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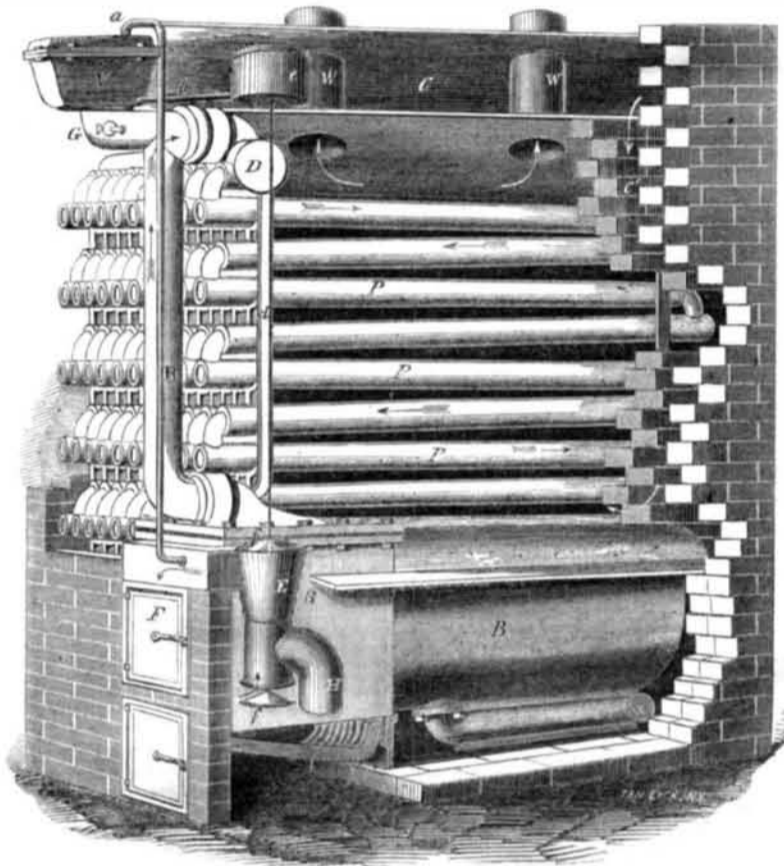
Fulminating Quicksilver.

On the late trial of Dr. Simon Bernard, in London, for conspiracy to murder Louis Napoleon, some very interesting scientific information was elicited in the testimony regarding fulminating powder. J. D. Parker, a druggist, testified that Bernard on the 14th of November, 1857, bought of him 8 pounds of absolute alcohol, 10 pounds of pure nitric acid, and 1 pound of quicksilver, which were the exact proportions for making fulminating quicksilver. C. Nicholson, chemist, engaged in the manufacture of fulminating powder for the government, testified that the ingredients and proportions for making fulminating mercury were 1 part by weight of mercury, 8 of absolute alcohol, and 10 of pure nitric acid. In order to make this powder, the mercury is first dissolved in nitric acid, and the solution thus obtained is added to the alcohol. When this is effected, a violent reaction ensues, accompanied with evolved masses of white vapor, and the fulminating mercury is precipitated in the form of a dense powder varying from a white to a gray and a yellow brown color, but the white is the purest and strongest. It is more explosive than gunpowder when dry, but it is kept prepared in a wet state, when it is perfectly harmless. M. C. Picot, director of the chemical laboratory connected with the artillery department in Paris, testified that the powder of the shells or grenades employed in the assassination act in Paris was pure fulminating mercury. He had examined their contents and was sure of this. W. Tozer, of the artillery works of the Woolwich arsenal in England, testified that fulminating mercury was twenty times stronger as an explosive agent than gunpowder. This he had proved by experiments with shells.

Burning of Western Steamers.

It appears to us that the new steamboat law has become a dead letter on our Western waters. Never before in all the dark history of Mississippi steam navigation, have more steamers been burned in the same space of time than from the beginning of the present year up to this date. Some of these disasters, with the awful consequences attending them, we have noticed in former numbers, and now we have to add another to the dread catalogue. On the 22d of last month, the *Ocean Spray* was consumed by fire about five miles above St. Louis while racing with the *Hannibal City*, and although it was broad daylight, the flames spread so rapidly that a great number of the passengers lost their lives. The testimony of those who were saved goes to prove that turpentine was sprinkled among the coals in the bunkers, and this took fire from the furnace, when the entire destruction of the vessel followed. What report will the inspectors for that district make of this horrible affair?

BROWN'S HOT WATER APPARATUS.



The best means of warming buildings, and of producing an artificially warm atmosphere in conservatories and forcing houses, has often been the subject of discussion in the columns of the SCIENTIFIC AMERICAN; and the general testimony has been in favor of heating by means of hot water, the numerous advantages of which it is needless to recapitulate. It may not be out of place, however, to mention that with them the air is never in contact with red hot metal, it cannot by any possibility reach a temperature as high as in the hot air furnace, and it becomes charged with no deleterious gas, but always remains the same in chemical and mechanical characteristics as when it entered the arrangement to be heated.

Our illustration is a perspective view of the excellent arrangement for heating air by hot water, invented by J. Brown, of this city, and patented by him May 30, 1854, and re-issued to him August 14, 1855. A portion of the brickwork is removed to show the arrangement of the tubes, and the course of the air and water.

