel, H', fixed upon the axle, the wheel, n, and cogged wheel, v, and pawl, and the intermediate roller, w, all constructed and operating in combination with each other, as described.

72,985.—CAR BRAKE.—David Dick, and O. W. Preston, Jr., Corning, N. Y.

We claim, 1st, The dog, D, as constructed, in combination with spring, l, operating conjointly substantially as set forth.

2d, In combination with dog, D, and spring, l, we claim kicker, b, and spur wheel, g', substantially as described.

3d, The engineer's connecting rod, W, when in combination with the brake apparatus, substantially in the manner specified.

4th, The pitch chain wheels, f g, and chain loop, M, in combination with rocking shaft, b, chain bar, B', and braking devices, substantially as described.

5th, The rocking shaft, b, worm wheel, d, slide, e, connecting rod, u, chain bars, B' E, and engineer's connecting rod, W, all combined substantially in the manner and for the purpose set forth.

72,986.—STOP COCK.—Justus Doering (assignor to himself, A. F. Shelly, and Charles Dixey), Philadelphia, Pa.

I claim the combination of the case and conical valve of a cock, and a conical stationary sleeve, fitting the case, and in which the valve turns, and which is so constructed and connected to the valve that it may be withdrawn with the latter from the case without the necessity of detaching any nuts or other astenings, all substantially as described.

72,987.—LET-OFF MECHANISM FOR LOOM.—George Draper, Milford, Mass.

I claim the said combination of devices, substantially as above described, for operating the said ratchet, the warp guide and beam, in manner as specified.

Also, their combination with the warp beam and its gearing, and ratchet, and with the warp guide, and the lay, the whole being substantially as explained.

72,988.—TRUNK.—Jonathan Smith Eaton, Roxbury, Mass.

I claim the combination, with the frame of a trunk, of the strips or pieces a a, substantially as and for the purpose set forth.

72,989.—BREWING.—William H. Elliot, New York city.

I claim the process herein described of brewing malt liquors, viz., condensing the vapor of boiling wort, returning it to the wort in a liquid state, and fermenting the two liquids together, substantially as herein set forth.

2d, Cooling the wort and condensed vapor separately, and afterwards mixing the two liquids together, before fermentation, substantially as herein specified.

3d, Employing a tank or reservoir, l, with its cooling device, in combination with tank, b, with its usual heating device, substantially as shown and described.

72,990.—HARVESTER RAKE.—Vanderlyn H. Felt, Rochester, N. Y.

I claim, in combination with the reciprocating rake, F, provided with projections, q r, the arrangement of the connecting and operating parts, consisting of the loose pulley, H, provided with the reacting spring, l, and operated by lever, K, the endless chain, G, the hinged bar, o, and the stop and projection, m' m, the whole operating in the manner and for the purposes set forth.

72,991.—EXPANDING PULLEY FOR BRAIDING MACHINE.—Jesse Fewkes, Newton, Mass., assignor to Silver Lake Manufacturing Company.

I claim the combination of the rods, b, pivoted to the pulley, A, with the plate, C, constructed as described, and the screw, D, for governing positively the position of said rods, substantially as described, and for the purpose set forth.

72,992.—INDIA-RUBBER DOOR SPRING.—B. G. Fitzhugh, Sykesville, assignor to himself and William G. Maxwell, Baltimore, Md.

I claim an India-rubber door spring, that is vulcanized in a curved or circular form, and applied to a door in a straighter form than that in which it was vulcanized, substantially as and for the purpose herein described and represented.

72,993.—HOLDER FOR GUM SCRUBBER.—Leonard Fleckenstine, Manor Township, Pa.

I claim the arrangement of the two corrugated or fluted plates, P R, for the purpose of folding the scrubbing edges of India-rubber, together with the use of a socket and screw bolts, substantially in the manner shown and specified.

72,994.—COMPOSITION OF MATTER FOR THE MANUFACTURE OF EMERY CLOTH, POLISHING WHEELS, ETC.—Lewis Francis (assignor to himself and Cyrus H. Loutrell), New York city.

I claim a composition of matter for various purposes, when the same shall be made substantially as herein described.

72,995.—SCISSORS SHARPENER.—L. M. Gilbert Warren, Mass.

I claim a scissor sharpener consisting of the bevelled file, A, combined and arranged with the circular guide piece, C, the parts being constructed and the whole arranged substantially as and for the purpose specified.

72,996.—MEDICINE FOR THE CURE OF HOG CHOLERA.—Geo. W. Gish and Wm. H. Ferguson, Daviess County, Ky.

We claim the medicine made by mixing, or by using at the same time, the ingredients described, for the purposes set forth.

72,997.—MANUFACTURE OF CLAY PIPES.—Geo. D. Goodrich, Joliet, Ill.

I claim, 1st, The improved method of fastening the trough carriage in, and disengaging the same from its rigid and described position on the frame on which its rests, substantially as herein described and specified, or other equivalent devices.

2d, The movable mouth piece, H, arranged substantially as herein described and specified.

3d, The combination, in a machine for the manufacture of clay pipes, of the trough for receiving the pipe, and the apparatus for lubricating the pipe as it issues from the mouth of the machine, substantially as described.

4th, Each of three devices to be used in combination with the clay pipe making machines, running the pipe continuously, and using the metallic or metallic lined troughs.

72,998.—HAT BLOCKING MACHINE.—Wm. C. Griswold, New York city.

The ring, A, to which the clamps are hinged when elastically seated, substantially as and for the purpose specified.

72,999.—HARVESTER.—Samuel B. Haines, Lewistown, Pa.

I claim, 1st, The leading wheel, A, attached to the shoe, G, as herein described and represented, and performing the double function of supporting the inner end of the finger beam and operating either the rake or reel, or both, as and for the purpose set forth.

2d, The grain wheel, M, in combination with the divider, L, provided with the flanges, d d', the latter being notched at d', and adjustable bearing, O, all constructed and arranged substantially as described, so as to admit of the wheel, M, and secure the protection of the latter by the divider, as explained.

73,000.—SAWING MACHINE.—I. R. Harman (assignor to himself and Thomas J. Meginnis), Whitestown, Ind.

I claim the combination of the movable center, 15, with slides, 7 and 7, 4 and 6, and eccentric cam, 5, and spring, 13, all constructed and operating substantially as set forth.

73,001.—APPARATUS FOR CLARIFYING SACCHARINE JUICES.—L. P. Harris, Crestline, Ohio.

I claim, 1st, The adjustable float, and its combination with the siphon.

2d, The combination of the adjustable float and siphon with the tube, c, and pipes, d and e, substantially as described.

3d, A cane juice clarifier, constructed and operated substantially as described.

4th, The combination of a cane juice clarifier, when constructed and operated substantially as described, with heating and evaporating pans, for the purposes set forth.

73,002.—PLOW AND HARROW COMBINED.—James Harsha, Circleville, Ohio.

I claim the bar or chain, A, lever, B b, and chain, D, arranged and applied substantially as described, for the purpose of combining an ordinary plow and harrow.

73,003.—ELEVATED RAILROAD.—Charles T. Harvey, Tarrytown, N. Y.

I claim, 1st, The arrangement and combination, with the column, a, of a false base, t, made in sections, and secured around the column at the surface of the ground, substantially as described.

2d, In a supporting column, the supplementary arc-shaped pieces, V, in combination with the branching arms of the column, a, with or without the triangular filling pieces, u, substantially as described.

3d, The base plate, n, in combination with the ears, m, arranged to fit the triangular interspaces of the column as ribs or flanges, 3, substantially as described.

4th, The arrangement and combination, in one piece, of the plate, k, the cap plate, l, and the connecting cylinder, j, substantially as described.

5th, The construction of the cap plate, l, with its friction rollers, i, substantially as described.

6th, The arrangement and combination, in the cable guide, e, of the wooden foundation, 4, and wooden side beams, 5, with the metallic bottom plate, f, and top right angled bars, g g, substantially as shown.

7th, The return cable guide, e', made substantially as described, by inverting the cable guide, e, and combining therewith the inverted cap, b, substantialy as described.

8th, The arrangement and combination of the upper rail, b, the I-shaped rails or beams, c c, and the wooden filling, d, substantially as above described.

9th, Arrangement of the main rail, b, upon the top of an under rail or beam, with a layer or cushion of wood interposed between them, substantially as described.

10th, The column, a, composed of ribbed segments, p, in combination with the flanged bars, r, which serve to unite the segments together, substantially as described.

73,004.—VEGETABLE CUTTER.—T. J. Hatfield, Warsaw, Ind.

I claim the combination of the reciprocating bed, B, adjustable knives, 1 2 3, plates, B' B', arranged with set screws, X X, box, D, follower, E, and spring lever, o, substantially as and for the purpose herein set forth.

73,005.—FLOWER STAND.—C. J. Hauck, Williamsburg, N. Y.

I claim a flower stand, composed of one or more sections, each made of a platform, , with a ring, b, and one or more standards, c, supporting a guide ring, d, all as shown and described.

73,006.—TOY.—John E. Hawkins, Lansingburgh, N. Y.

I claim the combination and arrangement of the ball driver or pocket, C and its spindle, B, with the stock or handle, A, and cup, D, in manner substantially and for the purpose as herein described.

73,007.—FIRE ESCAPE.—Edward Hawthorne, Mountain View, Cal.

I claim the apparatus constructed, arranged, and operated substantially as and for the purpose described.

73,008.—INVALID BEDSTEAD.—Wm. Heath, Bath, Me.

I claim the arrangement and application of the windlass, G, and its cord H, and the gear, g, and belt, h, thereof, with the lock frame, B, and the main frame, A, of the bedstead, substantially as described.

Also, the combination of the movable bracket, N, and its supporting rod and weight, O, with the seat frame, C, and its arm, R, as set forth.

Also, the seat elevating mechanism, and its arrangement with the main frame and the seat frame, as specified, such seat elevating mechanism, consisting of the shaft, H', its screw or screws, k k, and one or more wedges, I I and inclined planes, K K, to operate together, as explained.

Also, the combination of the toggles, P Q, with the movable bracket, N its supporting weight, O, and arm, R, as hereinbefore described.

73,009.—HAY FORK.—John G. Hitchcock, New York city.

I claim, 1st, Holding the tines against end pull by means of the projections or shoulders, b, arranged to lock against the ferrule or cap, C, while the latter is fixed on the handle by the screw, D, or its equivalent, all substantially as herein set forth.

2d, The within described construction of the fork tines, B, with a shoulder, b, at the commencement of the root of the tine, adapted to apply against a solid end of the cap, C, substantially as and for the purpose herein set forth.

73,010.—BOOTS.—James Holland, Conshohocken, Pa.

I claim a metal ring or bent wire, d, applied to the upper edge of the boot leg, within the folds of the strips, A and A', as set forth, for the purpose specified.

73,011.—FIELD FENCE.—D. S. Humphrey, East Townsend, O.

I claim the combination of two or more wires, B, with the posts, A, and slats or pickets, d, when secured thereto by means of the hook spikes, C, as specified.

73,012.—LANTERN.—John H. Irwin, Chicago, Ill.

I claim, in combination with the burner of a lamp, and a globe or protector thereof, one or more tubes or passages, D, or their equivalent, arranged to operate substantially as specified and described.

73,013.—ALARM LOCK FOR DOORS.—Anthony Iske, Lancaster, Pa.

I claim the combination and arrangement of one or two hooked bolts, C levers, D, sleeve, E, with the arm, B, on the vibrating plate, with or without its knob, b, when applied to a lock for the purpose of connecting the same with the bell or alarm, in the manner specified.

73,014.—FASTENING OF JAR COVER.—J. F. Johnson, New York city.

I claim the use of two or more inclines in recess on the neck of the vessel, in combination with a metal cap or stopper, with corresponding inclines, substantially as described.

73,015.—WATER HEATER FOR FIRE ENGINES.—Peter M. Kafer and Joseph M. De Lacy, Trenton, N. J.

We claim the arrangement of the checks, A A and E, elastic pipes, F, F, condensing coil, D, and with cocks B B and D D, levers, c d, pin, e, compensating levers, b b, wrenches, a a, constructed substantially as set forth.

73,016.—FARM GATE.—Israel L. Landis, Lancaster, Pa.

I claim, 1st, The upright lever, K, its spring, N, clip, M, and latch, P, when arranged, combined and operated by the rope, S, and pulleys, T, as herein described, and for the purposes set forth.

2d, The construction and combination of the bent hinge, C, with its inside block, F, as herein described, and for the purpose set forth.

3d, The diagonal rail, X, with its clip, Z, when combined and operated with the upper rail, G, of the gate, as herein described, and for the purpose set forth.

73,017.—BREAD CUTTER.—John Madden and I. G. Haserot, Cleveland, Ohio.

We claim, 1st, Operating the hinged or jointed table, F, by means of the cam, H, substantially as and for the purpose set forth.

2d, The adjustable table, F, and cam, H, in combination with the knife, substantially as and for the purpose set forth.

3d, The arrangement of the knife in two sections, D D, and jointing the same together, as seen at J, in combination with a table and slide, for the purpose set forth.

73,018.—CONFECTION OR CAKE.—Wm. Manning, Chelmsford, Mass.

I claim a new and improved combination cake, as herein described, using for that purpose the aforesaid ingredients, or composition of matter, or any other substantially the same, and which will produce the intended result.

73,019.—LINE REEL.—Lyman Martin, Indianapolis, Ind.

I claim the combination of the frame, A, drum, B, crank, C, the plate, D, and pin, G, for the purpose of a line reel, all arranged and operating as set forth and described.

73,020.—SEEDER AND CULTIVATOR.—Henry S. Matteson, Stockton, Cal.

