Scientific American.

THE ADVOCATE OF INDUSTRY, AND JOURNAL OF SCIENTIFIC, MECHANICAL, AND OTHER IMPROVEMENTS.

VOLUME XI. NEW-YORK, JUNE 21, 1856. NUMBER 41.

THE
Scientific American,
PUBLISHED WEEKLY
At 128 Fulton Street N. Y. (Sun Buildings.)
BY MUNN & COMPANY.

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

Agents.

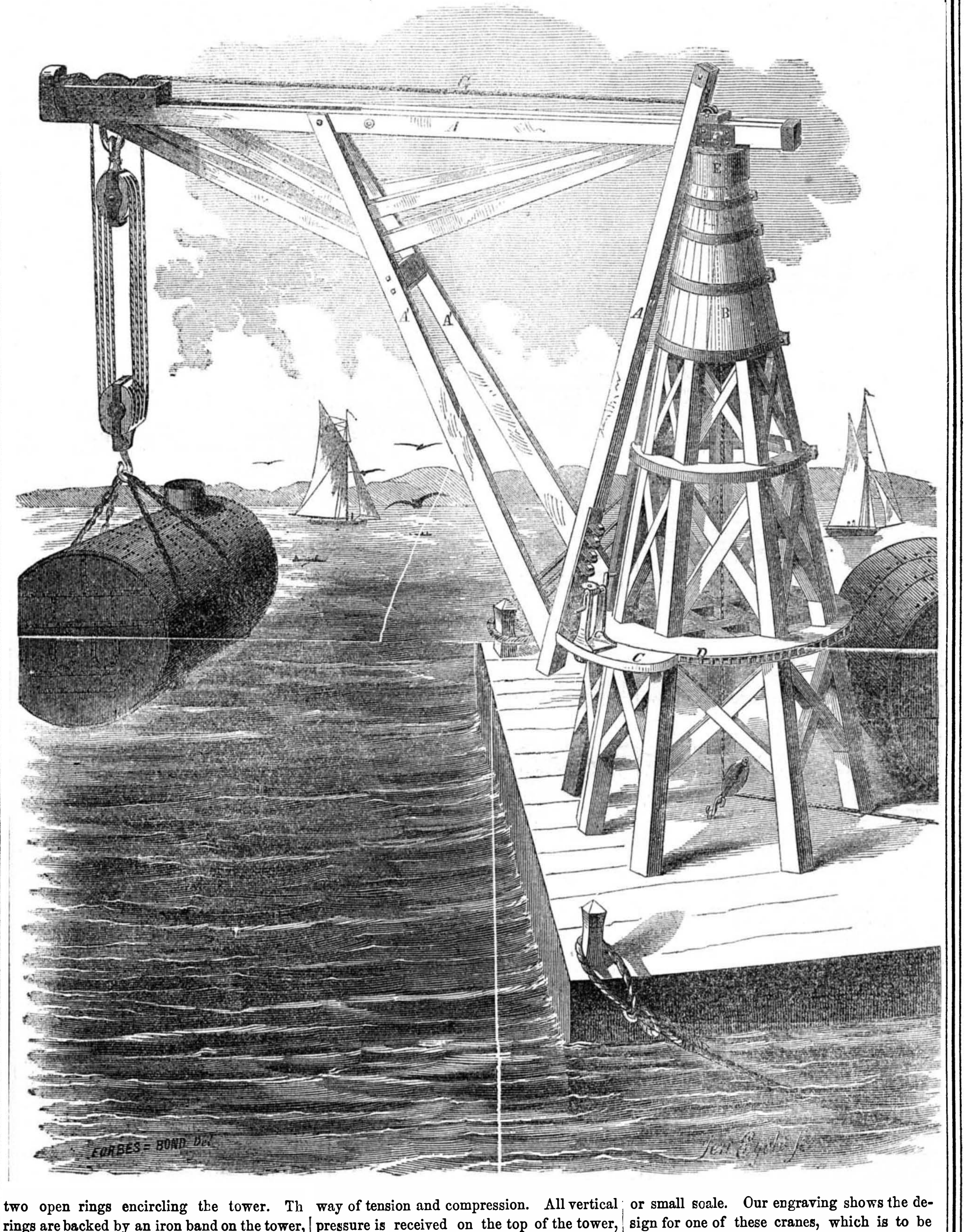
Federhen & Co., Boston. | Dexter & Bro., New York
A. Winch, Philadelphia. | E.E. Fuller, Halifax, N S.
A. G. Courtenay, Charleston. | S.W. Pease, Cincinnati, O.