A solid brickwork foundation being prepared, the boiler, B, is set therein, the fire door, F, being let into the front of it, and the fire box is made of the boiler itself, so that there is always a mass of water surrounding the fire; by this means all the heat produced by the combustion of the fuel is made available, and is absorbed by the water. The whole of the apparatus being filled with water, when it gets warm it gradually begins to ascend from the boiler, B, up the rise pipe, R, and from that to the distributing pipe, D, from this the cold water descending the pipes, P, allows the warm water to descend in them also, and come by the return pipe (seen at the bottom of the boiler) into the boiler again; thus a continuous circulation of warm water gradually becoming hotter, is secured—the arrows in the pipes indicate the direction of the cur-

rents. But if the fire is kept up, the water would commence boiling, and steam be generated, which would totally stop the action of the apparatus. This is prevented by an ingenious device. When the apparatus is full of water, it rises through the pipe, G, up to about an inch in the box, V, which is divided into two compartments up to about four-fifths of its height, and a siphon connects the two compartments. When ebullition commences, this water is, of course, thrown over the top of the compartment, and passes through the pipe, *b*, into the box, *e*. In this box, *e*, there is a float, which, as it rises, closes the lower valve, *f*, of the draught box, E, that admits the air under the fire, and thus supports the combustion, and elevates the upper valve or damper, *f*, which admits the cold external air on to the top of the fire, and thus checks the fire, and the current of air cools the water in the boiler down to a proper temperature. The external air finds its way to the draught box, E, by means of the pipe, H, which is represented as broken off.

a is a pipe by which any steam that may by chance be generated can pass down into the fire, and thence to the chimney. The cold air coming down through flue, C', and space, C, is warmed by contact with the pipes, P, and passes up through the pipes, W, to the registers, or other means of rendering it available for warming the building. The white arrows indicate the direction of the current of air passing in cold and out warm.

It will be seen from this description that the air can never become too hot, and the apparatus is self-regulating in all its parts, and compensates for any expansion of the water at the boiling point. A continuous ventilating, as well as warming current of air is secured through the building, and the air is as pure as the moment it entered the flue.

Any more information concerning this ap-

paratus can be obtained by addressing Brown's Water Furnace Co., 274 Canal street, three doors east of Broadway, New York.

The Uncertainties of History.

During the confinement of Marie Antoinette, the Queen of France, by the Jacobins of Paris, she was deprived of the use of the cosmetics with which she was wont to give the raven hue to her naturally silvery locks; and history, in describing her execution, represents her hair as changing from a jet black to gray color through the mental anguish she experienced. The assassin Orsini, lately executed in Paris for attempting the life of the French Emperor, and ruthlessly murdering twelve innocent persons, presented the same apparently strange anomaly from the same cause. When Orsini was arrested, his luxuriant locks were as black as night, but when guillotined, they were of an iron gray color, simply because he either neglected his toilet, or else was deprived of the usual hair dye he previously employed to give them their black color. His friends, and the papers generally, attribute the change to another cause, of course, and we have no doubt that history will represent the effect as being produced by the mental activity and agony he experienced during his incarceration.

The Government and Agriculture.

The House of Representatives at Washington have passed a bill donating land to the several States for the benefit of agriculture and the mechanic arts. The bill was introduced by Mr. Morrill, and passed by yeas 104, nays 101. It grants six millions three hundred and forty thousand acres of land, to be apportioned to each State in a proportionate degree with its number of Senators and Representatives—which is equal to twenty thousand acres for each Senator and Representative in Congress—to which the States are now respectively entitled. The proceeds of the sales of these lands are required to be invested in stocks of the United States, or of the States, or some other safe stocks, and the money so invested to constitute a perpetual fund, the interest of which shall be inviolably appropriated by each State to the endowment, support and maintenance of at least one college, where the leading object shall be, without excluding other scientific or classical studies, to teach such branches of learning as relate to agriculture and the mechanic arts, in such manner as the Legislatures of the States may prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life.

Traction Engines.

From our English exchanges we learn that Messrs. Tuxford & Sons, of England, are exporting quite a number of their traction engines to Cuba. They are intended to draw the sugar from the mill to the railway, to plow, and to be made generally useful. Senor Placide Gener is the enterprising importer, and we hope that he may be well repaid for his appreciative spirit.

A Deadly Color.

It is said that the new Azof green of the Paris spring fashions is dyed of such poisonous materials that seamstresses who prick their fingers while sewing it lose the use of their hands, and ladies have been taken violently ill from wearing shawls of this color, and in consequence, inhaling its poisonous odors. The tint is very brilliant.



Issued from the United States Patent Office
FOR THE WEEK ENDING MAY 4, 1888.

[Reported officially for the Scientific American.]

LAMPS—L. Bailey, of Charlestown, Mass., and R. Thayer, of Boston, Mass.: We claim, first, The arrangement of the annular reservoir, G, within the case, C, as shown, so that both the inside and the outside draughts of the flame may be supplied up through the base and pedestal, and in their passage cool all sides of the reservoir, substantially as set forth.

Second, The button, L, when made of concavo-convex form, and of the proper dimensions, so as to throw the air that passes up through the central passage, H, down on the flame, and at the same time permit the flame to rise vertically, instead of spreading it laterally, as usual.

Third, The combination of the revolving cap, E, wick tube, I, with or without the button, L, and the annular reservoir, G, arranged relatively with each other, and used in connection with the case, C, the hollow pedestal, B, and base, A, substantially as described, and for the purpose set forth.

[This invention consists in a peculiar construction of the lamp, whereby the reservoir containing the burning material is kept in a cool state, the flame supplied with a large amount of oxygen commensurate with its requirements, to produce perfect combustion, the light is readily graduated as desired, and wholly extinguished when necessary, without the emission of smoke, or any disagreeable odor, and the wick is retained in proper position, so that it may be trimmed accurately with great facility.]

DEVICE FOR SHELTERING FROM DUST THE LOWER CARRYING PULLEY OF BAND SAWS—James Balla, of Richmond, Ind.: I do not claim hanging saws by attaching the same to straps which pass over reciprocating pulleys, for this has been previously done.

But I claim the shields or guards, J, J, placed over the lower pulley, D, when constructed and arranged relatively with the straps, H, of said pulley, substantially as and for the purpose set forth.

[This invention relates to an improvement in that class of sawing machines in which the saws are attached to straps or bands which pass over pulleys having a reciprocating rotating motion. The object of the invention is to obviate the difficulty attending the accumulation of sawdust between the lower pulley and saw band. This is done by having shields or guards placed over the lower pulley, properly arranged to protect it.]

STEAM ENGINES—Daniel Barnum, of Jersey City, N. J.: I claim combining with an air pump of a marine engine an independent or separate suction pipe connecting the hold of the vessel with the air pump directly, and not through the channel way or condenser, such pipe being connected, and the combination being substantially as is set forth.

MACHINE FOR BENDING WOOD—Thomas Blanchard, of Boston, Mass.: I do not claim, broadly, what is termed "compound bending," or preventing the fibers of the wood from being stressed longitudinally while being bent in the required form, for this process was formerly patented by me.