I claim 1st, The beams, C B, in combination with beams, D, and cross beams, I, with draw bar, L.

2d, The chest, A, wooden shaft, h, and iron slide, i, in combination with crooked pin, k, handle, O, crank, b, connecting rod, c, when used and arranged for the purpose herein specified.

73,021.—APPARATUS FOR COLLECTING PRECIOUS METAL.—James T. McDougall, San Francisco, Cal.

I claim, 1st, A sluice containing obstructing standards, so placed as to convert the current into eddies, substantially as herein described.

2d, The iron standards, B C, together with the removable copper tubes, D, or an equivalent device, constructed and arranged substantially as above specified.

3d, The plugs, a a, for raising and lowering the tubes, substantially as described.

4th, The copper plates, b b, when employed and attached to the sides of the sluice, as and for the purpose herein described.

73,022.—CORN PLANTER AND PLOW COMBINED.—Patrick Melsaac, Waterloo, Iowa.

I claim the herein described arrangement of the several parts constituting the corn planter, and the mode herein described of attaching the same to a common plow, as specified.

73,023.—CHURN.—Gabriel McWilliams, Fostoria, Ohio.

I claim the tube, B, piston, F, as arranged in combination with the case, A, and operated in the manner and for the purpose set forth.

73,024.—HARROW.—John Mercier (assignor to Israel Kinney), Detroit, Mich.

I claim, 1st, The blocks or balls, A A, etc., with holes cast or bored, and the rods, B B, etc., when constructed substantially as and for the purpose described.

2d, The combination of the above described blocks or balls, A A, etc., and B B, etc., in conjunction with harrows or cultivators, when constructed substantially as described, and for the purpose set forth.

3d, The disk, G, the draught bar, H, and the pin, I, when attached to cultivators or harrows, in the manner and for the purpose described.

73,025.—SLEIGH RUNNER.—John G. Meiler, Plymouth, Mich.

I claim, 1st, The construction of metal runners, of the shape set forth, provided with clips, B, and provided with means of connection, substantially as described, and for the purpose set forth.

2d, The attachment, constructed from iron straps, H and I, provided with the adjusting bolt, K, and the slot, J, operating substantially as and for the purpose described.

3d, The combination of the above described runners and attachments when constructed substantially in the manner described.

73,026.—COTTON BALE TIE.—Carson Mudge, New Orleans, La.

I claim the making of the two additional openings or holes, A, in cotton ties, designed for use in connection with hoop irons, so that the same may be used with equal ease for fastening together the ends of wire rope or wire, as herein described.

73,027.—LATHE.—L. F. Munger, Rochester, N. Y.

I claim, in combination with the lathe centers, placed vertically, or nearly so, over the front of the lathe, the ways, a b, on said front of the lathe, for the slide rest to move on, for the purpose of adapting the parts to the different operations, as herein described and represented.

Also, the combination of the centering rod with the mandrel and its adjustable bearings, substantially as described.

Also, in combination with a planing or chasing tool, that receives motion from the face plate or mandrel of the lathe, a slide rest or holder, that has a vertical, horizontal and swiveling motion with regard to said tool, as and for the purpose substantially as described.

73,028.—VISE CLAMP.—H. O. Nanen, New York city.

I claim a vise clamp, composed of two jaws, A, hinged together by means of shanks, a, and a pivot or pivots, b, and provided with lips, d, on their backs, d, removable lining, e, on their working faces, and a spring, c, which opens the jaws, substantially as herein set forth.

73,029.—VELOCIPEDE.—Martin Newman, Unadilla, N. Y.

I claim the device for propelling velocipedes, constructed substantially as herein shown and described.

73,030.—PULLEY BLOCK.—I. W. Norcross, Boston, Mass.

I claim, 1st, In pulley blocks, making the several cheeks by casting them independently and separate from the other parts, substantially as described.

2d, The cast studs, E, interposed between the cheeks, and held thereto by rivets or other suitable fastenings, substantially as described.

3d, Dividing the stud, E, and combining the same with the eye, D, substantially as described.

4th, The skeleton partition or cheek, H, substantially as described.

5th, Arranging anti-friction rollers, I, beneath the axles of the pulley, substantially as above described, in combination with a pulley block of any form or construction.

6th, The hollow partition, H, made substantially as described, for the purpose of containing an anti-friction roller, one or more, to support the axles of the pulleys, and to form a recess for the shank of the eye.

73,031.—SAW MILL.—C. D. Olmstead, Williamsport, Pa.

I claim, 1st, The stirrup, with its fast and loose sides, holding in one side the section of a ball, and provided with set screws for adjusting purposes, al

arranged and constructed as shown and described, and for the purpose indicated.

3d, In connection with the stirrup, as shown, the construction and arrangement of the various parts which constitute my muley block, as described and for the uses indicated.

73,032.—STEAM TRAP.—Chas. E. Palmer, Manchester, N. H.

I claim the movable valve seat, C, constructed with a partitioned coupling, A B, substantially as set forth.

73,033.—RAIL SET.—George Patterson, Augusta, Mich.

I claim the withinldescribed device, C D E, adapted for bending or straightening railroad rails, substantially as specified.

73,034.—COTTON BALE TIE.—Joshua L. Phillips, Washington County, Miss.

I claim the device herein described, consisting of the central bar, A, when provided with the wings, B B', in which, at the points, a a', are grooves to receive the band, a longitudinal opening for the ends of the band, and holes, d d', as and for the purpose herein set forth.

73,035.—ANCHOR.—D. C. Pierce, Clayton, N. Y.

I claim the fenders or rods, C C D, constructed as shown, attached to the flukes and stock of the anchor substantially in the manner as and for the purpose set forth.

73,036.—ANCHOR.—D. C. Pierce, Clayton, N. Y.

I claim the shackle, E, in combination with the bars, C C, and the pivoted fluke, A, all arranged substantially as and for the purpose specified.

73,037.—PICKER MOTION FOR LOOMS.—Joseph Pilkington, Frankford, Pa.

I claim the combination of the weight, 2, shaft, O, arm, g, and staff, d, all constructed and arranged as and for the purpose described.

73,038.—PUMP VALVE.—Wm. H. Pollard (assignor to Downs & Co.'s Manufacturing Company), Seneca Falls, N. Y.

I claim the combination of the concave disk, g, of the valve, with the elevated seat, s, arranged as described, and operating in the manner and for the purpose specified.

73,039.—LOCK COUPLING FOR GAS FIXTURES.—Thomas L. Reed, Providence, R. I.

I claim the coupling constructed substantially as described, with a male and female sleeve, and an annular packing cavity, and a helical groove, and a peg or stud, in combination, all as and for the purpose set forth.

Also the packing ring composed of india-rubber and leather united together, substantially as described for the purpose specified.

73,040.—GAS SOCKET.—Thos. L. Reed, Providence, R. I.

I claim the shell of the socket constructed with a cylindrical cavity, and a shoulder, e, and a lip or ledge, l, as described, and in combination with the packing n, constructed substantially as and for the purpose set forth.

73,041.—APPARATUS FOR SEPARATING GOLD FROM ORES.—Thomas Rhoads, Ottawa, Ill.

I claim the inside double helix, C, the helix, B, inside kettle, A, the feed pipe, F, and the heating flue, H, when in combination with each other, constructed substantially as and for the purpose described in the foregoing specification.

73,042.—DRIVING BRIDLE.—Archibald Rice and Lewis Leach, Fresno, Cal.

We claim the combination and arrangement of the straps, a a, with loops or pulleys, c c and d d, with the reins, A, hitched to the post hook, and running through the loops or pulleys, c c, and to the hames or saddle, substantially as described.

73,043.—DEVICE FOR SECURING STOPPERS TO BOTTLES.—Wm. H. Richards, Auburndale, Mass.

I claim a device for securing corks or stoppers to bottles, demijons, etc., substantially as described.

73,044.—MACHINE FOR POUNCING HATS.—John C. Richardson, Newark, N. J., assignor to himself and James H. Prentice, Brooklyn, N. Y.

I claim, 1st, Mounting the partially revolving frames, B and C, and their connections on the centers, b and c, arranged out of line with the shafts, D and M, and arranged to operate relatively to each other substantially as and for the purposes herein set forth.

2d, Also, in pouncing machines, the sand paper, W, or its equivalent, the beveled parts, P and R, and the buttons, V, and grooves, r, or their equivalents, combined and arranged for joint operation as a pouncing wheel, substantially as and for the purposes herein set forth.

73,045.—CHECK FOR PICKER STAFF.—Elisha Robbins, Worcester, Mass.

I claim the arrangement and application of the adjustable spring brake with the picker staff and shuttle box, as described.

Also the combination and arrangement of the adjustable spring brake and the arch spring with the shuttle box, the picker, and the sword of the lay the whole being substantially as specified.

73,046.—STUMP EXTRACTOR.—John B. Robertson, New Orleans, La.

I claim the truncated pyramidal frame structure, B C, when the same is supported at its front end by the axle of the wheels, A, and at its rear end by the pivoted adjustable standards, E, in combination with the rod, F, screw, collar, or nut, N, metallic plate, M, circular collar, b, and pivoted standards, b, when these several parts are constructed and arranged for conjoint operation, substantially as herein described, for the purpose set forth.

73,047.—HOOK FOR WHIFFLETREES.—D. D. Robinson, Niles, Mich.

I claim the hook, C, pivoted in the groove at the outer end of the socket, A, connected closely to the projection, B, forming a perfect loop, and held in place by the spring, a, when all are constructed and arranged as herein set forth.

73,048.—MODE OF LASTING BOOTS AND SHOES.—Ichabod R. Rogers (assignor to Geo. E. Bartlett), Lynn, Mass.

I claim an inner sole, A, of any suitable material, provided with a row of stitches, a, by which the upper leather is united to it by stitches, substantially as and for the purpose set forth.

73,049.—GATE.—Wm. H. Rogers, Harlen, Ill.

I claim, 1st, The combination of the gate, a a', with the cord, n, and the roller, n, sheaves v w, and handle, m, or an equivalent, arranged for the purpose of opening the gate, substantially as described.

2d, The combination of said gate with the cord, e, and the sheaves, b b, and handle, l, or an equivalent, for closing the gate substantially as described.

73,050.—HORSESHOE CUSHION.—G. E. Rust, Boston, Mass.

I claim the double pad or cushion composed of leather and felt or other fibrous cloth, and interposed between the hoof of the horse and the shoe, substantially as herein described.

73,051.—TRACTION ENGINE.—Theodore Scheffler and Henry Morrison, Paterson, N. J.

We claim, 1st, in traction engines for common roads, supporting each wheel on an independent short axle, running in suitable bearings, situated on each side and close to the wheel, in the manner and for the purpose described.

2d, The arrangement of the loose clutch, J, and the internal and external clutches, K and L, in combination with the levers, a and b, or their equivalent, operated by the steam cylinder, M, the whole being arranged and combined in the manner and for the purpose substantially as set forth.

3d, Connecting the driving wheels, H, with the driving shaft, F, through chains, or their equivalents, passing over clutches, arranged and operating substantially as specified.

4th, Driving the forward wheels, P P, by a separate and independent cylinder or cylinders attached to the movable truck, Q, and turning with said truck and wheels.

5th, The center piece, R, fast to the truck, Q, with suitable passages for the steam and exhaust through said center piece, in combination with the socket S and guide frame, T, supporting the smoke box, C, or end of the boiler, the whole being constructed and arranged in the manner and for the purpose described.

6th, Operating the ropes or chains that turn the forward truck and wheels of the engine, to guide or direct its movements by means of hydraulic cylinders operated by a force or steam pump, substantially in the manner and for the purpose set forth and described.

73,052.—BED BOTTOM.—Adolph Schlingman, Alexandria, O.

I claim, 1st, A bed bottom consisting of the cord, F, and transverse perforated slats, G1 G2 G3 G4, with or without the longitudinal stiffening slats, H, the cord being rove forth and back through said slats, and held at the ends by pins, substantially as described and represented.

2d, The combination with the cord, F, and transverse, G1 G2 G3 G4, of an adjusting or tightening rail, E or K, applied and operating substantially as described and represented.

73,053.—ROCK DRILLING MACHINE.—Carl Schumann, Freiberg, Saxony, assignor to Edward B. Jackson, Boston, Mass.

I claim, 1st, Imparting a forward and rotating movement simultaneously to the valve rod of a rock drill, by means of the levers, e' e', and their connections, substantially as described.

2d, The rotating device consisting of the levers, e' e', operated by means of the guide, b1, on the piston rod, E', the link, f, guide rod, f', pawl, o, pivoted on the guide rod, f', pawl, o2, pivoted on the guide piece, n, and the guide pieces, m n, and ratchet wheel, H, substantially as described.

3d, The device for operating the valve rod, consisting of the levers, e' e', operated as described, the forked lever, b, toothed wheels, k k, screw rod, j, bar, l, and bar, l, provided with shoulders, i, substantially as described.

4th, The device for rotating the piston rod and rock drill, consisting of the levers, e' e', operated as described, lever, g, slotted guide rod, g', pawl, p, pivoted to the guide piece, m, guide pieces, m and n, shoulder, d, and the piston rod, E', and slotted ratchet wheel, e', substantially as described.

5th, The combination of the pieces, I I', with the mortised shoulders, J, cylinder, K, with tongue, s, clamp, L, and ratchet wheel, H, operated substantially as set forth.

6th, The arms, e e, extending from the back plate, G', of the valve chest, G, forming the bearing of the main shaft of the device, substantially as described.

73,054.—DEFECATING CANE JUICE.—A. B. Sharp, Paincourtville, La.