Responsible Agents may also be found in all the principal cities and towns in the United States.

Single copies of the paper are on sale at all the periodical stores in this city, Brooklyn, and Jersey City.

TERMS--$2 a-year,—$1 in advance and the remainder in six months

IMPROVED INDEPENDENT CRANE.



Improvement in Cranes.

The invention illustrated in the accompanying engraving relates to certain improvements which simplify and cheapen the cost of that class of cranes which are used for lifting, lowering, or moving about with facility and dispatch the heaviest bodies of all kinds, such as bed plates of large marine engines, steam boilers, &c. This work is generally performed by shears, or by a derrick. The former are, for many reasons, inconvenient; the latter is of complicated construction, costly, and liable to accident or breakage, owing to its large number of parts, and the difficulty of arranging them so that the strain shall be distributed properly throughout.

In cranes constructed according to the improvement now under discussion, the jib, A with its main braces, A′, stays, A″, and other immediate accompaniments, and the load, are sustained vertically on the top of a stationary post or tower, B, all the vertical pressure being transferred to the top of the tower, B, by means of the backstay timber, A″, leaving only a lateral horizontal pressure against the side of the tower at the circular way.

The improvements consist, firstly, in the employment of the backstay, A″, for the purpose just indicated, being connected to the jib at the top and mainbrace at the bottom, it also supports a pendant segmental traveler or foot piece, C, so applied as to work round the lower part of the pillar or tower when the jib is turned, and also to support the outer end of the jib with whatever weight may be there attached. The jib is fully braced against lateral displacement.

A second improvement consists in an arrangement of an anti-friction roller frame, D, in combination with the foot piece, C, so as to reduce friction, and prevent the binding of the foot piece against the tower.

In the annexed figure, the crane is shown as standing upon a float, so that it may be conveniently moved from one locality to another, placed alongside of steamers, &c. The pyramidal tower frame or frame work, B, is used in place of the ordinary vertical post. The tower terminates in a spindle or point, E. The jib, A, with its several braces and parts, is supported vertically on the top of the tower by means of a cast-iron or other metal cap or socket, G, which fits upon the spindle, E. The spindle, E, is made hollow, for the crane rope, G or chain to pass through it to the barrel, which, with its gearing for winding the rope, may be arranged within the tower or at one side, and may be operated by hand, horse, or steam power. The barrel and gearing are not represented, as they need not differ from those of other cranes. The traveler, C, is suspended from jib, A, by means of back-stays, A″.

These braces are spread apart considerably at their bases, thus balancing the traveler, C, equally, obviating its tendency to trip out sidewise, giving it free suspension from the apex of the tower, exempting it from vertical or lateral binding, &c.

To prevent the bearings of the small friction rollers against which the traveler, C, presses, from being crushed, they are arranged on a circular frame, D, which is composed of two open rings encircling the tower. Th rings are backed by an iron band on the tower, and the friction rollers are hung in the frame, D, is such a manner that the faces of the rollers will rest and travel on the back band. The traveler, C, also presses against the face of the rollers, so that their journals are wholly relieved, and cannot be crushed. This arrangement permits the easy swinging around of the jib and its load; for this purpose a stationary winch and gearing, G, is employed, working in a rack on the tower. Two men, only, are required to move the jib with its weight around.

This crane is simple in its construction, being a combination of a few member which act together, and capable of being strengthened in every part to almost any extent by mere enlargement of parts. Much care appears to have been exercised to use the strength of timber to the best possible advantage in the way of tension and compression. All vertical pressure is received on the top of the tower, and all the lateral or horizontal stress against its side, while the structure of the crane is such as to meet these strains most perfectly.

This plan for a crane may be adopted in iron foundries, forges, &c., by making the tower from 20 to 30 feet high, and about 6 feet diameter at the base, of boiler-iron, from 1-4 to 3-8 in. thick, secured to masonry at the base, independent of the roof, or any other support; or a tower may be formed of 5-inch plank staved up and hooped; or with barrels, arranged so as to take up the shrinkage of timber.

Similar sizes may also be used with great advantage on docks, for lifting cargoes of all kinds, machinery, &c.