But I claim the particular means employed for thus bending the wood in the required form, for the special purpose mentioned, that is to say, the employment or use of the rotating mold, E, with the strap, G, attached, in combination with the sliding pressure bar, K, provided with the adjustable slide or stop, h, the outer end of the strap, G, being attached to the bar, K, or box, L, and the parts arranged as shown, whereby the strips, N, may be bent in regular or irregular curved form, with the ends adjoining each other, for the manufacture of picture and slate frames, chair bottom hoops, and similar articles.

[A notice of this invention will be found on another page.]

MACHINES FOR HULLING RICE—Francis and Lodowick Burdick, of South East, N. Y.: We claim the peculiar dress in our horizontal stone mill, composed of the frustum of a cone and its corresponding concave, constructed and operating as and for the purpose described.

RAILROAD CAR COUPLINGS—W. H. Burrigess, of N. L. Post, of Cleveland, Ohio: We claim making the fulcrum of the jaws forward of, or more towards the center of the coupling bar or link than those parts of the jaws which catch the head of the link, so that the draft upon the link has a tendency to close the jaws, substantially as described.

And in combination with vibrating jaws having their fulcrum arranged as described, we claim the peculiar construction of the lifter, substantially as described, by which the said link connects the couplings, when the cars are run together, and by which they uncouple or disconnect themselves, when one of the cars is thrown from the track, or the link vibrated beyond a given angle, as described.

MACHINE FOR MAKING HORSE SHOE NAILS—Tisdale Carpenter, of Providence, R. I.: I claim the described machine for making horse shoe nails, consisting essentially of the revolving die table, I, arm, P, carrying the swage, l, and shear, m, the carriage, S, with its swage, h, constructed and operating in the manner substantially as set forth.

Second, I claim the receiving box, R, with its retaining spring, o, substantially as described.

Third, I claim, in combination with the table, I, the guide, h, arranged and operating as set forth.

WATER CLOSET—William S. Carr, of New York City: I claim the concave ring or cup, m, screwed onto the hollow column, l, in the manner and for the purposes specified, when this is used for passing the rod to the lever of pan water closets, substantially as specified.

SEED PLANTERS—James Charlton, of Alleghany, Pa.: I claim, first, The rings, y, with their lugs, b, projecting studs, t, and heads, c, in connection with the strips, x, and cylinder, g, for the purpose of enlarging or contracting the seed chambers, and agitating the seed in the hopper.

Second, The arrangement of the flexible rods, S, axle, k, yoke, j, lever, p, and strip, r, with notches, l and 2, as described, and for the purpose set forth.

REVOLVING FIREARM—Samuel Colt, of Hartford, Conn.: I claim as new, in combination with a central pin which is inserted from behind, to admit of readily taking out and replacing the rotating breech, and which is feathered or otherwise fitted to the central bore of the rotating breech, so as to turn therewith, and which passes entirely through the central bore of the said rotating breech, and into the framing in front for support, the making of the rear end or head of the said central pins with ratchet teeth, or the equivalent thereof, to be acted upon by the mechanism for turning and holding the rotating breech all substantially as and for the purpose described.

NUT MACHINE—Richard H. Cole, of St. Louis, Mo.: I claim the use of a traversing die, whereby the nut

blank is first passed and prepared on the blank surface of the said die, and afterwards punched and finished over a hole in the same die, substantially in the manner described.

BLOCK KILNS—John W. Cary, of New Orleans, La.: I claim, first, The peculiar arrangement and manner described of constructing the furnaces, so that by means of the arches, B, B, placed as specified, and constructed of brick, or other argillaceous substance, intermediate supports of grates or otherwise for the fuel are rendered unnecessary.

Second, The peculiar arrangement of auxiliary ash pits or air chambers, C', with main air chambers or ash pits, C, and arches, D', D', formed by setting the brick zig-zag, and alternately diagonal, as specified, for the purpose set forth.

Third, The specified manner of constructing the brick arches, D', D', when the bricks are "set" as specified, so that the horizontal area of their interior chamber shall be greater than that of the throat of the furnaces, for the purposes set forth.

Fourth, The specified zig-zag and alternately diagonal setting of the brick throughout the kiln, for the purpose set forth.

Fifth, The specified arrangement and construction of auxiliary end arches and furnaces, in combination with the main side arches, for the purposes set forth.

Sixth, The specified arrangement of vertical flues and horizontal passages in the wall, in combination with the partly open top and the furnaces for the purpose set forth.

[A notice of this invention will be found in another column.]

FEEDING DEVICE FOR CROSS-CUT SAWING—Jeremiah Darling, of Cincinnati, Ohio: I claim the reciprocating table, F, suspended at one end, and supported by rollers at the other, to facilitate the operation of cross-cut sawing, substantially as set forth.

RAILROAD CAR SPRINGS—Andrew M. de Hart, of Reading, Pa.: I claim the combination of the semi-elliptic plate springs, a, a and b, b, as arranged with the box, C, press block, D, and connecting rod, E, substantially in the manner and for the purpose fully set forth.

RING BOLT—George W. Devin, of Ottumwa, Iowa: I do not claim separately a slide bolt and spring, for that is a common and well-known fastening.

But I claim the slide bolt, A, provided with the spring D, and ring, C, and secured to the door substantially as shown, in combination with the socket or nosing, E, provided with apertures to receive the shackle of a padlock, the whole being arranged as and for the purpose set forth.

[A full description, with an engraving of this invention will be published in a few weeks.]

DEVICE FOR GOVERNING LATERAL MOTION OF CARRIAGE IN GOGGING BACK, IN CIRCULAR SAWING MACHINES—William M. Ferry, Jr., of Ferrysburgh, Mich.: I claim providing a short auxiliary rail, I, alongside the inner rail of the log carriage, C, and opposite the oblique inclined gage bar, G, and furnishing the carriage with an auxiliary wheel, J, which has a vertical axis, a, and having said wheel come in contact with, and run against, the side of the auxiliary rail, and thereby prevent any lateral movement of the carriage other than that necessary to prevent the log rubbing against the face of the saw, and heating the same, and also avoid the scratching of the face of the board by the teeth of the saw, substantially as and for the purposes set forth.