I claim the supplemental or additional revolving cylindrical water cistern, B, when constructed and operating in connection with Patterson's cylinder A, or any other cylinder substantially the same, and specially employed for purifying the fumes of sulphur to be subsequently used in the defecation of cane juice, as set forth.

73,055.—JOURNALS OF AXLES OR SHAFTS.—Calvin D. Smith, Baldwinville, Mass.

I claim the arrangement of the inclined passage, c, and the grooves, a and b, together and with the journal, as specified.

73,056.—MACHINE FOR MASHING AND BOILING WORT FOR BEER.—John Stark and Michael Stark, Buffalo, N. Y.

We claim the combination of a beer mashing and boiling apparatus, in the manner and for the purpose set forth, or any other principally the same.

73,057.—MANUFACTURE OF ILLUMINATING GAS.—Levi Stevens, Washington, D. C.

I claim, 1st, The use of a close chamber, for mixing a hydrocarbon and hydro-oxygen, under heat and pressure, which mixture is to be afterwards retorted, to convert it into a fixed gas for illuminating purposes, as described.

2d, Also in combination with the close heating or mixing chamber, an injecting apparatus, worked by a volume of escaping steam to force the hydrocarbon into said chamber against the pressure of steam therein, substantially as described.

73,058.—RAILWAY CHAIR.—Isaiah Tillson, South Abington, Mass.

I claim the arrangement and combination of the jaw arms and their chambers in the chair, with the jaws and the rails arranged within the chair, as set forth.

Also the combination of the covering plates with the jaws, their arms, and the chambers for receiving such arms, as set forth, such covering plates serving to prevent the jaws and their arms from being thrown out of the chair by vertical movements or vibrations of the rails.

Also in combination with the chair, movable jaws, to act against or grasp opposite sides of the rail or rails, and be pressed against such by a weight or wheel while resting on or passing along on such rail or rails, or either of them, as set forth.

73,059.—WINDLASS.—Lafayette L. Treman, Ithaca, N. Y.

I claim, 1st, The enlarged ends of the levers extending and bifurcating over the ratchet wheels, E, so as to embrace the said ratchet wheels by a sliding surface, F'', as set forth.

2d, The adjustment of the said levers and ratchets, made as described, on the shaft, C, within the bits, A, for the purposes specified.

3d, The combination and arrangement of the levers, ratchets, and clicks, constituting the working parts of the windlass, within or inside of the bits, for the purpose of giving free scope to the chain, cable, or rope on the heads, and avoiding their interference with the said moving parts, with the heads on the ends of the shaft, outside of the bits, as set forth.

73,060.—PAINTER'S CANVAS.—Chas. Volkmar, Baltimore, Md.

I claim a canvas or other material prepared for receiving colors or other substances, by means substantially as herein described.

73,061.—HARROW.—John N. Wallis and Theodore Wallis, Fleming, N. Y.

We claim, 1st, The flanged cylinder, C, when used as and for the purpose specified.

2d, The double nut or shell piece, F, when used in the manner and made to subserve the purpose above set forth.

3d, Supporting the teeth of drags or harrows by means of a cylinder, which shall allow the teeth to rotate as and for the purpose specified.

73,062.—MODE OF CLOSING UP BOOT LEGS.—Preston Ware, Newton, and Calvin R. Tilton, Tisbury, Mass.

We claim making a boot leg whose diverging edges are united by a lap seam by machinery, substantially as described.

73,063.—SEWING MACHINE.—Albin Warth, Stapleton, N. Y.

I claim, 1st, Making the needle slide, M, and the guide rod, P, either or both, in the form of tubes, closed below, so as to prevent oil used in lubricating them from falling on the table, substantially as described.

2d, The combination of the guide rods, O and Q, with the holding plate, S, substantially as and for the purpose described.

3d, Making the needle and pressure guide rods, O and Q, either or both, hollow, to allow the escape of air, substantially as described.

4th, The combination of the thread guide, s7, with the presser foot, substantially as described

5th, The hook, 28, formed substantially as and for the purpose described.

6th, The combination of the grooved shuttle with the hook, 28, as and for the purpose set forth.

7th, The disconnected friction pins in the shuttle, arranged substantially as described.

8th, The shuttle, S', constructed as shown and described.

9th, The spring, L, arranged so as to bear upward against the needle slide, substantially as described.

10th, The combination of the eccentric, r7, universal joint, G I, rod, F, and needle lever, C, constructed and operating substantially as and for the purpose described.

11th, The tension device, X y, and the take-up, W, arranged and combined substantially as described.

12 The combination of the reversible slide, r, the nut, n, having arms, p p, and the rock shaft, u, having toes, t t, substantially as described.

13th, The lever, w, provided with two shoulders, 1, 1, in combination with the spring, x, substantially as described.

14th, The adjustable plate, 7, for regulating the length of the stitches, in combination with the jaws, 5, 5, of the feeding apparatus, substantially as described.

15th, The box that holds the feed wheel, composed of the rigid plate, 11, the spring plate, 12, and the elastic rings, 14, 16, substantially as described.

16th, The hollow axis in which the feed wheel turns, in combination with the hollow hub, closed at one end, substantially as shown and described.

73,064.—SEWING MACHINE.—Albin, Warth, Stapleton, N. Y.

I claim, 1st, The arm, D, and brace, H, in combination with each other and with the shaft, C, table, A, and platform, G, substantially as and for the purpose described.

2d, The independent take up K, and cam E, in combination with the double pointed shuttle, S, constructed and operating substantially as and for the purpose set forth

3d, Making the shoulders, h, of the double pointed shuttle, S, radiating from the center of the shuttle race, substantially as and for the purpose described.

4th, The arrangement of the winding attachment, m, in combination with the elastic center, j, substantially as and for the purpose set forth.

5th, The cap, k', in combination with the elastic center, j, and with the shuttle race, constructed and operating substantially as and for the purpose described.

6th, The hooked pin, p', in combination with the pin, p, in the shuttle, substantially as and for the purpose set forth.

7th, The movable center, v, in combination with the adjustable center point, r, constructed and operating substantially as and for the purpose set forth.

8th, The adjustable cap, M, on the main cam, E, combined and operating in connection with the feed bar, L, substantially as and for the purpose set forth.

9th, The recess, w, in the presser foot, in combination with the adjustable spring, x, constructed as described, which keeps the braid up against the shoulder, y, substantially as and for the purpose set forth

73,065.—SHEEP RACK.—Jacob D. White, Kilbourne, Ohio.

I claim a feeding rack or manger a a a b b c c I I, provided with an inclined hinged lid or cover, d d, and a self-adjusting feed rack, g g g2 J J, which is held in a vertical position by the pieces of leather, h2 h2, affixed to each end of the rack, and so arranged as to press backwardly on the feeding material by its own gravity, without any auxillary appliances, constructed and arranged substantially as herein shown and described, for the purpose set forth.

73,066.—MEANS OF ATTACHING HANDLES TO DIPPERS.—John B. Wood, Cranston, R. I.

I claim slitting or otherwise removing a portion of the material of the stick or handle which is held in the metal socket piece, when combined with the metal socket, substantially as and for the purpose described.

73,067.—FELLER FOR SEWING MACHINES.—Enoch S. Yentzer and Alfred K. McCain, Ottawa, Ill.

We claim, 1st, The attachment of both the single turner, a, and the gage or guide, b, to the presser foot, by the means and in the manner substantially as herein described.

2d, The single turner, a, in combination with an adjustable gage or guide, f, adapted for felling seams, substantially as described.

3d, The attachment of the turner, a, of a feller, to an elastic holding plate, B, substantially as described.

73,068.—LAMP CHIMNEY FASTENING.—John Allen and Chas. E. F. Lewis, Washington, D. C.

We claim, 1st, The circular and grooved holder, divided into segments, operating on hinges, and held by fastenings, as herein described and for the purposes set forth.

Also the use of an elastic or rubber ring, fitted into the groove of the holder, for the purposes set forth.

73,069.—VALVE GEAR.—John F. Allen, New York city.

I claim the arrangement of the governor and link motion with reference to the wrist motion, constructed as described, to produce an automatic control of the induction valves, substantially as specified.

73,070.—FRICTION ROLLER FOR BAND SAWS.—Thomas A. Ballou, Cleveland, Ohio.

I claim the roller, A, consisting of the head, A', and follower piece, D, and pieces of raw hide, C, clamped between the head and follower by means of clamp screws 1, all constructed to operate substantially as described.

73,071.—RAILWAY SWITCH.—Truman G. Beecher, Beaver Dam, N. Y.

I claim, 1st, The rails of a portable switch, constructed with flanges, for attaching them to the track of a railroad, and locking them in position, substantially as set forth.

2d, In combination with such rails, the ties, D, constructed substantially as described.

3d, The ties, D, formed with flanges, arranged substantially as set forth, to form locks to hold the tie on the bed-rail, when in proper position to sustain the temporary track.

4th, So constructing the rails of a temporary switch that the temporary track may be carried over the bed-rail, said portable rails being formed substantially as set forth.

5th, In combination with the tie, D, the brace, D1, so arranged as to act both to support the rail laterally and to form a chair to hold the rail down, substantially as described.

73,072.—KEY COUPLING FOR MUSICAL INSTRUMENTS.—Jonas Berger, Knoxville, Ill.

I claim, 1st, The construction of a key coupling in which the octave is operated without depressing its key, substantially in the manner and for the purpose as herein specified.

2d, The construction of the key board, F, with standards E, and providing the same with grooves and slides, d, in combination with the straps, G, cross pieces f and c, standards, D, valves, C C, and springs, s s, all arranged substantially in the manner and for the purpose as herein specified.

73,073.—APPARATUS FOR CARBURETING AIR.—William W. Brereton, Cleveland, Ohio.

I claim the immersed carbureting vessel, Z, with its contained float, D, in combination with the gravitating air holder, M, tank, L, and inverted siphons F I Q R, when arranged and employed substantially as and for the purpose set forth.

73,074.—CANE AND UMBRELLA COMBINED.—Geo Bockstaller, New York city, assignor to Lewis Schneider and W. W. Mosay.

I claim the combination of the cover, detachable from the stretchers, and from the stick and the sheath, E, arranged to take the place of the cover, and to give to the umbrella the appearance of a walking stick, all as set forth.

73,075.—CANT HOOK.—E. Broad, St. Anthony's Falls, Minn.

I claim the plate, D, with its ears and stops, x x, as shown and described, whereby the hook, C, as constructed, is hinged to the handle, A, and prevented from falling too far back or forward, substantially as herein specified.

73,076.—CONSTRUCTION OF LUMBER WAGONS.—S. D. Carpenter, Madison, Wis.

I claim, 1st, The rocker block and the coupling block attached to the pole, for the purposes and substantially as herein described.

2d, Also, the manner of fastening the stakes to the bolster, for the purposes and substantially as herein described.

3d, Also, the manner of fastening the reach together and operating the same, the cast iron socket, C, the sleeves and wedges, the shank, E, and the wrought iron fillet for strengthening the same, for the purposes and substantially as herein set forth.

73,077.—WATCHKEY PROTECTOR.—A. J. Chase, Boston, Mass.

I claim a vulcanized india-rubber key guard, consisting of the bulb, d, and loop, f, made substantially as and for the purposes herein shown and set forth.

73,078.—COMBINED LATCH AND BOLT.—Pascal P. Child (assignor to S. R. Fox Manufacturing Co.), St. Louis, Mo.

I claim the sliding bolt latch, C, in combination with the keeper and striker, D, the latter being constructed as described, with rebated projections, d2, which act as strikers for the latch when it is used as such, and the hasp rail, d, which confines the latch when acting as a bolt, as shown and described.

73,079.—MACHINE FOR PRESSING BRICK.—Wm. H. Coombs, Fort Wayne, Ind.

I claim, 1st, The improved brick-pressing machine, constructed and operating substantially as herein described.

2d, In combination with the mold, in which the bricks are pressed, and a plunger or piston, operated by a crank and pitman, to press the brick in the mold, the movable back piston, P', moved by the means and in the manner substantially as herein described, to remove the pressed bricks from the mold.

3d, In combination with a plunger or piston, operated by a crank and pitman to press the bricks in the mold, the feeder, i, operating in the manner and by the means substantially as herein described, and for the purpose set forth.

4th, In combination with the mold and a pressing plunger or piston, the elastic backing, O', substantially as and for the purpose set forth.

73,080.—MELODEON.—Wm. Cooper, Deposit, N. Y.

I claim, 1st, Graduating the dip or depression of the keys, by mechanism controlled by the receiver, substantially such as herein described, for the purposes specified.

2d, The two receivers, A, and the two exhausters, with their operating pedals, so combined that the storesaid receivers may be worked, either together or separately, at the pleasure of the player, substantially as herein set forth.

3d, The slide, b, or equivalent device, arranged in such relation with the two receivers that the latter may be either separated or made to communicate with each other, substantially as and for the purpose herein set forth.

73,081.—CULTIVATOR AND PLOW.—Wm. H. Damron, Robt. H. Massey, and Lorenzo F. Whitman, Macomb, Ill.

We claim, 1st, The combination of the wheel, a, with the wrist, e, sliding chases, e', and cross beam, a', as and for the purpose described.

2d, The combination of the plow beam, c, with the sliding crotches, i, the cross beam, a', the guide, n, and slotted cross beam, o, substantially as set forth.

3d, The combination of the plow beam, c, with the crotches, i, provided with the holes, l, and pins, k, as and for the purpose set forth.

73,082.—STRAIGHT EDGE.—Samuel Darling, Bangor, Me.

I claim, 1st, A straight edge, hardened at its edge or edges and not at its center, substantially as described.