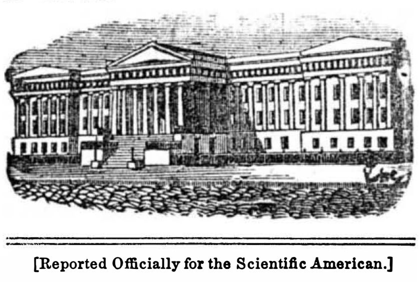
The invention combines strength, safety, and durability, with economy of use and construction. It is capable of employment on a large or small scale. Our engraving shows the design for one of these cranes, which is to be capable of lifting 150 tuns.

Mr. B. J. Burnett, of the Novelty Iron Works, New York City, is the inventor, and will give any further information. Patented December 25th, 1855. English and French patents have also been secured.

Two locomotives have been built at Mason & Co's. Works, Taunton, Mass., for the railroad on the Isthmus of Suez, Egypt. They are stated to be built in the most superb manner; they weigh 25 tuns each, and have furnaces for burning coke.

Electro Chemical Baths.

We have received several communications on this subject, in answer to Dr. Smith's communication which appeared a few weeks ago in our columns; to these we will give attention in our next number.



[Reported Officially for the Scientific American.]

LIST OF PATENT CLAIMS

Issued from the United States Patent Office

FOR THE WEEK ENDING JUNE 11, 1856.

HAND PEGGING—Wm. W. Batchelder, of New York City: I claim the attachment of the knife to the plunger and the arrangement of the upper groove in regard to shutting off communication between the trough and the peg receiver, substantially as described.

I also claim the combination of the vibrating foot piece with the lower end of the machine operated by means of the wedge, o, and spring, I, substantially as specified.

HYDRO-STEAM ENGINE—Wm. Baxter, of Newark, N. J.: I claim the method substantially as described, of imparting rotary motion to a wheel or wheels by the pressure of steam or other equivalent expanded gas, acting alternately on the opposite one of two columns of water or other liquid connected together to cause the said water by such alternate action to pass through and impel the wheel or wheels, as set forth.

HARNESS TRACE COUPLINGS.—Chas. K. Bradford, of Lynn, Mass.: I claim the combination of the india rubber plug or spring friction bearer, E, with the tenon button and its locking case, the same being made to operate therewith substantially as specified.

I also clam arranging in the locking case and transversely of its entering slot, the safety recesses, o o, the same being for the purpose as specified.

ROTARY PUMPS—John Broughton, of Chicago, Ill.: I claim a rotary pump composed of a rotary eccentric piston, working within an oscillating barrel with any arrangement of inlet and outlet passages, substantially as set forth.

CUTTING FLOUR MILL—Jonathan Burdge, of Cincinnati, Ohio: I do not claim adjustable knives for the purpose of grinding grain, nor furrows cut in the grinding surfaces of mills; nor do I claim, simply, the arrangement of opposite grinding surfaces, so that their teeth or cutters cannot be brought into contact, as such devices have been used before.

I claim forming the surface of the cutter head with central and peripheral ledges, d e, and a plane or level depression, h, between them, equal in width to the cutters and in depth to the depth of cut required, for the purpose of easily setting the cutters all to an exact and uniform hight, and of preventing the possibility of their being brought into contact with the counter plate above, and also for the purpose of preventing the escape of meal or particles of grain at the periphery, substantially as described.

I also claim the notches or nicks, p p, in the ledge, e, of the cutter head, and the notches, q q, in the ledge or surface, f, of the counter plate, said notches having the least possible width at their inner ends, and gradually widening or flaring outwards when the two sets are arranged in combination so as to cross each other, and thus mutually scrape outward by their edges, any dust or glutinous substance which may have a tendency to adhere to the opposite surfaces of the ledges, substantially as set forth.

I also claim the peculiar construction and arrangement of the counter plate with bent, gathering, and retaining ridges, n, running across from the inner to the outer peripheries of a conical concavity, m, in its under side, the lower edges of said ridges being all in the same plane, and even with the surrounding surface, f, when combined with the cutters, i i, and operating in connection therewith, substantially in the manner and for the purpose specified

REED BOARDS FOR MELODEONS—Jeremiah Carhart, of New York City: I claim, first, the means whereby the reciprocating motion with variable stroke is communicated to the frame, D, viz., the segment, R, which gears into the rack, u, on the frame, D, and into the pinion, s, on the shaft, M, the pulleys, N N, on the shaft, M, and the shaft, Q, in the frame, L, actuated by the bar, S, and the bars, z z, on the frame, E, by which the pulleys, N N, are alternately connected and disconnected with the shaft, M, substantially as described.

Second, I claim the dogs, F F, constructed substantially as shown and for the purpose specified.