[A description will be found on another page.]

CASTING CAR WHEELS—David Finley, of Champlain, N. Y.: I do not claim the heating of molds in an oven or muffle before pouring the metal into them.

Nor do I claim the heating of castings in their molds, when that is effected by placing the molds in an oven, or any receptacle that has been previously heated.

But I claim the heating of the knowl and cope of the flask, and parts of the mold contained therein, separately from the chill ring, then putting the whole of the flask and mold together, and either placing it in a box, or its equivalent, and surrounding it with non-conducting material within the said box, and after pouring the metal into the mold, burying the whole in a pit, or omitting the box, surrounding the flask and mold with the non-conductor in the pit, substantially as specified.

[The several parts of the mold, with the exception of the chill, are heated in an oven, and then when placed together with the chill, they are in a condition to receive the molten metal. The complete mold is placed in a suitable receptacle, and surrounded by a non-conducting substance, and then covered up in a pit. The metal, when poured into a mold which has been thus heated, and surrounded by a non-conducting substance and buried, is cooled so slowly as to be thoroughly annealed, and yet the proper operation of the chill is not interfered with, as at the time of pouring in, the chill ring is comparatively cold.]

HARVESTERS—R. H. Fisher, of Claremont, N. H.: I claim, first, Mounting the main frame, A, on the axle, B, so that the frame may slide freely thereon, in connection with the spirally slotted collar, K, placed on the axle, and receiving a pin, k, attached to the axle, substantially as shown and described, whereby the mechanism which operates the sickle may, when desired, be readily thrown in and out of gear with the driving wheel.

Second, Raising and lowering the sickle, J, by means of the pulley, M, placed loosely on the axle, B, and the chain, l, attached to the back of or collar having holes, and the pulley, substantially as described.

Third, Attaching the finger bar, P, to the main frame A, by overlapping the end of the finger bar and the lower end piece, n, of the main frame, the finger bar resting on a semi-spherical projection, o, on the end piece, and adjusted by the screws, p, substantially as and for the purpose set forth.

[In this harvester there is a novel means employed for driving the sickle; the frame is also so arranged that it may be readily raised or lowered, and the mechanism which operates the sickle thrown in and out of gear with the greatest facility. The finger bar is attached in the main frame in a new way, so that the front edge of the finger bar and sickle may be more or less elevated, as circumstances require.]

VAPOR LAMP BURNERS—C. A. Greene, of Boston, Mass.: I do not claim a ring or collar having holes through it, turning upon the outside of a shoulder having corresponding holes through it, to form a regulator for a fluid lamp, as this is an old device and cannot be made to operate successfully.

But I claim the combination of the hollow spur, susceptible of being turned in either direction, and having slits or apertures formed in it with the cap, d, through which similar slits or apertures extend, as described, and for the purpose of regulating the jet or jets of flame by the turning of the said spur.

WASHING MACHINE—Ashman Hall, of Danville, N. Y.: I claim, first, Constructing the slats or bars which form the rubbers with spiral grooved and ridged surface for the purpose described.

Second, In arranging the spiral grooves and ridges formed on the slats, so that they incline in opposite directions in each succeeding slat for the purpose set forth.

Third, The combination of the dippingscoop with the vibrating rubber, arranged as described for the purpose set forth.

BRACES OF EAVE TROUGHS—Wm. H. Henderson, of Franklin, Ind.: I claim the arrangement of the brace, A, as constructed in the trough, and with the pins, a, a, for the purpose set forth, and also this arrangement in combination with the strap, C, for the better security of the trough as is fully described.

BILLIARD TABLE CUSHIONS—Geo. W. Holman, of New York City: I do not claim an elastic cushion for billiard tables, but I am not aware that a whalebone facing has ever before been applied to said elastic cushion, whereby the new and useful results specified are attained.

Therefore I claim the whalebone facing to the elastic cushions of billiard tables substantially as and for the purposes specified.

QUARTZ CRUSHERS—Wm. H. Howland, of Sacramento, Cal.: I do not claim broadly the raising of a pestle or weight by having a horizontal cam acting upon a pulley or circular disk on its end or shaft, for this is a device that has been previously used for analogous purposes for operating rock drills, &c.

But I claim, in combination and combination of the annular mortar, A, and pestles, J, substantially as and for the purposes set forth.

Second, Having an annular feeding chamber between the upright, C, and the inner surface of the cylinder, L, arranged substantially as and for the purposes set forth.

[See another page for a description of this improvement.]

SEED PLANTERS—James J. Johnston, of Alleghany, Pa.: I claim, first, The arrangement of the flexible bottoms, b, springs, c, rod, d, and division piece, e, in the seed chambers, a, as herein described and for the purpose set forth.

Second, The arrangement of the depositing tube, g, with lugs, t, share, h, rod, i, lever, j, and sliding gate, k, as described and for the purpose set forth.

LAMPS—Edward F. Jones, of Boston, Mass.: I claim securing the chimney to the removable cap, and both of them to the lamp by means of a spring operating in the manner substantially as set forth.

REVOLVING FIRE ARM—Benj. F. Joslyn, of Worcester, Mass.: I claim revolving the cylinder, B, by means of a slotted spring clutch cylinder, D, operated by a lever, G, as described.

[The nature of this invention consists in combining and arranging a series of parts in such relation to the hammer shaft as to enable it to operate upon the same in such a manner as to not only revolve the required distance by the act of cocking the hammer, but also secure them firmly while in communication with the stationary barrel, and also in making the ramrod susceptible of being increased or diminished in length and operating it by a duplex motion.]

SMUT MILLS—John C. Kelley and Amos Frost, of Edinburgh, Ind.: We claim, first, The arrangement of the hopper as constructed with the air passage, F, in the manner herein set forth and for the purpose described.

Second, We claim the peculiar arrangement of the scourer as constructed with the air passage, D and C, connecting spout, a, and fan, B, for the purpose of separating the smut from the wheat as fully set forth.

SEEDING MACHINES—James F. Kierstead, of La Porte, Ind.: I do not claim separately the adjustable perforated bar, E, nor the reciprocating bar, G, with its pendents, h, attached, for such devices or their equivalents have been previously used.