2d, Also, a straight edge, having a hardened edge or edges, and admitting, when warped by hardening, of being brought into true, substantially as described.

3d, Also, a straight edge made of two or more thin pieces, having one or both edges hardened for the purpose of making it thicker, substantially as described.

4th, Also, a straight edge composed of a thin plate, with hardened edge or edges, and a supporting bed or plate, substantially as described.

5th, Also, a straight edge composed of two or more hardened straight edges secured end to end upon a supporting bed plate.

6th, Also, a straight edge, when constructed as herein set forth, whether the same be used as a single edge or with two opposing edges, as in a gage, substantially as described.

7th, Also, the mode, herein described, of undergraduating the straight edges to compensate for the stretch in hardening.

8th, Also, the process, herein described, of reducing the graduated edges to the proper standard by tempering.

73,083.—STEAM GENERATOR.—John H. Duhme, Cincinnati, Ohio.

I claim the steam boiler, constructed as described, consisting of the sections, C, placed one above the other, and connected together at the ends by means of the pipes, a, said sections consisting each of the corrugated longitudinal plate, c, and corrugated transverse plate, d, secured together at their points of intersection, all arranged as described as and for the purpose specified.

73,084.—BOILERS FOR HEATING APPARATUS.—C. R. Ellis, Brooklyn, N. Y.

I claim a series of pipes for a hot-water heating apparatus, formed with the waterway thimbles near the ends of the tubes, in combination with the pipe, g or h, having a range of thimbles on one side, the whole being connected together by tie rods, as set forth.

73,085.—WATER-PROOF SAFE.—J. P. Ellis, Flushing, N. Y.

I claim a water-proof safe or receptacle for papers and other valuable documents, constructed substantially as herein specified.

73,086.—POTATO PLANTER.—Henry Farmer, Pontiac, Mich.

I claim the arrangement and combination of the said iron fingers, hopper, and plow, acting together as and for the purpose above specified.

73,087.—CULTIVATOR.—Wm. Frantz, Piqua, Ohio.

I claim the combination of the standards, D D', and shovel plows, E E', adjustably attached to cross beams, C C', and the adjustable rake, F, arranged to operate substantially as set forth.

73,088.—PICTURE AND CURTAIN KNOB.—J. Gardner, New Haven, Conn., assignor to Samuel Peck & Co.

I claim, as a new article of manufacture, a picture or curtain knob, or knob for like purposes, made of the material and in the manner substantially as herein specified.

73,089.—LUBRICATING COMPOUND.—E. J. Gerdom and C. W. Schindler, Albany, N. Y.

We claim a lubricating compound made of the ingredients above specified, and having the property that it will melt at a temperature of from 100° to 110° as set forth.

73,090.—FIELD FENCE.—I. A. Gormly, Bucyrus, Ohio.

I claim the combination of metal posts, anchors, and braces, with dowel pins and wedges, substantially as described.

73,091.—BASE BURNING HOT-AIR FURNACE.—James Gray, Albany.

I claim, 1st, In a base burning stove or furnace, which has a supply cylinder, an escape passage from the chute, J, through the horizontal pipe, d', or the hollow ring, e', into the flue, F, substantially as described.

2d, Providing the chute, J, leading through one side of the external casing into the cylinder, E, with a damper or valve, g, substantially as described.

3d, The construction of the double-wall cylinder, D D', annular chamber, d d, and air-passages, f f, substantially in the manner shown and described.

4th, The combination of the magazine, E, outer casing, H, with the hollow open-work section, F, and the annular chamber, d d, with air passages, f f, crossing it, of a base burning air heating furnace substantially as described.

5th, The combination of the magazine, E, central exit flue, F', and ascending annular flue, d, leading from the fire chamber, substantially as and for the purpose described.

6th, Conducting the heated products of combustion, rising from the fire pot C, around and over the coal-supply cylinder, and discharging them into a central flue directly over the center of the said supply cylinder, in combination with warm-air chamber, G and G', such chamber being inclosed by wall H, all for the purpose of heating air which is to be used for warming apartments, substantially as described.

7th, Making the iron protector or the guard plates, k k, of the fire bricks, or their equivalents, portable in segments, so that they may be removed through the lower end of the magazine, E, substantially as described.

8th, In the construction of a base burning, air heating furnace, having a magazine, E, an annular circulating air chamber, and an annular smoke passage, both surrounding said magazine, and situated between the same and the annular wall, D, the inclined chute or passage, J, provided with a valve, g, and gas-escape conduit, and adapted to serve as a means for introducing coal into the magazine from a point which is below the top of the outer casing, substantially as described.

9th, The flaring arched opening of the ash pit, A', formed by the inclined plate, a2, substantially as described.

10th, The combination of the sectional lining, h h, with annular circulating space, G, and jacket or wall, D', substantially in the manner described and shown.

11th, The combination of the magazine, E, damper or valve, g, the horizontal pipe or pipes, d', and the hollow ring, e', substantially as described.

12th, The arrangement of the flues, d' and e', so that they can be cleaned by using a flexible handled brush from inside of the door leading into the coal-supply cylinder or reservoir, substantially as described.

13th, In a base burning air heating furnace having a magazine, E, a doorway or passage, provided with a door or window, and opening into the combustion chamber through the outer casing of the furnace, substantially as described.

14th, In a base burning, air heating furnace having a magazine, E, a passage, covered by a door or window, and leading into the combustion chamber through and across the air chamber formed by the exterior case or wall and the outer wall of the furnace, substantially in the manner and for the purposes described.

73,092.—APPARATUS FOR DISTILLING AND RECTIFYING.—Calir Gresluchna, New York city.

I claim the blow-off pipe, P, in combination with the cups, d1 d2 d3 d7, in the rectifier, G, substantially as and for the purposes described.

73,093.—RECIPROCATING BALL TOY.—Theo. D. Haehnlen, Philadelphia, Pa.

I claim the combination of the ring, A, the elastic cord, C, the ball, D, and handle, B, substantially as specified.

73,094.—CULTIVATOR.—W. O. Hargrave, Ripon, Wis.

I claim, 1st, The board, H, connected to the tongue, C, by the hinge, H, so that the drill teeth can be elevated by the driver, in the manner as set forth.

2d, The axle, A, with its blocks, D D D, between which are hinged the beams, E E E, provided with their shovels, e e e, when used in connection with the board, H, bars, d d, securing the horizontal resting bar, G, and operated by the rod, b, upon the beam, E, by the hinge, H', the whole constructed and used in the manner substantially as specified.

73,095.—WORM FOR GEARS.—Dennis Harrigan and Joel Whitney, Winchester, Mass.

We claim an endless screw or worm, with its threads so formed as to have their general direction from root to summit such that, if prolonged, they would meet at a point distant from the roots of the threads equal to the radius of the wheel they are intended to drive.

Also, the forming of these threads upon a body whose bounding lines, in a direction parallel with the axis of the worm, are concave, the radius of the concavity being equal, or nearly so, to the radius of the wheel to be driven.

73,096.—BEEHIVE.—Chas. Hastings, Dowagiac, Mich.

I claim the combination of the box, A, with an air chamber, a, and a series

of movable comb frames, B B, with recesses, x x, said frames and recesses are covered with paper, C, or equivalent material, as and for the purposes specified.

73,097.—BRICK TRUCK.—Napoleon B. Heafer, Bloomington, Ill.

I claim a truck which is adapted for general use in a brick yard, consisting of a platform, A, with removable head and tail boards, A' A', mounted upon rollers, C C, and provided with a sliding hand tongue, E, and also means for attaching thills, F, substantially as described.

73,098.—PORTABLE FENCE.—L. F. Henderson, Freeport, Ill.

I claim the uprights, A A, secured with cleats, F F, and to bases, B B, in combination with top rails, D, stakes, C, and lower rails, G, substantially as and for the purpose set forth.

73,099.—SPIRIT METER FOR DISTILLERS.—J. C. Horton, New York city, and James Milligan, Brooklyn, N. Y.

We claim, 1st, The method of ascertaining the quantity of spirits produced in a distillery in a given time by using, in combination with an automatic meter to measure the spirits passing from the worm, another automatic meter, to measure the beer passing from the fermenting cisterns to the still, said meters being arranged and provided with automatic registers, substantially as described.

2d, Also, the method of ascertaining the quantity of spirits produced by a distillery in a given time by passing the beer through an automatic registering meter on its way from the fermenting cisterns to the still, whether in combination with a meter to measure the distilled spirits or not, substantially as herein described.

73,100.—SHAFT COUPLING.—Geo. W. Hubbard (assignor to Cresson & Smith), Philadelphia, Pa.

I claim the combination of a clamp or griping coupling, A, constructed substantially as described, and provisional safety key, D, with the shafts, B and B', as and for the purpose set forth.

73,101.—PUSHING JACK FOR RAILROAD CAR.—Ezra Hutson, Brockport, N. Y.

I claim the hinged jaw, g, in combination with hinged lever, C, and hand lever, A, substantially in the manner specified.

73,102.—DEVICE FOR SHARPENING HORSESHOE CALKS.—Wm. M. Jones, Horicon, Wis.

I claim the within-described V-shaped file, constructed and used substantially as and for the purpose specified.

73,103.—WASHING MACHINE.—Joel Lee, Galesburg, Ill.

I claim, in combination with the box, with wheel, B, and crank, shaft for operating the pitman, rack bar, and pinion, E, the arrangement of the self-adjusting pins, G G, directly over the pedestal, I, constructed as described, and placed over ther bottom of the box, as specified.

73,104.—BREAD BOARD.—Wm. H. Lewis, New York city.

I claim the cutting board for bread, etc., formed with a recess or case for receiving the knife, as set forth.

73,105.—FILTER.—Joseph N. Lighthall, Joliet, Ill.

I claim a filter consisting of a vessel, A, provided with a central inlet pipe, C, a removable cover, B, perforated partitions, F G, and an outlet pipe, G', substantially as described.

73,106.—PANTALOON PROTECTING GUARD.—E. Lindsley, Cleveland, Ohio.

I claim, 1st, The guard plate, A, loops, B B, and pins, C, when combined and arranged in relation to the pantaloons, substantially as and for the purpose described.

2d, The button, D, and guard, A, arranged as described, in relation to the boot and pantaloons, substantially as and for the purpose set forth.

73,107.—BROOM.—H. Lumbard (assignor to himself, G. E. Gerts, and John Semidt), Chicago, Ill.

I claim the arrangement of the reeds on the wedges, B B, and the manner of securing them to the block, A, by means of said wedges, substantially as and in the manner herein set forth.

In combination with the above, the rivets, C C, and plates, D D, arranged as described and specified.

73,108.—CURTAIN FIXTURE.—T. J. Marinus, Independence, Iowa.

I claim, 1st, The automatic clamp, G, when constructed substantially as and for the purpose specified.

2d, The combination of the automatic clamp, G, wire, H, and cord, E, all arranged and operating in the manner and for the purpose set forth.

73,109.—FIBROUS MATERIAL FOR THE MANUFACTURE OF ROPES, CORDS, AND FOR COVERING WIRES, CORDS, ETC.—Henry A. Martin, Roxbury, assignor to Joseph H. Adams, Boston, Mass.

I claim a fiber formed from gutta percha, for the purposes set forth.

73,110.—SCREW MACHINE.—B. A. Mason, New York city.

I claim, 1st, The receiver, n, and pusher, 11, in combination with the blank carrier, f, substantially as and for the purposes set forth.

2d, The ring-blank carrier, f, in combination with the ring tool holder, d, and cutters, r, the holder passing through the carrier, as and for the purposes set forth.

3d, The arrangement of devices as described for operating the pusher, 11, as and for the purposes set forth.

4th, The removable chucks, constructed and applied as set forth, in combination with the ring-blank carrier, f, as and for the purposes specified.

5th, The delivery slide, w, actuated as specified, in combination with the ring-blank holder and ring tool holder, as set forth.

6th, A machine for cutting screws, in which the tools and their supporting ring are moved continuously by gearing that is connected with the screw driver by a change-able gearing all arranged substantially as set forth so that the pitch of the screw thread may be varied, as specified.

7th, The cams, k and s, or projections applied to the ring, d, substantially as specified in combination with the parts that supply the blank, force it into the blank holder, and move the blank holder and the screw driver, the parts being arranged and operating substantially as set forth.

73,111.—GOVERNOR.—T. B. McConaughey, Newark, Del.

I claim, 1st, The hinged arm, D, in combination with hook, e, and tripping ever, E, when constructed and operating substantially as set forth.

2d, The governor pulley, h, when driven by and combined with pulley, g, and belt, H, in the manner substantially as specified.

73,112.—GRAIN MEASURE.—E. O. Melvin, Brooklyn, Wis.

I claim the combination of the bifurcated chute, A a a', with the gate, B, lever, L, rod, S, and the registering apparatus above described, substantially as described for the purpose herein set forth.

73,113.—RAILWAY-SWITCH ALARM.—I. Ferguson Morsell, Stamford, Conn.

I claim the combination with the switch bar and lever, capstan or other device for operating the same of a clock movement provided with an alarm gong attachment, substantially as and for the purposes herein specified.

73,114.—REEDS FOR ORGANS, ETC.—William Munroe, Cambridge, Mass.

I claim, as an improved manufacture, musical reeds in which the tongue is secured in place between two projections, in the manner substantially as described.

Also the combination with the tongue secured in place substantially as described of a depression in the middle or elevation at the ends of the bed to which it is secured, substantially as and for the purpose set forth.

73,115.—MACHINE FOR MAKING PASTE.—G. G. Noah, Boston, Mass.

I claim, 1st, Introducing steam into the perforated arms and into the contents of the tub, for the purpose above described and in the manner substantially as set forth, or by any equivalent means.