Third, I claim giving the lateral feed motion to the frame, E, by means of the rack, 5, and pawl, 3, when said pawl is actuated by the bars, T U, and roller, 4, arranged substantially as shown and described.

HEAD BLOCKS OF SAW MILLS—John M. Carlisle, of Williamston Springs, S. C.: I claim attaching or connecting the carriage, C, to an endless chain or belt by means of an arm, T, arranged as shown, so that it will actuate at each end of the stroke of the carriage, a slide, I, having a pawl, J, attached, which, by means of suitable gearing, as shown, moves or sets the log to the saw, whereby the feed movement of the carriage, and also the setting movement of the log are rendered automatic or self-acting, as described.

WATER-PROOF PERCUSSION CAPS.—James Chattaway, of Hamden Co., Mass.: I claim the application to percussion caps of a fusible alloy which will melt without exploding the powder, as described, using for that purpose the aforesaid metallic compound, or any other substantially the same, and which will produce the intended effect.

STEAM PRESSURE GAUGES—S. W. Brown, of Lowell, Mass.: I claim the combination of the rigid radial arms, P P, with the flexible and elastic disk or surface, R, for covering the joints of these radial arms steam tight when yielding or moving by the force of steam or water to correctly indicate the pressure thereof, the radial arms, P P, being fitted so as to operate so close to each other as to prevent the surface, R, from bagging, essentially in the manner and for the purpose set forth.

SHUTTER OPERATOR—Hiram Collins, of Salisbury, Mass.: I claim opening and closing the blind or shutter, B, by means of the inclined or oblique rod, C, which passes through the stiles of the casing, and having its lower or outer end bent and fitted within a socket, b, attached to the lower part of the shutter or blind, the rod and blind being secured at desired points by means of the pin, g, in the knob, D, substantially as shown and described.

COATING CLOTH WITH PAINT—Daniel Cushing, of Wheeling, Va.: I claim the arrangement of the several rollers and belts, as described, wherein I make use of the friction of the cloth on the roller, A, for the purpose of giving the necessary tension and movement of said cloth, when in combination with the means of spreading the paint or composition, as in the manner described, and in the delivery of the cloth when coated, substantially in the manner and for the purpose set forth.

I also claim the arrangement of the hanging frame G, constructed substantially in the manner described, for the purpose of receiving the cloth for drying, thereby rendering the painting and hanging it a single mechanical operation.

RUBBING AND POLISHING PAINTED CLOTH.—Daniel Cushing, of Wheeling, Va.: I claim the mechanism constructed and operating substantially in the manner described, for the purpose of rubbing painted or enameled cloth.

CLEANING INDIA RUBBER—A. G. Day, of Seymour, Conn.: I claim the exhaustion of the noxious gases from the crude india rubber, and its subsequent treatment for the purpose of cleansing and purifying it, as set forth.

POCKET-BOOK—J. C. Dickinson and Robt. Bate, of Hudson, Mich.: We claim the plate, B, with hooks, d, attached, the plate being secured at one side of the pocket book, and used with or without the sliding plate, C, substantially as and for the purpose specified.

SEALING PRESERVE CANS—C. E. Russell, of St. Louis, Mo.: I claim the combination of the spring ring, E, and groove, G, or its equivalent, in the manner described and for the purposes specified.

SHEARS FOR SHEET METAL—H. C. Dole, of Adrian, Mich.: I claim the employment of pitman j k, levers and eccentric wheels, N H, constructed as described, for operating the blades, C D, in conn ction with the adjustable gauge, Q, in the manner and for the purpose set forth.

DOUBLE ACTING STEAM PUMPS—R. B. Gorsuch, of New York City: I disclaim effecting a connection between the water on both sides of the piston or plunger, or between either end of the pump, cylinder, and the forcing main above the force valves, except throngh said valves in the ordinary action of the machine, at any time or for any purposes whatever,

Neither do I claim operating the steam valve in direct acting steam pumps by a secondary piston, as they have been used in various combinations for that purpose.

But I claim the secondary piston, e, in combination with the pump cylinder, depending for its action upon the elastic balance chamber, S, and the reverse motion of the pump plunger combined or either separately for attaining the end in view substantially as described, and for the purpose set forth.

THREE-WHEELED CARRIAGES FOR CHILDREN—J. H. Gould, of New York City: I claim the curved arms, B B, resting upon the arms or bars, A A, forming a support for the body of the carriage, and terminating in sockets both in front and back, for the reception of the arms, C C, D, for the purpose of permitting the carriage to be both drawn and pushed from either the back or front position.