But I claim the reciprocating bar, G, provided with the pendents, h, and the adjustable perforated bar, E, in combination with the bar, L, the parts being arranged relatively with each other and the discharge openings, c, so as to operate as and for the purpose set forth.

[The object of this broadcast sower and coverer is to prevent the distributing device from becoming choked; to ensure a perfect and even movement of the same, and one that may be regulated to discharge more or less seed from the hopper in a given time as required; and further to obtain a perfect covering device, one that will conform to the inequalities of the ground and be under the perfect control of the driver.]

CORN HUSKER—Chas. N. Lewis, of Seneca Falls, N. Y.: I claim the combination and arrangement of the lever, a, d, the sleeve or collar, C, and yielding gauge, D, operating conjointly substantially in the manner and for the purpose described.

MOWING MACHINE—Henry Marcellus, of Amsterdam, N. Y.: I claim attaching the main frame, D, of the machine to the axle, A, by connecting the frame by means of journals, c, d, to the sleeve or collar, C, which is placed loosely on the axle, A, substantially as and for the purpose set forth.

[This invention consists in a novel way of attaching the main frame of the machine to its axle, whereby the sickle is allowed to conform to the inequalities of the ground without at all affecting the perfect operation of the driving gear, and the machine as a whole rendered extremely simple and effective.]

PUNCHING METALLIC TUBES—Benj. Mackerley, of New Petersburg, Ohio: I claim the combination of the mandrel, a, the punch, d', and the detent, j, substantially in the manner and for the purpose set forth.

I also claim the use of the gong-shaped wedge, k, in combination with the mandrel, a, and the punch, d', substantially in the manner and for the purpose as set forth.

AUTOMATIC LATHE—John McNary, of Brooklyn, N. Y.: I claim the sliding or traveling lathe heads, K, L, between which the stick to be turned is centered in combination with the rotary cutters, c, when the above parts are arranged to operate as shown, viz., so that the stick will be gradually fed to the cutters until the desired form is given it, and then its feed motion stopped by the stick rotating, I, blade, C, and yielding gauge, D, so that a perfect symmetrical form may be given it.

I further claim giving the feed and return motion to the stick to be turned, and also rotating the same from the cutter shaft, B, by means of the screw, g, on said shaft, worm wheel, h, on shaft, F, in connection with the gearing, w, a', screw, d', worm wheel, e', and the screw, p, on shaft, G, together with the gearing through the medium of which the screw shaft, F, is rotated, the above parts being used in connection with the lever, H, and the catch, n, rod, a, and with the pawls, l', n', actuated by lever, O, and pinion, u', the whole being arranged to operate as and for the purpose set forth.

[See notice of this improvement on another page.]

STEAM BOILERS—James Montgomery, of Brooklyn, N. Y.: I do not claim vertical tubes in boilers connected with water spaces above and below except under an arrangement like that set forth, viz., where the lower water space is immediately over the fire, and the draft of the furnace returns over said space and among the tubes as set forth.

That is to say, I claim the arrangement of the series of tubes placed vertically or nearly so between an upper and a lower, and connecting vertical water spaces, when said lower water space is made directly over the fire chamber and the draft is returned over said lower space and among the vertical tubes as set forth.

Second, And I also claim the arrangement of the shield plate in combination with and interposed between the crown sheet of the furnace and the lower ends of the series of water tubes, substantially as and for the purpose specified.

ARRANGEMENT OF GAS ENGINES—John C. Fr. Salomon, of Baltimore, Md.: I claim, first, arranging all the parts necessarily employed in generating and working gaseous vapor within a tight chamber which is supplied with oil, hot air or other suitable heating medium, substantially as and for the purposes set forth.

Second, The employment in combination with the above named tight chamber, of the combined arrangement of fire flues, smoke stack, circulating coil, boilers, vapor chest, and cylinder for accomplishing the objects above specified, substantially as set forth.

[See description of this invention on another page.]

CHUCK FOR SCREW CUTTING—Richard Nuttall and John Kirkpatrick, of Alleghany, Pa.: We claim, first, the projection, j, on the movable die seats, and the transverse slot or notch, k, in the removable cutting dies, the one being adapted to the other as described and for the purpose set forth.

Second, The use of the troll plate when constructed as specified, and operating in connection with the die seat and die as set forth.

FLUID METERS—Wm. C. Perrine, of New York City: I claim making the measuring chambers gradually larger in each direction from near the middle, where the exterior edges of the diaphragms are fastened substantially as described, so that the diaphragm will be held by the water or remain in contact with the parts enlarged until it is drawn away by the center of the diaphragm or by the plates which move and traverse with the center of the diaphragm.

I claim the recesses, P, P, in the ends of the measuring chambers, in combination with the plates, H, H, arranged to work into them (the said recesses).

I also claim the openings, w, w, in the plates, H, H, provided with valves, or such equivalent openings as will well answer the same purpose.

I claim making recesses, p, p, with their sides parallel, in the flanges, T, T, so that that portion of the diaphragm in or opposite to said recesses, may vibrate a very little, between the measuring chamber and the line where it is bound or held firmly by the flanges.

HOISTING MACHINES—Reuben Packard, of Rockland, Me.: I claim the circular plate or its equivalent, arranged substantially as described, in order that it may be turned easily and held in any desired position by pawls or their equivalents, for the purpose of sustaining any combination of mechanical powers constructed thereon, for drawing or lifting heavy weights or their equivalents.

CAST-IRON PIPES—Clifford Pomroy, of Pottsville, Pa.: I claim a cast-iron pipe chilled inside, as a new article of manufacture, for the purpose of conveying fluids impregnated with or containing substances which soon destroy iron pipes which are not so chilled.

CEMENTS FOR ROOFING—Richard Simons, of Rockford, Ill.: I claim the composition of ingredients when compounded in the manner set forth.

DEVICE BY WHICH THE WIDTH OF THE BOLT CHECKS THE FEED IN SHINGLE MACHINES—A. C. Sawyer, of Canton, N. Y.: I do not claim the use of a race bar, N, nor do I claim or limit myself to the use of a rack and pinion feed, as a screw or chain could easily be substituted; nor do I limit myself to the particular place in which the lever, L, hangs, whether before or after the saw.