2d, The combination of arms attached to the shaft wholly perforated or partly perforated and partly not perforrted, for the purpose above described and in the manner substantially as set forth.

73,116.—SHINGLE MACHINE.—D. L. Peacock, Rockport, Ind.

I claim, 1st, A cutter frame composed of two parallel plates, m m', the upper one holding a knife, N, and the lower one having a raised bed, m''', arranged and combined substantially as and for the purpose specified.

2d, The combination of a cutter frame having tapering arms, t t, with the movable planer, G, bearing in hinged arms, H H, substantially as and for the purpose specified.

73,117.—FRICTION ROLLER.—C. W. Pierce, Albany, N. Y.

I claim the collars, A A, made in two parts and provided with slots or openings in which the rollers, D D, are held, as and for the purpose set forth.

73,118.—SKATE SHARPENER.—B. F. Prettyman, Alexandria, Va.

I claim, 1st, The adjustable guides, B B, in combination with the adjustable file or cutting tool, E, substantially as described and for the purpose set forth.

2d, The combination of the file or cutting tool, E, and key, F, when the same are constructed and arranged substantially as described.

73,119.—SEWING MACHINE.—George Rehfuss, Philadelphia, Pa., assignor to the American Buttonhole, Cording, Braiding and Embroidering Machine Company, New York city.

I claim the combination of the upper and lower eye-pointed needles when the movements herein described are imparted to the two needles so that by their joint action they may produce with two threads the stitch herein described in the body or on the edge of a fabric.

73,120.—HINGE.—Reuben Reiber, Lebanon, Pa.

I claim, 1st, The pivoted plate, c, with screw hole to fasten it to the shutter or other object in combination with the leaves, A A', and pins, a a, all constructed and arranged and operating substantially in the manner and for the purpose described.

2d, The right and left-hand hinge leaves, A A' b b', fastened together by a pin, s, which has a head, a', and to which head a plate, c, is pivoted, all substantially in the manner and for the purpose described.

73,121.—TICKET HOLDER.—N. J. Richardson, Lowell, Mass.

I claim, 1st, As a new article of manufacture, a ticket holder formed of a single wire, in the manner described.

2d, The holding spring or clamp, E, arranged and operating as described.

73,122.—GLASS LAMP.—D. C. Ripley (assignor to Ripley & Co.), Pittsburg, Pa.

I claim a lamp which is constructed with a pressed base, A, and one or two handles, B, and a globe, C, blown thereupon, substantially as described.

73,123.—MACHINE FOR HANDLING OR PILING BRICK.—James Sangster, Buffalo, N. Y.

I claim, 1st, The partitions, B, when made movable by means of the handles, C, and pins, D, substantially as and for the purposes herein described.

2d, Also, in combination with the above, the springs, G, so arranged as to force said partitions, B, apart, substadtially in the manner and for the purpose herein described.

73,124.—APPARATUS FOR GENERATING GAS.—D. F. Scheaf, Dayton, Ohio.

I claim, 1st, The arrangement of the tank, A, pipe, C, and stove, B, in such a manner that the made gas is passed back through the oil tank, the various parts being constructed and operating substantially as set forth.

2d, The arrangement of the receiver top with chain, N, lever, P, and pipe, C, provided with a stop cock in such a manner that the flow of oil to the generator is regulated by the rise and fall of the receiver top, substantially as and for the purposes specified.

73,125.—CHURN.—Conrad Schifferly, Bourbon, Ind.

I claim, in combination with the dasher, b, the saucer-shaped disk, e, as and for the purpose described.

73,126.—DIVIDER AND CALIPER.—E. S. Scripture, Brooklyn, N. Y.

I claim, 1st, The wedge-shaped circular rib, R, and groove, R', secured by a set screw, s, or an equivalent thereof, for the purpose substantially as described.

2d, Also adjusting the leg, B'', of the caliper by means of a set screw, e, in the manner as above set forth and shown in the drawings at Fig. 1.

3d, Also a universal divider with braces, 1 2 3 4, and having the inner surfaces or disks of the head, A, corrugated or ribbed and grooved, as shown at Figs. 3 and 4, for the purpose as above set forth.

73,127.—CLOCK CALENDAR.—J. K. Seem, Canton, Pa.

I claim the construction and arrangement of the wheels, B C D, and the plate, d, substantially as described for the purposes set forth.

73,128.—SWING.—B. F. Shaffer, Dayton, Ohio.

I claim, in combination with the seat, g g, of a swing, the hinged pedal attached to the swing and the cords, c c, fastened to the pedal and carried over pulleys on the swing frame, h h', and then fastened in front of the point of suspension of the swing, said several parts being respectively constructed and arranged substantially as set forth.

73,129.—GATE.—Franklin R. Sherman, Dowagiac, Mich.

I claim the frame, E, used in combination with the gate, the wheels, G and H, and the post, C, substantially as and for the purpose set forth.

73,130.—GARBAGE CAN OR VESSEL.—William Shires, Cincinnati, Ohio.

I claim a garbage vessel consisting of the sheet-metal body, A, wooden staves, B, and base, C, for the purpose set forth.

73,131.—MACHINE FOR BRAIDING WHIP LASHES.—Phineas L. Slayton (assignor to himself and Almet Reed), New York city.

I claim, 1st, The circular disks, F, with slots, h, gearing into each other to carry the braiding fingers, herein described, constructed, arranged and operating as set forth.

2d, The braiding fingers herein described traveling in guide ways, a a, with their ends pointing inward and approaching near to the center of the hollow sphere herein described, all constructed, arranged and operating substantially as and for the purpose set forth.

3d, The oscillating guide blocks, s s, the the curved plates, n n', and the pin, o, in combination with the plates, 1 1', constructed, arranged and operating substantially as described.

73,132.—WAGON PROTECTOR.—G. R. K. Smith, Brooklyn, N. Y.

I claim the construction, application and arrangement of a protecting guard, substantially as and for the purposes described.

73,133.—SAFETY PADLOCK FOR RAILROAD CARS.—George W. Stevens, Albany, N. Y.

I claim the lock composed of the shell, A, yoke, B, and springs or spring catches, C, combined and operating in such manner that the lock may be detached only by severing the yoke, substantiallp as herein set forth.

73,134.—BARREL CHURN.—S. H. Swasey, Morristown, Vt.

I claim, 1st, A float frame made to fill or nearly fill the diameter of the barrel or churn when provided with floats extending to or nearly to the central float arbor and operating in connection with said float arbor, substantially as described.

2d, The central float arbor provided with floats alternating with those on the float frame so arranged that it may be made to rotate with the float frame or held stationary when desired, substantially as and for the purposes described.

3d, The means for adjusting or setting the float frame and float arbor, whereby the floats may be set or held in the same plane with or at right angles to each other, for the purposes and substantially as described.

4th, The adjustable shaft, b, provided with the squared end and with the grooves, c c1, for controlling the relative operation of the float arbor and frame, substantially as described.

5th, The grooved perforated pivot, b1, provided with the squared end fitting in the float arbor, whereby said arbor may be held stationary for working the butter, substantially as described.

73,135.—MEDICAL COMPOUND.—D. W. Taylor, Bell county, Texas.

I claim the preparation or medicine herein described for the purpose set forth.

73,136.—PADLOCK.—M. P. Thatcher, Pontiac, Mich.

I claim the arrangement of the plates, A and B, with their shafts and cylinders as constructed and used in combination with the wheels, F F, as and for the purpose specified.

73,137.—MACHINE FOR TREATING ORES OF GOLD AND SILVER WITH VAPOR OF MERCURY.—William A. Thompson, New York city.

I claim, 1st, The cylinder, A, when suspended upon hollow trunnions, H, one of which is connected with a retort for vaporizing mercury and the other with a steam generator and so suspended that one end may be turned down to allow the contents to be drawn off, substantially as set forth.

2d, The cylinder, A, suspended upon hollow trunnions, and constructed with opposite windows, G, and openings, D E and F, and used in combination with the stirrer, B, substantially as and for the purpose set forth.

72,138.—APPARATUS FOR PREPARING PAPER STOCK.—Joel Tiffany, Albany, N. Y.

I claim, 1st, The use of a strong, close vessel for heating the entire liquor to be used in the reducing vessel to its maximum heat before introducing the same into the reducing vessel in combination with the reducing vessel, substantially in the manner and for the purpose above described.

2d, The use of a close vessel, B, in combination with a reducing vessel, G, to be used with their several connecting pipes, substantially in the manner and for the purpose above described.

73,139.—WATER-PROOF FABRIC FOR THE MANUFACTURE OF TRAVELING BAGS, TRUNKS, CARRIAGE TOPS, AND OTHER ARTICLES.—William H. Towers, Boston, Mass.

I claim, 1st, The improved fabric, made substantially as herein described.

2d, The combination of one or more thicknesses of paper with a woven fabric and finishing the same with enamel, substantially as herein described.

3d, The manufacture of traveling bags, trunks, valises, table covers, carriage tops, and similar articles, by combining enamelled paper with other textile fabric, substantially as described.

4th, The application of glycerin to compound fabrics of paper and cloth, such as herein described, to render them tough and pliable, substantially as set forth.

5th, The combination of gums, resins, paraffine, collodion, drying oils, and the like with a fabric composed of paper and cloth, substantially as described.

73,140.—CAR COUPLING.—Jacob N. Vandegrift, Stephen T. Vandegritt, Smith D. French and Elias S. Stone, Wabash, Ind.

We claim, 1st, The method and means described for self-coupling cars of a railroad train, to wit, by forcing the link held by the coupling bolt of the bumper of one car up to and past the bevelled coupling bolt, D, of the bumper of the other car which coupling bolt is fixed by a rivet, P P, to an attachment, E, which tilts as the coupling bolt rises and falls, and which attachment is kept in place by the spring, b t.

2d, The method and means above described for uncoupling and detaching railroad cars at will whether the cars are in motion or at rest, viz., by the use of a cord or chain, R, in reach of the conductor and attached to a compound lever, U m T, affixed at U to the side of the bumper and at T to the attachment by which the coupling bolt is raised or depressed so that the coupling bolt may be raised and depressed at will.

3d, The method and means above described for uncoupling and detaching railroad cars when run off the track, viz., by using corresponding couplers as above described on the bumpers of each car and so that when the forked lever, F, of the bumper of one car rests on top of the spring, i, of the forked lever on the bumper of the other car and being moved laterally pushes the wheel, I, at the end of the attachment of the coupling bolt against the inclined planes, O, of the forked lever the effect will be to depress the coupling bolt and detach the cars.

73,141.—SHOEMAKER'S HAMMER.—Jacob Vigeant, Marlboro, Mass.

I claim constructing the hammer with the inclined striking face set at an angle with the handle, substantially as shown and described.

Also combining with the handle having uniform opposite sides the two inclined faces arranged with respect to each other and to the handle, substantially as shown and described.

73,142.—ATTACHMENT FOR HOPPER OF GRINDING MILL.—David C. Walters, Warsaw, Ind.

I claim, 1st, A bell so operated and arranged within the hopper that when surrounded by the grain it will be held stationary but when uncovered will be caused to ring, substantially as and for the purpose specified.

2d, The loaded lever, D, and connecting rod, d, so combined with the float, B, in the bottom of the hopper that the said lever may operate when the float is released from the weight of grain in the hopper, substantially as and for the purpose specified.

3d, The bell, F, wire, f, and adjustable annular block, E, in combination with the standard, C, rod, g, and bar, G, substantially as and for the purpose specified.

73,143.—SULKY PLOW.—Joseph Warwick, Springboro, Ohio.

I claim, 1st, The device for lowering and raising the plow beam consisting of the plates, g and l, the former being slotted, pivoted as described, adjusted by means of the set screws, k, and operated by means of the lever, G, and bow rack, H, substantially as described.

2d, The screw shank, s, of the sheath, k, and nut, t, in combination with the standard, F, attached to the land side, L, by means of the bolt, p, for the purpose of lowering the plow point, substantially as described.

3d, The mold board, I J, with its part, J, bent around the sheath and secured to the same, substantially as and for the purpose described.

4th, The share, M, with its bent part, N, connected to the land side, L, and with the latter forming the point, attached and constructed substantially as described.

5th, A plow with separate mold boards and share both attached to the sheath in such a manner that no bolt or rivet is used on their surface, substantially as described.

73,144.—FLOCK DUSTER.—Miles Waterhouse, Passaic, N. J.

I claim the rotating brush cylinder, d, with its spirally arranged brushes and beaters, d' d' d', when combined together and with the screen, e, and the openings, e and i, in the manner and for the purposes shown and described.

73,145.—LAMP.—Hiram B. Wellman, Allegheny City, Pa.

I claim the pipe, C, for oil, and the pipe, E, for water, having chamber, D, between them, when arranged in combination with the lamp, A, and used for the purposes set forth.

73,146.—PROCESS OF MANUFACTURING WHITE OXIDE OF ZINC.—Samuel Wetherill, Philadelphia, Pa.

I claim passing the products of combustion from the furnace into an auxiliary chamber or chambers containing incandescent carbon, and thence, through the incandescent coals, into contact with a hot blast, substantially as and for the purposes described.

73,147.—APPARATUS FOR THE MANUFACTURE OF WHITE OXIDE OF ZINC.—Samuel Wetherill, Philadelphia, Pa.

I claim the combination, with the furnace, of one or more chambers, communicating with said furnace, and adapted to contain incandescent coals, and permit the passage of the products of combustion from the furnace through the said coals, substantially as and for the purposes described.

Also, in combination with the incandescent chambers, hot-air flues, into which the vapors of zinc may pass from said chambers, to mingle with and be carried off by a hot blast, substantially as described for the purposes set forth.