TOOL FOR WATCHMAKERS—Wm. Hart, of Maysville, Wis.: I claim having the jaw, C, attached to the upper part of the leg, A, of the calipers and the jaw, D, connected to the upper part of the leg, A', by links, d d, the jaw, D, having a shank, b, attached to it, the shank passing through a slot in the leg, A, and bearing against a spring, c, and the shank, b, having a rod, f, attached to it, which rod passes through a hollow screw, e, which is attached to the jaw, C, the screw, e, having a nut, E, upon it, substantially as shown and for the purpose specified.

THRASHING MACHINES—Wm. Holmes, of Brooklyn, N. Y.: I claim the use of a series of cams, H, constructed and arranged as described, for the purpose of operating the beating levers, D, by revolving in the curves, I I, or their equivalent, and striking both arms of each of the levers, D, in rapid succession, giving to the downward motion of the longer arm or beater, a quick whipping stroke, the whole arranged and operating substantially as specified.

GUTTA PERCHA—James Reynolds, of New York City. I claim the combination of the rotary forcing apparatus, consisting of a cam, E, for forcing out the sliding piston, D D, arranged entirely within the rotating head, C C, of the frame, c c, with a passage or passages within the rotating head which carries the said pistons providing for leakage, substantially as and for the purposes described.

FIRE ENGINES—David Russell, of Lockport, N. Y.: I disclaim the several elements composing my engine, separately considered.

I claim the arraugement of the series of pumps with the circular train way, and the mechanical devices actuating the pistons, substantially as and for the purposes set forth.

SHIPS' SAFES—Wm. Mount Storm, of New York City. I claim, first, the combination of the receptacle or sheath, B, open at the bottom and at its top open to the upper deck, with the (independently water tight) double shelled buoy, C, having within it again the independently water-tight deposit chamber, for valuables, said chamber being accessible from the exterior by a water-tight door closing and clamping, for that purpose, on an elastic seating, &c., substantially as described.

Second, I claim the buoy, the tube, flag, and float, Z Z', for the purpose explained.

STICKING PINS—J. B. Terry, of Hartford, Conn.: First, I claim the movable conductor or conductors with notches for the head to hold the pins and push them into the crimp portion of the paper.

Second, I claim the movable notched cross bar to correspond with the notches in the conductors, and the movable plate or its equivalent, to hold the pins in their proper place, while the pins are thrust to their place by the conductor.

Third, I claim the combination of the movable conductor or conductors, the apparatus for changing the position of the points of the pins, and holding the same with the clamp or jaws which hold the paper while the pins are thrust through.

R. R. CAR WHEELS—Wm. R. Thomson, of Cleveland, Ohio: I do not claim forming the hubs of car wheels in sections, and welding said sections together irrespective of the peculiar form of the sides of said sections or butts, as described.

I claim havinr the butts made the entire length of the hub, and the sides of the butts inclined, curved, or made in zig-zag form, so that they form, when placed together, dovetail joints, for the purpose of preventing any lateral movement of the butts, and to insure the perfect welding of the same at all points of contact, whereby a solid and perfect hub is obtained.

REGISTERS AND VENTILATORS—E. A. Tuttle, of Williamsburgh, N. Y., I claim the combination of the leaves or valves, B B, and the center piece, F F, connected together in working order at ihe points, S S, substantially as described.

BOLT FOR SHUTTERS—Philip Warner, of Lancaster, Pa.: I do not claim a bolt as attached to a plate by clips with a flanged plate catch.

But I claim two corresponding silver-plated metal flanged plates, in combination with a silver plated knob attached to an inside bolt, having on the reverse or inside of the plates, corresponding clips in which the bolt operates, said bolt and clips to be fitted to a mortise in a window shutter, for the purpose of presenting a neat silver plate on each shutter to hide the bolt, and completely protect it from the weather, substantially as described.

GOVERNOR FOR STEAM ENGINES—Marshal Wheeler, of Honesdale, Pa.: I claim the pressure piston working in an offset chamber, placed between the throttle and the engine cylinder, and combined with the throttle valve, said pressure piston being made to act against a spring which simultaneously closes it, and the throttle valve, and which yields in proportion to the resistance upon the engine piston, and opens the throttle valve in a corresponding degree, substantially as set forth.