But I claim the use of a lever, L, hanging by the side of the saw in such a manner that the bolt in running under it will raise or lower it, and adjust the travel of the carriage, for the purpose and in the manner substantially as set forth.

SEWING MACHINES—E. Harry Smith, of New York City: I claim arranging the cranks and connections to the needle and shuttle in substantially the manner set forth, whereby the differential movements are imparted to the needle and shuttle in the alternating manner described.

VENTILATING AND EXCLUDING DUST FROM RAILROAD CARS—A. B. Spencer, of Rochester, N. Y.: I claim the revolving wet sheet or endless apron (passing through water) for the purpose of cleansing and purifying the air as it passes into the car, which sheet or apron, together with the tank containing the water, and that portion of the bottom whereon it rests.

I claim as a partition, by which I divide the instrument into two complete ventilators, either of which as set forth will act as the downward ventilator, while the other always acts simultaneously in the opposite direction.

GAS GENERATORS—Wm. N. Taylor, of Philadelphia, Pa.: I claim, first, The combination of the retort, with a series of movable partitions connected so that all can be taken out together, and so arranged as to divide the retort into a series of chambers through which the gas circulates in its passage from the lower chamber to the discharge pipe, for the purpose described.

Second, Dividing these chambers by means of punctured diaphragms or their equivalent, arranged as described, in order to retard the passage of the gas, and bring the entire volume in contact with the heated metal for the purpose described.

LAMP ATTACHMENT FOR PREVENTING SMOKE, &c.—Ralph Thomas, of Hoboken, N. J.: I claim the movable cap provided with a screwed green top A, and base piece, C, when applied to lamps, constructed and operating as set forth and described.

TYMPANS FOR PRINTING PRESSES—L. T. Wells, of Cincinnati, Ohio: I claim attaching the cloth or parchment, B, to the frame, A, of the tympan, by means of the leather strips, c, provided with eyelets, d, said strips, c, being fitted in grooves or rebates in the frame and the cloth or parchment attached to the strip of the lace, C, substantially as described.

[A notice of this improvement will be found in another column.]

HARVESTERS—Lewis Miller (assignor to C. Aultman & Co.) of Canton, Ohio: I claim so hinging the bar or beam which carries the cutters and fingers to the beam, L, as that it may be raised up, folded over, and carried upon the main frame, substantially as described.

I also claim, in combination with the beam, L, hinged as described, the braces, N, S, rigidly connected therewith, but hinged at their opposite ends, so that the beam, L, may rise and fall at pleasure, but be permanently braced in its proper position to give the cutter and finger bars or beams in turn their proper working position, as described and represented.

HARVESTERS—Lewis Miller (assignor to C. Aultman & Co.) of Canton, Ohio: I claim, in connection with the inner shoe, an adjustable supporting wheel, when said wheel is in advance of the point of the divider or shoe, as set forth.

HARVESTERS—Lewis Miller (assignor to C. Aultman & Co.) of Canton, Ohio: I claim so combining a reel, with a platform and main frame that are hinged together, as that the raising and lowering of either shall not in any wise injuriously affect the rotation and uniform action of the reel, or change its position with regard to the cutters, for the purpose and in the manner substantially as described.

SHEET METAL CHAINS—James Lancelott, of Cranston, R. I., assignor to Sackett Davis & Co., of Providence, R. I.: I do not claim the making of an ornamental chain from steel metal, neither do I claim the weaving of a chain by turning over the arms of each link upon the body of the next link without the use of a solder.

But I claim the forming of the body of each link into a dome disk or cap, so as to admit of the projecting arms of each link being bent at a very acute angle against the sides of the dome or cap of the next succeeding link for the purposes specified.

BOOT TREES—Wm. W. Willmott (assignor to himself and H. F. Gardner), of Boston, Mass.: I claim in the application of the screws, the rod and toggles (or mechanical equivalents) to the front and back portions, A, B, of the leg of a boot tree, the arrangement of the two sets of toggles as shown in the drawings; and the application thereto of the screw rod, H, in such a manner that it may be used to move longitudinally during its rotary motions on its axis, the same being for the purpose as specified.

I also claim combining the regulator or latching mechanism, N, e, e (or their equivalent) with the back and front parts, A, B, of the leg portion of the boot tree and the separating mechanism applied thereto, and made to operate therewith, substantially as described.

SAWING MACHINE—H. S. Vrooman, of New York City, assignor to Henry Albro, of Covington, Ky.: I do not claim, broadly, the sawing of logs or bolts in volume form, for this has been previously done.

But I claim, first, The traveling or sliding collar M, on lever, E, as connected with the knife or saw frame, B, the pawl arms, N, N, in combination with the recip-

rotating connecting rod, G, the vibrating lever, E, the pawls, w w', and the ratchet wheel, O, whereby an increasing rotary speed of the log or bolt, U, is obtained from the traveling collar, M, passing down to a wider sweep of lever, E, as set forth, the power being transmitted from the ratchet shaft, P, to the bolt U, as shown, or by any other equivalent device, for the purpose described.

Second, The cutters, p, attached to the carriage, L, operated automatically by and in combination with the vertical screws, for the purpose set forth.

Third, The lateral moving knife plate or stock c, crank D, operated by and in combination with the vibrating lever, E, for the purpose shown.

Fourth, The combination of the knife, C, cutters, p, and the feed movement of the bolt or log, U, when the whole are arranged to operate as and for the purpose set forth.

RE-ISSUES.

SIRUP CASTERS—Edmund Higelow, of Springfield, Mass. Patented April 6, 1858: I claim the combination of a self-measuring faucet and air tube with each of two or more reservoirs for sirup or like fluids, the reservoirs being on a common base forming a caster, substantially as and for the purpose specified.

HAEVESTERS—Charles Crook, of New Hope, Pa. Patented May 5, 1857: I claim, first, Operating and changing the speed of the cutters by means of the internally geared wheel, I, and spur wheel, D 2, in combination with the pinion, J, the same being arranged and rendered adjustable, substantially as set forth and for the purpose specified.

Second, Connecting the rod, G, to the end of the lever, F, by means of the swivel joint, i, when the said joint is situated at or near the center of vibration of the cutter frame.