Also, the arrangement of the blast tubes, g, immediately over the furnace and communicating with the chambers, E E, as and for the purposes described.

73,148.—HAMES-TUG BUCKLE.—Ludwig Wetzell, Washington, D. C.

I claim the hames-tug buckle, g, with loop cover, a, and pin, f, when the parts are constructed, connected, and fitted to produce the result, substantially as described within.

73,149.—CARRIAGE HARNESS.—Ezra Wilder, South Hingham, Mass.

I claim making the parts of the saddle relatively adjustable, substantially as shown and described.

Also, making the parts of the hames relatively adjustable laterally, substantially as above described.

73,150.—WATER WHEEL.—Courtland B. Wilson and Abner S. Houghton, Trenton, N. J.

We claim the combination of the top plate, E F, and the rim, G H, with the movable self-adjustable buckets, L L, stays, K K, the groove or channel, O O, and stops or abutments, P P, all substantially as above described, and for the purpose set forth.

73,151.—CHEESE BOX AND BUTTER TUB.—Frank H. Wilson, Wethersfield, N. Y.

I claim the arrangement of the box or tub, A, with its cover, B, box, A, having a flat metal shoulder, d, on each side, near its top, and cover, B, having similar metal shoulders, e, on its inner flange, as and for the purposes set forth.

73,152.—VISE.—Linus Yale, Jr., Cooperstown, N. Y.

I claim, 1st, A screw capable of operating the moving jaw of a vise, in combination with a nut having an inclined plane thereon, and an inclined plane attached to the moving jaw, these parts being and operating in combination, substantially as described.

2d, In combination with a rack attached to the stationary jaw of a vise, and an inclined plane attached to the moving jaw thereof, a racked nut, provided with a screw, and an inclined plane, the combination being substantially such as described, and operating substantially as set forth.

3d, In combination with the jaws of a vise, a screw, a rack, and a racked nut, a spring, located as described, and operating in combination with the parts with which it is combined, substantially as described, to control the position of the rack, substantially in the manner and for the purpose specified.

Lastly, a sectional collar, in combination with a moving vise jaw, and the screw which operates it by means of recesses therein, the combination being and operating substantially as hereinbefore set forth.

73,153.—PUMP.—Frederick Yeiser, Danville, Ky.

I claim the rod or shafts, D D, provided with agitating cross-pins, and used with the stock, A, substantially as and for the purpose set forth.

73,154.—TIME ALARM.—Louis Baum, Washington, D. C.

I claim an alarm, arranged to be operated by an ordinary watch, through the medium of the weight, T, cord, I, and revolving shaft, F, arranged to operate substantially as described.

73,155.—CAR SEAT LOCK.—G. W. R. Bayley and John McCluskey, Algiers, La.

We claim, 1st, The bar, A, and pins, a, disposed on the said bar, a, substantially as above described, in combination with the lips, E, or their equivalent, in the manner and for the purpose substantially as above set forth and described.

2d, The said bar, A, in combination with the half cap, F, and padlock, G, in the manner and for the purposes above set forth and described.

73,156.—BUCKWHEAT HULLING MACHINE.—Joseph Baysore, Freeport, Ill.

I claim, 1st, The arrangement of the tightening bar, N, spindle step, c, knockers, d, for operating the trash screen, spindle, a, ball, g, fan blower, E, and curved spout, G, as herein shown and described.

73,157.—STRAW CUTTER.—A. J. Bell, Bloomingburg, N. Y.

I claim the toothed cutter blade, C, in combination with the frame, G, guides, F, and box, B, all constructed, arranged, and operating substantially as described.

73,158.—ATTACHMENT FOR PLOW.—Wm. Bennett, Rushville, Ind.

I claim, 1st, The vertically-adjustable fender, H, attached to the bar, E, sliding in the guide, F, when such bar is attached to the spring, J, whose forward end is secured to the beam, A, in such a manner that the fender shall yield to a clod of earth, and be thrown into the proper position by the spring, J, after passing such clod, as herein shown and described, for the purpose specified.

2d, The spring, J, when secured to the sliding bar, E, bearing the pendent arm, G, and fender, H, for the purpose of allowing a yielding movement to the fender when brought in contact with clods of earth, as herein shown and described.

73,159.—AUTOMATIC WATER GATE.—H. Besse, Delaware, O.

I claim, 1st, A water gate, A, pivoted at or near its lower margin, and provided with a projecting float, B, all substantially as shown and described, and operating as and for the purpose set forth.

2d, The latch, e, or other equivalent device, operated by a float, m, or other equivalent device, substantially as shown and described, and in combination with the water gate, A, all as and for the purpose set forth.

73,160.—SLUICE BLANKET.—Abraham Block, San Francisco, Cal.

I claim a sluice blanket provided with woven ribs, substantially as herein described.

73,161.—WATCH.—George A. Bowen, Trenton, assignor to himself and Samuel C. Parrott, Bordentown, N. J.

I claim the ring, r, formed within the drum, A, and fastened to the main spring, B, when combined with the catch, E, and shoulder, s, substantially as and for the purposes herein shown and described.

73,162.—HOLLOW AUGER.—Albert Brush, East Constable, N. Y.

I claim, 1st, The hollow auger, D, provided with the knives, e e', for forming upon spokes the tenons, b, and shoulder, s, adapted to fit into the recess in the felleys formed by the auger, C, having the extended cutting lips, c, and the adjustable guide, d, constructed to operate as herein shown and described.

2d, The auger, C, when provided with the projecting cutting lip, c, and adjustable gage, d, constructed and operating as herein described, for the purpose specified.

73,163.—PROCESS OF MIXING IRON AND STEEL.—James Cartwright, Youngstown, Ohio.

I claim the process of mixing and combining steel and iron, substantially as herein described.

73,164.—KNITTING MACHINE.—J. Chantrell, Bristol, Conn.

I claim, 1st, The manner, herein shown and described, of connecting the arms of the sinkers, m, by means of annular plates, r', and rivets, as set forth.

2d, The needle carrier, G, when connected with the sliding rack, F, and with the plate, H, in such a manner that a combined longitudinal and transverse sliding motion is imparted to it, substantially as herein shown and described.

3d, The reciprocating thread carrier, R, when arranged as described, in combination with the arms, e1, needles, I and J, and sinkers, W, all made and operating substantially as herein shown and described.

4th, The devices herein shown and described, for communicating motion from the needle carrier, G, to the bar, P, holding the thread carrier, said devices consisting of the spring plates, a1 b1, cams, c1, and stationary cams, d1, all made and operating substantially as herein shown and described.

5th, The devices herein shown and described for adjusting the stroke of the sinkers, W, consisting of the grooved plate, V, vertical slides, g', eccentric shafts, h', gear wheels, i', and sliding rack, j', all made and operating substantially as herein shown and described.

6th, The combination of the perforated disk, d, adjustable connecting rod g, and the segment, D, as and for the purpose set forth.

73,165.—WHIP.—J. S. Cook, West Groton, Mass.

I claim a whip having its lash secured or hung to its stick, through a swivel ring or eye, substantially as and for the purpose described.

73,166.—CORN PLOW.—S. H. Cox and William H. Pence, Matton, Ill.

We claim, 1st, Connecting the forward ends of the plow-beams, H, to the frame, C, by means of the clevis, I, constructed as described, and the long adjustable bolt, J, substantially as herein shown and described, and for the purpose set forth.

2d, The combination of the lever, O, and toothed pawl, P, with the shaft N, grooved segments, M, chains, L, and beams, H, in connection with the clevises, I and long bolts, J, for raising the plows vertically from the ground, substantially as herein shown and described.

3d, The combination and arrangement of the plows, V, having cutters, v' attached to them, and turning the dirt from the hills, plows, W, running at a lower level than the plows, V, and turning the dirt toward the hills, standards, R and T, and beams, H, with each other, substantially as herein shown and described, and for the purpose set forth.

73,167.—FLOUR BOLT.—William Craig, Uniontown, Pa.

I claim the bolt, constructed as described, having the partition, v2, between the outer and inner bolting cloths, v v1, operating substantially as described for the purpose specified.

73,168.—LOW WATER ALARMS FOR BOILERS.—F. S. Davenport, Jerseyville, Ill.

I claim, 1st, The construction and arrangement of the hollow tube, C, provided at its upper end with the screw plug, D, having valve seat, g, the hollow tube, E, fitting into tube, C, and having the opening, j, communicating with the interior of the float, and provided at its upper end with the pointed valve, h, all operating as described, for the purpose specified.

2d, In combination with the outer and inner tubes, C and E, when arranged as described, the valve seat, g, the valve, h, and the orifice, j, substantially as and for the purposes set forth.

73,169.—BROOM OR BRUSH HOLDER.—Anthony G. Davis (assignor to himself and Augustus N. Woolson), Watertown, Conn.

I claim the patent broom-brush holder, constructed as described, consisting of the curved spring arms, A, made in one piece, and secured in position under the bar, B, and slotted to receive the sliding bar, C, as herein described for the purpose specified.

73,170.—TIRE SHRINKER.—Edward B. Decker, Bedford, Ill.

I claim the combination of the operating lever or handle, D, pivoted straps, C and E, pivoted levers or bars, A and B, having clamps with stationary jaws, F G, and pivoted eccentric jaws, H I, attached to them, with each other, substantially as herein shown and described, and for the purpose set forth.

73,171.—EXTENSION CLOTHES POST.—George Dittenhaver, Napoleon, Ohio.

I claim the combination of the sliding part, B, provided with the spring pawl, b, and having the removable clamp, D, secured to its upper end, and

justed by means of the thumb screw, F, all constructed and operating substantially as described for the purpose specified.

73,172.—CULTIVATOR.—Edwin Doolittle, Pawnee, Ill.

I claim, 1st, The hinged sides, M, friction wheels, N, and bent bar, E, with each other, and the plow beams, I, and with the beams or bars, D, substantially as herein shown and described, and for the purpose set forth.

2d, In combination with the above, the knees or bars, O, cross bar, P, and lever, R, all arranged and operating in the manner and for the purpose set forth.

3d, The combination of the adjustable connecting and brace bars, W, uprights, V, and plow-beams, I, when arranged to operate in the manner herein described and represented.

73,173.—CULTIVATOR.—John W. Doud, Forestville, Iowa.

I claim, 1st, The combination of the frame, C, strengthening braces, D, and diagonal plow beam, E, to which the standards, F, of the plows, G, are attached with each other, the said parts being constructed and arranged substantially as herein shown and described, and for the purpose set forth.

2d, Connecting the axle, B, to the tongue, I, of the frame, C, by the inclined bars, J, and jointed or link connection, K, substantially as herein shown and described.

3d, The combination of the cross bar, M, and adjustable chains, L, with the inclined bars, J, and frame, C, substantially as herein shown and described, and for the purpose set forth.

4th, The combination of the lever, N, chain, P, and bail or bar, R, with the frame, C, and axle, B, substantially as herein shown and described, and for the purpose set forth.

5th, The combination of the levers, S and T, with the frame, C, axle, B, and inclined bar, J, substantially as herein shown and described, and for the purpose set forth.

73,174.—DOOR HINGE.—Charles Dupre, Louisville, Ky.

I claim the hinge plates, a and b, furnished with the arms or ears, E E' and c, in combination with the pin, C, screw, D, and socket, F, or their respective equivalents, in manner as and for the purposes described.

73,175.—TIRE SHRINKING MACHINE.—James Elliott, Milford, Wis.

I claim, 1st, The combined sides, M, friction wheels, N, and bent bar, E, with each other, and the plow beams, I, and with the beams or bars, D, substantially as herein shown and described, and for the purpose set forth.

2d, In combination with the above, the knees or bars, O, cross bar, P, and lever, R, all arranged and operating in the manner and for the purpose set forth.

3d, The combination of the adjustable connecting and brace bars, W, uprights, V, and plow-beams, I, when arranged to operate in the manner herein described and represented.

73,176.—BUCKLE.—Louis Elsberg, New York city.

I claim the buckle constructed as described, consisting of the buckling loop, A, having the flattened center, C, and bent edge, D, its extremities, B, bent at right angles to the center, forming bearings for the loop, E, the latter having the serrated tongue, I, fitting between the arms, B, upon the flat surface of the loop, A, beneath the edge, D, as herein described for the purpose specified.

73,177.—HAY KNIFE.—Charles A. Fisher, Geneseo, Ill.

I claim, as a new article of manufacture, the hay knife, when formed from a piece of metal, as shown and described, and provided with the handles, F G, as herein set forth.

73,178.—SEWING MACHINE.—David Forrest, Eastport, Me.

I claim the bent hand lever, D, in combination with the slide rods, e k, mounted on the base, b, and connected with the needle, a, and the looper, d, as set forth, the whole constructed and operating as herein described.

73,179.—HORSE HAY FORK.—C. E. Gladding, Troy, Pa.

I claim, 1st, In combination with a power hay fork, the connection, d, or its equivalent, formed of the parts, E F and G, or their equivalents, substantially as and for the purposes herein shown and described.

2d, In combination with the connection, D, or its equivalent, the ball, C, substantially as described.

73,180.—STRAW CUTTER.—J. F. Hammond, North Sudbury, Mass.

I claim, 1st, The combination and arrangement of the bevelled knives, L M N, with each other and with the sliding frame, D, and feed box, C, substantially as herein shown and described, and for the purpose set forth.

2d, The combinations of the slotted lever arms, a T, sliding frames, O, and sliding rake heads, S, one set or both, with each other, with the feed box, C, frame, B, and knife frame, D, substantially as herein shown and described, and for the purpose set forth.

73,181.—CULTIVATOR.—C. A. Harper, Wheeling, Ind.

I claim, 1st, The combination of the wheel, D', with the cultivator frame, A, substantially as herein shown and described, and for the purpose set forth.

2d, The combination of the spiral or screw plate, H, with the wheel, D', and with the cultivator frame, A B, substantially as shown and described, and for the purpose set forth.

73,182.—BURGLAR ALARM LOCK.—Samuel T. Heminway, Saratoga Springs, N. Y.

I claim the combination and arrangement of the pivoted lever, B, having its outer arm projecting through the aperture, T, on the top of the lock, the notched arm, A, secured to the verge, the spring, C, and arm, R, substantially as described, for the purpose specified.

73,183.—CAR AXLE BOX.—Geo. H. Henfield, San Francisco, Cal.

I claim the combination of the grooved caps, e e, the linings, a a, provided with pins, c c, and the shells, A A, arranged as and for the purpose herein described.

73,184.—STRAW CUTTER AND CORN SHELLER COMBINED.—Clark R. Hewett, Wanpun, Wis.

I claim, 1st, The combination of the shafts, J N, bevel gear wheels, L M, cutter knives, P, and sheller teeth, S, with the balance wheel, O, of a combined folder cutter and corn sheller, substantially as described, and for the purpose set forth.

2d, The combination of the rubber springs, R, with the knives, P, and balance wheel, O, substantially as described, and for the purpose set forth.

73,185.—BOBBIN.—Albion P. Holmes, Great Falls, N. H.

I claim the spool or bobbin, having its solid wooden body surrounded by the metallic cylinder between the end disks, the bearings of said spool being composed of wood, as herein described, for the purpose specified.

73,186.—PAD CRIMP PRESS.—George Kennedy (assignor to himself and A. J. Tompkins), Clarksville, Iowa.

I claim, 1st, The frame or press, A B, adapted to receive the blocks, C D, constructed and operated substantially as herein shown and described and for the purpose set forth.

2d, The removable crimping blocks, C D, or their equivalent, constructed and operated substantially as herein shown and described and for the purpose set forth.

3d, The combination of the removable crimping blocks C D, or their equivalent, with the frame or press, A B, substantially as herein shown and described and for the purpose set forth.

73,187.—FRUIT JAR.—J. M. W. Kitchen, New York city.

I claim the vent plug when attached to an elastic band, or its equivalent, and arranged for operation substantially as described, for the purpose set forth.

73,188.—SPRING BED BOTTOM.—Gottlieb Koenig, Plymouth, Mich.

I claim the bars, C, the springs, D, and the regulating rods, E, constructed, combined, and operating with the platform, B, and the base frame, F, in combination with a bedstead, substantially as described.

73,189.—SNOW PLOW.—Charles Lusted, New York city.

I claim, 1st, The hinged oscillating plowshare, D, when made and operating substantially as and for the purpose herein shown and described.

2d, A snow plow provided with an oscillating share, D, which is hinged to the upper edge of a stationary share, C, and which has flanges b, at the ends, substantially as herein shown and described.

3d, The hinged share, D, of a snow plow, connected by means of a jointed rod or rods, g, with a crank or cranks, a, on the axle of the plow truck, as described, the crank or cranks being loose on the axle, and connected with clutches, so that the share can be made to oscillate or not, as set forth.

73,190.—HAY ELEVATOR.—Harvey McCown and Luther M. McCown, Enon Valley, Pa.

We claim, 1st, The carriage, E, constructed as described, when its bottom consists of the bar, E, hung at one end, e, of the carriage, its free end extending beyond the opposite side of the carriage, and notched at f, to fit over the catch, b, upon the pendent, I, said bottom, E, being held in position by means of the coiled spring, F, and released by the pressure of the hook, d, as herein described, for the purpose specified.

2d, The combination of the hinged and notched bottom, E, coiled spring F, hook, d, pendant, I, catch, b, rollers, C C, and slide bars, a a, all constructed, arranged and operating substantially as and for the purpose herein shown and described.

3d, The carriage, B, on which the vertical saw, b, and horizontal saw, a, are mounted when arranged to be moved on the ways, A A, by means of a rack and pinion and when arranged to operate a rod, f, through the medium of a pin, f, on the same, substantially as and for the purpose described.

4th, The rod, I, provided with pins, f f', and double incline, i, when arranged to be operated from carriage, B, in combination with the paw, z, and gage ratchet wheel, y, constructed, arranged and operating substantially as and for the purposes set forth.

5th, The toothed reed wheel, n, to which motion is given by worm, w, on shaft, g, through the medium of clutch pulley, n2, on same shaft, substantially as described.

6th, The combination of the clutch pulley, n2, arm, v, gage ratchet wheel, y, and shaft, g', all constructed and arranged substantially as described.

73,191.—ENDLESS CHAIN POWER.—William McCreery, Pittsburg, Pa.

I claim the arrangement of the shifting clutches, e e, the bevels, a a and b, the pulleys, c c1 c2 c3 c4, and the endless chain, d d, when applied as and for the purposes herein described.

73,192.—COMBINED HORSE RAKE AND HAY SPREADER.—Frederick E Nearing, Brookfield, Conn.

I claim the frame, G, fitted loosely on the axle, B, and carrying the revolving rake, H, in combination with the loose pulley, E, and clutch, F, on the axle, B, and the lever bar, J, on the frame, G, with the spurs, g g, on the rake head, all being arranged to operate in the manner substantially as and for the purpose set forth.

73,193.—BAG FASTENER.—Daniel Overholtzer, Polo, Ill.

I claim the bag fastener constructed as described, consisting of the link, b, having an open hook at one end, between the sides of which the bend of the locking hook, d, is pivoted, in such manner that the link, C, when placed over the locking hook, will clamp the bend of said hook in the hooked end of the open link, b, as herein shown and described.

73,194.—WATER METER.—Walter Payton, Sewardstone Road, Victoria Park England.

I claim the combination of the axles, b b, vanes, b1 b1, gear wheels, b2 b2, worm, d, gear wheel, f; worm, f2, gear, g, shaft, g1, worm, g2, and gearing for the operation of the indicators, g3, chambers, e e3 and e4, all arranged as described, for the purpose of measuring the passage or flow of liquids, or for raising and forcing fluids, or for obtaining motive power, as herein shown and described.

73,195.—PRINTING PRESS.—C. Potter, Jr., Westerly, R. I.

I claim, 1st, the combination of the eccentric bearing, E, adjustable box F, segmental pinions, G, segments, H, lever, L, and cylinder, C, substantially as described, for the purpose specified.

2d, The wheel, K, and cam, c, in combination with the eccentric bearing, E, for the purpose of returning the cylinder after having been lifted to its original position before taking a sheet, substantially as herein shown and described.

73,196.—FEED GAGE FOR PRINTING PRESSES.—C. Potter, Jr., Westerly, R. I.

I claim the two screws, D D', and slotted guide plate, B, in combination with the box, composed of two parts, E E', fitted to the shaft, A, and all arranged substantially in the manner as and for the purpose set forth.

73,197.—CLEVIS.—E. M. Potter, Kalamazoo, Mich.

I claim the employment of the two pulleys, A and A', substantially as shown and described, in combination with the ropes or chains, D and D', and the clevis iron, C, or other equivalent device for the purpose of working three horses abreast in plowing or other equivalent operation, all as set forth.

73,198.—ICE SLEIGH.—John Rancevau, Carthage, N. Y.

I claim, 1st, The wheel, , having its bearings in the hinged frame, in combination with the elastic strip, I, whereby the wheel is held upon the ice and permitted to conform to its irregularities, as herein set forth, for the purpose specified.

2d, The construction and arrangement of the pivoted brakes, K I, connecting rods, O, foot levers, E and N, and springs, P, substantially as described, for the purpose specified.

3d, The combination and arrangement of the spur wheel, D, hung in the hinged frame, gear wheels, E F G, elastic strip, I, brace, J, springs, P, foot levers, M N, connecting rods, O, pivoted brakes, K L, block, U, and thumb nut, V, substantially as described, for the purpose specified.

73,199.—PLATE-LIFTER.—D. E. Roe, Elmira, N. Y.

I claim, 1st, The combination of the spring, C, with the claws, A and B, substantially as and for the purpose shown and described.

2d, The loop, b, or other equivalent device for holding the claw, B, at a proper distance apart from the claw, substantially as shown and described.

73,200.—RAILWAY SWITCH.—W. L. Rogers, North Cornwall, and W. E. Crane, New Britain, Conn.

We claim, 1st, The bent or right angular levers, D D', rods, E E' F F', cranks, G G', pinions, a, and rack-bars, I I', all arranged and applied to a switch to operate in the manner substantially as and for the purpose set forth.

2d, The rod, J L, and tube, K, notched as shown, and provided with the spring, l, and plates, g h, in combination with the rods, M M', shafts, I I', pinions, m, and rack bars, N N', all arranged substantially in the manner as and for the purpose specified.

73,201.—BRICK MACHINE.—James Sangster and David P. Dobbins, Buffalo, N. Y., and John S. Richards, Erie, Pa.

We claim, 1st, The combination of the lug or projection, Q, and the movable jointed connection, D2, or its equivalent, when constructed and arranged substantially as and for the purposes herein described and set forth.

2d, Also, the projecting pieces or rims marked, P2, within the mould in combination with the rims, G', or any equivalent thereto, on the upper perforated piston or pistons, I, substantially as and for the purposes herein described and set forth.

3d, The combination of the mechanism, X X, spring, Y, and cross bar, A', with the vertically moving perforated pistons, substantially as and for the purposes described.

4th, Also, the combination of the vertically moving perforated pistons, I, when the perforations in the lower pistons, G, are made larger than those in the upper pistons, for purposes substantially as herein described.

5th Also, the combination of the upper and lower perforated pistons, with the cams, R, and friction roller, D3, or its equivalent, substantially as and for the purposes herein described and shown.

73,202.—PRESERVE JAR.—F. Joseph Shefferly, Detroit, Mich.

I claim sealing a preserve jar by raising the cover in the neck of the jar, instead of lowering it, substantially as described.

73,203.—ENVELOPE.—F. Marion Shields (assignor to himself and James A. Jarnagin), Macon, Miss.

I claim the envelope, constructed as described, consisting of the parts, B C, provided with the wings, G G, and flaps, H H E E2, having their edges gummed, as shown and specified.

73,204.—THRESHING MACHINE.—John F. Skinner, Brasher Iron Works, N. Y.

I claim, 1st, The operating of the shoe, C, through the medium of the lever, G, and the cam composed of the double spiral thread or flange, c, on the pulley, H, substantially as shown and described.

2d, The spring, N, pulley, h, and lever, M, arranged in connection with the belt, L, and wheel, O, substantially as and for the purpose specified.

73,205.—BOLT CUTTER.—E. A. Sloat, Theresa, N. Y.

I claim the stationary cutter, A, the movable cutter, C, the lever, E, and the plates, B, constructed and arranged substantially as herein shown and described, for the purposes set forth.

72,206.—GATE.—Gaius P. Stebbins, Sparta Centre, Mich.

I claim the sliding gate, B, hung or suspended on rollers, a a, in combination with the weight, k, the pivoted bar, E, platforms, F F, and the pulleys, D J J', all arranged to operate in the manner substantially as set forth.

73,207.—UTERINE ELECTRODE AND ABDOMINAL SUPPORTER.—Albert J. Steele, New York city.

I claim, 1st, Wire electrodes, insulated and covered with sponge, substantially as shown and for the purpose specified.

2d, The straps, B, for sustaining the electrode in place, substantially as shown, and for the purpose specified.

3d, The form of the electrode having a ring, g' and stems, f f', attached thereto, substantially as shown and for the purpose specified.

4th, The form of electrode having the ring, g, and cross pieces, h h, substantially as shown and for the purpose specified.

5th, The form of electrode having a single stem, f', and cross piece, h, substantially as and for the purpose shown and described.

6th, Elastic straps, c c, in combination with the strap, B, substantially as and for the purpose shown and described.

7th, The abdominal belt, A, in combination with the above described electrodes, substantially as and for the purposes shown and described.

8th, The non-conducting plate, D, in combination with the wire electrodes, as hereinafter described, substantially as shown and for the purpose specified.

73,208.—TINNERS' FORMING MACHINE.—William Stine, Elmore, Ohio.

I claim the flaring gage, a, in combination with the rollers of a tinman's forming machine, arranged and operating substantially as and for the purpose herein described.

73,209.—PLOW.—James Urie, Evansville, Ind.

I claim, 1st, The standard, C, constructed as described, having the flange, c1, extending its entire length upon one side, and the horizontal part or land side forming two flanges upon its rear end, gradually decreasing in width toward the forward part, all cast in one piece, as herein described, for the purpose specified.

2d, The point, A, when cast in one piece as set forth in combination with the standard, C, constructed as described having the flange, c1, extending its entire length upon one side and the horizontal part or land side forming the flanges upon its rear end gradually decreasing in width toward the forward part and cast in one piece, as herein shown and described.

73,210.—SAW.—George Walker, Middletown, N. Y.

I claim the annular rivet, c, inserted in the side of the saw tooth engaging with the notches, a, upon the cutter, B, whereby the latter is held in the groove of the tooth, as herein shown and described.

73,211.—HORSE HAY FORK.—J. H. Walker, Grand Rapids, Mich.

I claim the vertical spring bolt, D', working in projections upon the side of the suspension bar, C, near its upper end and fitting into the notch, e, in the underside of the curved frame, B, passing through the mortise in the suspension bar, C, above the spring bolt, D', arranged and operating as described for the purpose specified.

73,212.—SCRAPER ATTACHMENT TO CARS.—E. B. Wells, Northampton, Mass.