BAGASSE FURNACES—Abraham Hager, of Baton Rouge, La., and Youngs Allyn, of New Orleans, La. Patented May 6, 1856: We make no claim to the insertion in Bagasse furnaces of a grate inclining from the front of the furnace to a position under the exit flue for the products of combustion, as the operation of such grate will be different from what is designed to be effected by our construction.

But we claim inserting in the furnace a skeleton dome rising above the exit flue, so as to arrest the fall of the wet bagasse, and for a limited time retain it above the fire, without obstruction to the draught for the furnace, substantially as set forth.

BOXES FOR RECEIVING PASSENGERS' FARES—John B. Slawson, of New Orleans, La. Patented July 23, 1857: I claim a fare box having two compartments, into one of which the fare is first deposited and temporarily arrested previous to its being deposited in the other when the former is provided with glass sides, so arranged that the passengers can see through one, and the driver or conductor through another, in the manner substantially as and for the purposes set forth.

DESIGNS.

COOKING STOVES—Russell, Wheeler, and Stephen A. Bailey, of Utica, N. Y.

CLOCK CASE FRONTS—Samuel B. Jerome, of Waterbury, Conn.

Wear of the System by Railway Traveling.

Now that all the world travel by railways, it is a circumstance of universal interest to determine what influence railway traveling exerts upon the health of the community, and more particularly since a suspicion has arisen that the great rate at which an express train runs produces an injurious effect upon the mind. A paper upon this subject, read before the Royal Society by Dr. Smith, contains some curious information, according to the London *Engineer's* abstract of it.

Dr. Ed. Smith, the author of the paper, is one of the physicians attached to the hospital for consumption and diseases of the chest, at Brompton, England. The plan he adopted was to determine the effect of railway traveling upon the respiration and pulsation, on the principle that the wear of the system will be in proportion to the activity of those functions. Dr. Smith, therefore, traveled repeatedly in each of the three classes of English railway carriages, and upon the engine, and at various rates of speed, and the influence on the quantity of air breathed was ascertained by the use of a spirometer. The greater part of the experiments were made upon the broad gage, but some were prosecuted on the narrow gage. The result of seventy-three series of experiments went to show that the greatest wear on the system occurred whilst sitting upon the engine. The precise average increase of air inspired was about 250 cubic inches per minute on the engine, 200 cubic inches in the second class, and 150 cubic inches in the first class; but, on many occasions, the quantity of air breathed in a first class carriage was scarcely more than would have been breathed when sitting quietly at home rocking in an easy chair. Upon the whole, the wear of system may be better understood by stating, that, five hours of railway traveling in a first class carriage are equal to six hours quietly sitting at home; or upon the engine, to eight hours. As compared with the old coach traveling, it is vastly lessened taking distance for distance.

In reference to the speed of the train, Dr. Smith found that the greatest wear was not with the greatest speed of fifty-five miles per hour, but at a rate of from thirty to forty miles per hour. The effect varied much at the same speed in different carriages of the same class; but there was the greatest constancy in the first class and the least upon the

engine. The general expression of the results of the inquiry was, that the quantity of air breathed was as the oscillation of the body and not as the speed, except so far as that speed and inequality of road tended to induce greater oscillation.

It was rendered very evident that traveling in our days is very far less an exercise than it was in the days of our forefathers. It was also proved that of all modes of traveling, none is so inexpensive to the system, so fitted to the necessities of invalids, as that of British first class railway carriages; and that traveling in private carriages on the common roads, hour for hour, and distance for distance, induces a far greater amount of wear. This is a very cheering result, as showing that one of the greatest improvements of the age is tending not only to the comfort but to the health of the community.

In our country there is neither first, second nor third class railway carriages—all are equal on the train. The first class carriages in England are for the superlatively rich, and are very comfortable, but not much more so than some of the carriages on our railroads. Railway traveling in England is smoother than with us; there is therefore less oscillation on the railroads in that country, consequently there is more wear of the body in traveling on our railroads. The improvement in ease and speed is incalculable in comparison with traveling on the old stage coach.

Science and Justice.

THE SCIENTIFIC AMERICAN, in commenting on the case of an individual who had robbed a roost by giving the hens chloroform, answers the query, "when thieves get scientific, what should the police do?" by referring the latter to its own columns. There is a great deal of common sense in this remark. The time may not be as yet, but it will be when science will be the strongest arm of the detective.

We find in a late English magazine a curious instance of the extreme point of delicacy to which chemical tests have been carried. A professor ascertained accurately into which one of a number of basins of water a lady had dipped her finger. The well-known story of the detection of a railroad robbery by Ehrenberg, opens a wide field of scientific research for philosophy in aid of justice. The microscope which reveals the smallest points of identity, if once fully used, might often establish connections of which ignorant ruffians would never dream—the very mud on a man's boots being enough to identify the connection of person and place, when examined by an experienced microscopist. The utility of photography and the telegraph in detective service is already recognized, and an even careless perusal of Berk's or Stille's Medical Jurisprudence cannot fail to convince the reader that the whole subject of the application of science to justice is of itself a science as yet in embryo, yet one which is perfectly capable of developing to a degree which would vastly increase the perils to which crime is at present liable. If one great mind could devote all its powers to this end, it would do as much for justice, peace, and order, as any which the world has ever witnessed. There is no reason why as much talent and education should not be devoted to the practical execution of the law as to punishing the guilty; in fact, we may say that the perfection of the former would be preventive, while the latter is only curative. At present, native unaided talent and experience are almost the sole qualifications employed in identifying malefactors. This is not enough. Reduced almost to certainty, this branch of justice would cast a terror over rogues which would be of the greatest service to humanity.—*Philadelphia Bulletin.*

A child was poisoned, in Norfolk Co., Va., through sucking the flowers of the yellow *jesamine*, and died within one hour after tasting them.

In one parish in England not less than \$4,000 are expended annually by the working classes for laudanum.

Secret of Horse Taming.

On the 21st of last month, at Astley's Amphitheatre, London, Mr. Cooke, the celebrated equestrian, undertook to exemplify Rarey's system of subduing vicious horses, and as a consequence there was a crowded house. The *Morning Advertiser* states that Mr. Cooke informed the audience, when the exhibition opened, that he was ready to tame any horse that was brought to him, and a vicious hunter which had been sent for this purpose was then taken into the ring. He then took a strap and attached it to the fetlock of the animals' right foreleg, brought it over its right shoulder and held it firmly by hand. The left leg was then doubled up inwards till the hoof was brought in contact with the thigh, when it was tied in that position with a strap. Mr. Cooke then took the reins of the bridle in one hand, and the strap attached to the horse's right leg in the other, and holding them taut, urged the animal to walk on three legs, with his head inclined to the left. The horse was made to walk in this manner three times round the ring of the circus, when he exhibited signs of great exhaustion, got down on his knees, and finally lay down in the most submissive manner. The straps were then taken off, and Mr. Cooke lay down upon him, patted him, and the animal received these caresses in the most docile and quiet manner, and appeared to be perfectly under the control of his tamer.

Recent Patented Improvements.

The following inventions have been patented this week, as will be found by referring to our List of Claims:—

TYMPAN FOR PRINTING PRESSES—L. T. Wells, of Cincinnati, Ohio, has invented an improved method of attaching the cloth or parchment to the tympan frame. He inserts in the frame strips of leather with eyelets, and to these the cloth or parchment is secured by lacing. It can be easily attached or removed, and forms a great convenience to the printing office.

TURNING MACHINE—John McNary, of Brooklyn, N. Y., has invented an improved turning machine for shaping regular or cylindrical ornamental forms, such as newels, ballusters, and similar beaded or ornamental work. The invention consists in a peculiar arrangement of means for operating rotary cutter stocks, and traveling heads, between which the stuff to be turned is centered, whereby the machine is rendered automatic in its action throughout, and made to work rapidly, and in the most efficient manner.

SAWING MACHINE—H. S. Vroogman, of New York, has invented a machine for sawing timber or logs spirally or in volute form in one continuous piece from the periphery to the center. The invention consists in a peculiar arrangement of means for operating a reciprocating knife or saw, and giving the same a proper feed movement towards the log or stuff being sawed, and also in giving the log or stuff which is centered between arbors, a gradually progressive rotating speed, so as to compensate for its gradually diminishing diameter while being sawed, and thereby allow the knife or saw to cut the log or stuff in spiral or volute form from periphery to center, or nearly to the center in a single or continuous piece. The invention is designed for sawing thin stuff, such as is used for the backs of mirrors, boxes, veneers and other purposes. The inventor has assigned his invention to H. Albro, of Covington, Ky.

MACHINE FOR BENDING WOOD—Thomas Blanchard, of Boston, Mass., whose invention of a machine for a similar purpose we noticed on page 240 of the present volume of the SCIENTIFIC AMERICAN, has invented certain improvements relating to a device by which wood is bent in the desired form without having its fibre distended longitudinally, so that the strength of the wood will not be impaired in consequence of being bent. The invention consists in the employment of a rotating pattern or mold with a metallic strap attached,

used in connection with a sliding pressure bar, having an adjustable stop fitted to it, the outer end of the metallic strap being attached to the sliding bar, and the whole arranged so as to form a simple and efficient machine.

QUARTZ MACHINE—W. H. Howland, of Sacramento City, Cal., has invented a machine for this purpose, the object of which is to obtain a very compact and efficient machine, and one that will not easily get out of repair, and having its parts so arranged that each will perform its full portion of the work to be accomplished. The machine is designed for crushing auriferous quartz, and consists of a series of pestles placed within an annular mortar and around a feeding spout, the pestles being operated by a horizontal double inclined cam, which acts against circular disks attached to the pestle rods, so that the pestles will be rotated as they are raised by the cam. There is also in connection with the above parts a screen and pulp trough, for the purpose of better separating the crushed materials.

BRICK KILN—This invention obviates many serious objections which are experienced in the burning of brick in ordinary kilns. The most prominent among these are the rapid destruction of the grates or furnaces, choking up the throats of the furnaces by the collection of charred fuel thereat, difficulty in burning the "heads" or sidewalls of the kiln to the same degree, within a given time, as the body of the same; also the unequal diffusion of the heat throughout the entire kiln from the side walls to the centre, and a too rapid escape of the heated flame or current directly up between the bricks forming the stands and arches; want of facilities for controlling the flame or heat, so as to equalize the heat at all parts of the kiln; loss of heat from the escape into the open air of partially ignited smoke or gases emitted from the fuel of the furnaces. We regard this as a first-rate improvement, and as a step in advance of anything we have seen in this line. The inventor is J. W. Crary, of New Orleans, La.

GAS ENGINE—In using the vapors of gaseous liquids as a motor, it is found that owing to the vapor being so rapidly generated or thrown off by the action of heat, and as readily condensed by contact with surfaces of less temperature than themselves through which they circulate that unless a uniformity of heat is maintained throughout the whole heating and working arrangement, great loss of effective power, as well as an irregular and unsteady working of the engine, will be experienced. The object of this invention is to avoid this loss of power, and to maintain a uniform pressure of vapor, and consequently effect a regular and steady working of the engine which is accomplished by diffusing, by means of a heating medium enclosed within a tight chamber, an equal heat over the whole surfaces through which the gaseous vapors necessarily have to circulate in order to exert their force upon the piston. The inventor is J. C. Fr. Salomon, of Baltimore, Md.

SAW MILLS—In saw mills which have the carriage arranged to run upon friction wheels having a lateral movement by means of offset boxes from toward the saw while gidding back, and which have the feeding head blocks, feed automatically by means of an oblique inclined gage bar and ratchet lever, inaccuracies are experienced in the thickness of the boards sawed. This difficulty arising from the wear of the boxes and track, and the consequent chance allowed the carriage of being forced from the saw, when the feeding ratchet lever comes suddenly in contact with the inclined gage bar, and is resisted by said bar in a manner to effect the feeding of the head blocks, and yet, at the same time, to pull over the carriage head blocks and log the same distance as the wear of the boxes and rails will allow. This invention of W. M. Ferry, Jr., of Ferrysburg, Mich., which is clearly defined by the claim, completely obviates the above objections, and therefore will prove a valuable auxiliary to self-setting saw mills.