I claim, 1st, The adjustable scrapers, D, held down upon the track by means of pressure upon the bar, H, the spring, E, permitting said scrapers to yield to the inequalities of the track, as herein set forth for the purpose specified.

2d, The construction and arrangement of the scrapers, C, attached to the end of the inclined springs, E, curved bar, F, stud, a, slotted and jointed rod, G, its sections, c d, pivoted to the cars, b b, the section, c, connected to the operating bar, H, as herein set forth for the purpose specified.

73,213.—VENTILATOR AND WINDOW SCREEN.—J. R. Wharry, Moundsville, W. Va.

I claim, 1st, The combination of the wire screen and frame, F G, shutters, C C', and window frame, as herein described for the purpose specified.

2d, The shutter, C C', metal bar, e, and lever, E, substantially as described when disposed without the lower part of a window frame, substantially as above set forth and described.

3d, The said shutter, C C', in combination with the slot, g', in screen frame, G, substantially as above set forth and described.

73,214.—MACHINE FOR SAWING LATHS.—Emery T. Wheeler and William H. Vaughan, Cannelton, Ind.

We claim, 1st, The adjustable rests, p p', in which are mounted feed wheels, n n', in combination with the sliding supporting rods, l l', and bars, s, all constructed, arranged and operating substantially as and for the purpose herein shown and described.

2d, The carriage, B, on which the vertical saw, b, and horizontal saw, a, are mounted when arranged to be moved on the ways, A A, by means of a rack and pinion and when arranged to operate a rod, f, through the medium of a pin, f, on the same, substantially as and for the purpose described.

3d, The rod, I, provided with pins, f f', and double incline, i, when arranged to be operated from carriage, B, in combination with the paw, z, and gage ratchet wheel, y, constructed, arranged and operating substantially as and for the purposes set forth.

4th, The toothed reed wheel, n, to which motion is given by worm, w, on shaft, g, through the medium of clutch pulley, n2, on same shaft, substantially as described.

5th, The combination of the clutch pulley, n2, arm, v, gage ratchet wheel, y, and shaft, g', all constructed and arranged substantially as described.

73,215.—WATER WHEEL.—George W. Wheeler and George V. Allen, Hartford, Md.

We claim the combination of the three sets of buckets, a b c, and the inclined rim, d, and bottom, e, to form the wheel, C, in connection with the case, applied to the wheel, and all arranged substantially as and for the purpose specified.

73,216.—MARKER FOR SEWING MACHINES.—Joseph P. White, Savannah, Ga.

I claim, 1st, The spring catch, e, and handle, d, in combination with the presser, C, bar, c, and gage, A, all made and operating substantially as herein shown and described.

2d, The hemmer, D, composed of two pieces, h and i, constructed as set forth, in combination with its sliding supporting block, f, bar, B, and gage, A, as and for the purpose herein shown and described.

3d, The marker, E F, hinged to the sliding block, K, and provided with the spring, m, substantially as herein shown and described in combination with the presser, C, all made and operating as set forth.

4th, The adjustable gage, , when provided with set holes, b b, in combination with the presser, C, handle, d, spring catch, e, adjustable sliding hemmer, D, and hinged and sliding marker, E F, all made and operating substantially as herein shown and described.

73,217.—CULTIVATOR.—Joseph Widman, Panola, Ill.

I claim, 1st, The detachable seat bars, E E, secured to the main frame, A, of the machine, substantially in the manner as and for the purpose set forth.

2d, The attaching of the front ends of the plow beams, G G, to the pendents, I, by means of universal joints, H, when this attachment is used in connection with the pivoted arms, O O, connecting bar, P, and lever, Q, for giving a lateral motion to the plows, substantially as described.

73,218.—BED BOTTOM.—S. J. Wingate, Decatur, Ill.

I claim the combination of the bars or levers, E, elastic straps or bands, L, and cross bars, I, with each other and with the slats, F, and frame of the bedstead, substantially as herein shown and described and for the purpose set forth.

73,219.—SHINGLE MACHINE.—Horace Woodman, Saco, Me.

I claim, 1st, The revolving table with its feeding and securing mechanism constructed substantially as described in combination with the rotary planer, V, and saw, C, as and for the purpose specified.

2d, The combination and arrangement of the outer grooved cylinders, K, adjustable frame, R, lever, Q, segment rack, k, and spring, g, substantially as described for the purpose specified.

NOTE.—In the above list of patents SIXTY-FIVE were obtained through the office of this paper.—EDS.

PENDING APPLICATIONS FOR REISSUES.

Application has been made to the Commissioner of Patents for the Reissue of the following Patents, with new claims as subjoined. Parties who desire to oppose the grant of any of these reissues should immediately address MUNN & CO., 37 *Park Row, N. Y.*

71,955.—SUSPENSION BRIDGE.—Charles Bender, New York city. Dated Dec. 10, 1867. Application for reissue received and filed Dec. 26, 1867.

I claim, 1st, The construction and arrangement of one or more yielding joints, connecting the beams or trusses of stiffened suspension bridges, substantially for the purpose herein described.

2d, I claim the use of bails, serving as material axis of rotation of said yielding joints, and I also claim the means and method to prevent any horizontal deviation of one or more of the adjoining parts of the beams or trusses, substantially for the purposes specified, both for all kinds of stiffened suspension bridges.

3d, I claim the attachment of the ends of the cables or chains at or near the first or shore piers to the longitudinal beams or to the trusses of stiffened suspension bridges, substantially as set forth.

4th, I claim the method employed to reduce the side motion, by leaning the longitudinal beams or trusses of stiffened suspension bridges against all the piers; and I claim also the attachment, on one pier immovable in any horizontal direction, while at the other piers allowance is made for the variations of the length of the beams or trusses, substantially for the purposes set forth and described.

5th, I claim one or more rollers, or pieces of rollers, with or without journals, placed on the end piers of stiffened suspension bridges, substantially for the purpose specified.

6th, I claim the means and method by which the beams and trusses of stiffened suspension bridges are secured vertically to the end or shore piers by use of the weight of the piers, if said bridges are constructed according to any of my claims, 1st to 5th inclusively, and I claim that method for suspension bridges with abutments, and I claim in all cases the means to allow thereby for the expansion and contraction of the bridge, for the purposes set forth and described.

70,648.—LAST.—Ambrose Taylor, Osawatomie, Kansas. Dated Nov. 5, 1867. Application for reissue received and filed Dec 27, 1867.

I claim, 1st, The spring hook, E, secured by its shank, F, in the block, B, and engaging with the hook, C, set in the last, A, all constructed and arranged to operate as herein set forth for the purpose specified.

2d, I further claim the prevention of lateral or backward movement of the block, B, by having the hook, C, extend upward above the surface of the upper side of the last, and within a recess in the under surface of the block, B, substantially as shown and described.

595.—APPARATUS FOR VULCANIZING CAOUTCHOUC.—George E. Hayes, Buffalo, N. Y. Dated March 5, 1861. Application for reissue received and filed Dec. 27, 1867.

I claim 1st, A vulcanizing vessel or oven having its opening and closing joint for insertion and removal of the mold at or near the bottom, by making it of two main sections, the upper or inclosing one of which forms the body of the vessel, while its lower section constitutes a base thereto, substantially as specified.

2d, So constructing and using a vulcanizing vessel with a flattened bottom as that the plaster mold containing the rubber compound shall be in contact with the inside of the lower part of the vessel, so that the heat from the lamp or other heater shall be applied directly to that part of the vessel upon which the mold lies, substantially as and for the purposes set forth.

3d, A mercury chamber formed in the upper section of the vulcanizing vessel, the same being constructed and arranged with the thermometer essentially as described.

4th, The open ring, C, in combination with the bottom, A, band, D, and cover, E, substantially as specified.

44,130.—METALLIC CONCENTRATOR.—Zenas Wheeler, San Francisco, Cal. Dated Sept. 6, 1864. Application for reissue received and filed Dec. 27, 1867.

I claim, 1st, The arrangement and combination of the corrugated surface, B, with a vibratory or oscillating pan or concentrator.

2d, The inclined grooves, K L and K' L', or their equivalent, in combination with a vibratory or oscillating pan or concentrator.

3d, The opening, D, in combination with a vibratory or oscillating pan or concentrator.

4th, The bowl, F, and tube, F, or either of them, in combination with a vibratory or oscillating pan or concentrator, substantially as and for the purposes herein specified.

36,201.—FLUID METER.—Napoleon Aubin, Montreal, Canada. Dated Aug. 19, 1862. Application for reissue received and filed Dec. 28, 1867.

I claim the combination of a diaphragm or its equivalent with a reversing apparatus and a slide valve, connected each with the other without the use of stuffing boxes, and the whole inclosed within a proper receptacle containing a valve seat, and constituting a fluid meter, constructed and operating substantially as above described.

I also claim constructing fluid meters with a single slide valve of such length that it will not cover both of the outside ports in the valve seat at the same time, in combination with a reversing apparatus arranged to throw said valve, while acting upon it, rapidly across the said ports, substantially as and for the purpose above described.

I also claim the use in fluid meters of a diaphragm when combined with a short slide valve of the above description, substantially as and for the purpose above described.

I also claim the use in fluid meters of compression springs when combined with a short slide valve of the above description, substantially as and for the purpose above described.

I also claim constructing the receptacle of fluid meters in two pieces, one half of which contains part of the side pipe, and the other half the other part thereof, when the joint between the two is made by a diaphragm, and the latter acts upon a reversing apparatus contained in one half of the said receptacle, substantially as above described.

15,627.—MACHINE FOR CUTTING DOVETAILS AND THEIR GROOVES.—Harvey Church, Troy, N. Y., assignee of Elbridge G. Matthews, Clear Water, Minn. Dated Feb. 10, 1857. Application for reissue received and filed Dec. 28, 1867.

I claim the use of knives of a form as hereinbefore described, either stationary or having a reciprocating motion, for cutting dovetails, or male and female grooves "cut under," in place of cutting them with knives having a rotary motion, the knives so described being used either singly or in combination with others for miters, as may be desirable.

I likewise claim the combination with the fixed stock, Q, of the mitering knife, f, and scouring and cleaning knives, e e, as herein set forth, for forming at one operation the miter and dovetail tongue and groove.

I likewise claim in combination with the fixed stock and mitering and dovetailing cutters above described, the traversing of the block or board in a clamped position past the same, or a reverse process, namely, moving the cutters adjusted in the fixed stock past the block or board clamped in position as described, all for the purpose of having the miter and dovetail formed therein as set forth.

9,781.—MOP HEAD.—George I. Colby, Waterbury, Vt., assignee of Harvey Murch, Lebanon, N. H. Dated June 14, 1853. Extended May 20, 1867. Application for reissue received and filed Dec. 28, 1867. Division A.

I claim, 1st, The combination of a socketed cross head with a binder having the two ends thereof united and a single fastening for holding the whole binder in such position as to clamp rags, etc., the combination being substantially as described.

2d, The combination of a socketed cross head with a binder having the two ends thereof united and a single fastening for holding the whole binder in such position as to clamp rags, etc., the combination being substantially as described.

3d, The combination of a socketed cross head with a handle and a binder having the two ends thereof united, the combination being substantially such as described.

4th, The combination of a socketed cross head with a handle and a binder having the two ends thereof united and secured in clamping position on the handle, so as to sustain or aid in sustaining the cross head, the combination being substantially such as set forth.

5th, I claim a binder in combination with a handle when the former can move longitudinally with reference to the latter, and is secured thereto when desired, the combination being substantially such as described.

9,781.—MOP HEAD.—Geo. I. Colby, Waterbury, Vt., assignee of Harvey Murch, Lebanon, N. H. Dated June 14, 1853. Extended May 20, 1867. Application for reissue received and filed Dec. 28, 1867. Division B.

I claim, 1st, The combination with a cross head and binder of a ratchet fastening, the combination being substantially as described.

2d, The combination of a ratchet fastening, handle, binder, and cross head, the combination being substantially as set forth.

☞ NOTE.—*The above claims for Reissue are now pending before the Patent Office and will not be officially passed upon until the expiration of* 30 *days from the date of filing the application. All persons who desire to oppose the grant of any of these claims should make immediate application.* MUNN & CO., *Solicitors of Patents,* 37 *Park Row, N. Y.*

The richest silver mining region in Europe, at the present day, is the Austrian dominions, at Przibram, in Bohemia. Some of the ores found in that place are remarkable, one vein in particular being composed almost wholly of ruby silver ores. Some of the zinciferous ores in this vicinity contain a very large percentage of cadmium, as compared with the blendes of other parts of the world. Several of the mines at Przibram are now worked to a depth of more than 1,800 feet, with no appearance of giving out.

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JOHN J. CISCO, Treasurer.

New York, Nov. 23d, 1867. 3 2

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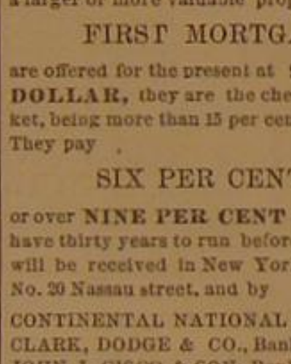

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From 25 to 1,000 horse-power, built in the best manner and at the shortest notice by the
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Warranted Superior to any other engine in the market, for economy of fuel, regularity of speed, and non-liability to derangement. [2 tf] JOS. P. MANTON, Agt.

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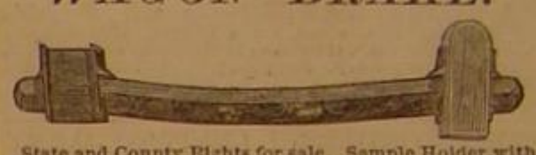

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