REAPING AND MOWING MACHINES—G. W. N. Yost, of Pittsburg, Pa.: I do not claim giving an abrupt and intermittent reciprocating motion to the cutter bar of grain and grass harvesters.

But I claim the described operating mechanism, or its equivalent, to produce an abrupt and intermittent reciprocating motion, in combination with the inclined edged cutters, D, and the straight edged cutters, E, whereby I obtain the shear and chop blow, substantially as and for the purpose set forth.

ROTARY EXCAVATOR—Daniel Judd, of Hinsdale, N. Y.: I claim the cylindrical form of the excavator, so formed in combination with the wheels, windlass and frame, that the load bears on its center, and rotates when being raised, and also when being discharged, substantially as described.

ATTACHING HORSES TO VEHICLES—Geo. B. Kaign, of Lumberton, N. J.: I claim supporting and controlling the ends of vehicle shafts, A A', by means of the loops or tugs, b b', secured to the hames, B B, making the breeching consisting of the band, E, and the adjustable holders, e e or their equivalents, a permanent, and adjustable part of the said shafts; and attaching the back ends of the traces, D D', together at the back end of the said shafts, so as to bear against and move on the pulleys, a a, in accordance with the forward motions of the horse, the whole being arranged and operating together substantially as described and set forth, and for the purpose of dispensing with the usual saddle, belly bands, crupper, breech supporting straps and whiffletree, and thus facilitating in connecting and disconnecting horses from vehicles, as described.

SEEDING MACHINES—C. O. Luce, of Freeport, Ill., I do not claim, separately, the distributing wheels, I I, for they have been previously used.

But I claim the distributing wheels, I I, in combination with the slides or valves, N N O O, arranged and operating as shown for the purpose specified.

CORN SHELLERS—Ebenezer Morrison, of Franklin, N. H.: I claim the arrangement of the two toothed truncated feed cones, R R, for both revolving and feeding down the ears of corn in such manner that the toothed shelling wheel, Y, will remove all the corn from the cob during such revolving, essentially in the manner and for the purpose set forth.

CARRIAGES—R. W. Benedict, of Brrant, N. Y.: I claim the combination of the springs, E, with the springs, F, and concomitant parts, in such a manner that the torsional motion of the body shall affect the spring, F, as described.

CUTTING STRINGS—George Blanchard, of New York City: I claim the internal and slanting arrangement of one or more knives inside the cup, the knife or knives being so arranged in the cup, that when the cup is put over the cork and turned, that the strings are immediately cut and the cork safely received in the top of the cup.

PLATFORM SUPPORTERS—C. E. Flagg, of Shelburne, Mass.: I claim the improved platform supporter or combination of the fastening bar, A, the slide bar, C, the bearer, E, and the strut, F, as applied together, and to be used substantially in manner and for the purpose specified.

POTATO DIGGERS—A. L. Grinnel & J. Z. Williams, of Willet, Wis.: We claim the two rakes, G G, attached to the frames, F F, the frames being hung on the shaft, E, which is connected to the frame, A, and the handle, H, of the frames passing through the side pieces of the frame, A, substantially as shown for the purpose specified.

SEED PLANTERS—P. B. Green, of Chicago, Ill., and E. A. Kennedy, of Newark, Ill.: We claim the seed slide, b, in combination with the foot, A, side springs, h, and catches, l, arranged and operating in the manner and for the purpose set forth.

SEED PLANTERS—George A. Meacham, of New York City: I claim, first, a machine for planting corn, constrncted so as to be applied to and operated by the foot, substantially as set forth.

Second, the employment of the self-adjusting step, G, applied in connection with the plunger and slide, E, seed tube or box, A B D, and flexible seed conductor, C, substantially as and for the purpose set forth.

STUFFING HORSE COLLARS—H. G. Robertson, of Greenville, Tenn.: I claim in combination with and specified relation to the movement of the reciprocating plunger or stuffing rod, C, the intermittently reciprocating mechanical feed formed by the bearded rack or toothed slide, c, and retaining fingers, d, operating together simultaneously in reverse directions within the hopper, essentially as and for the purposes set forth.

STRAW CUTTERS—Thomas Wiles, of Somerset, Ohio: I claim the feed and discharge bottom, B, in combination with the reciprocating knife projection, p, arranged and operating as and for the purpose specified.

BREECH-LOADING FIRE-ARM—Henry Gross, of Tiffin, Ohio: I am aware that breech-loading fire-arms have been constructed in which the chamber is drawn back and elevated, and then thrown down and moved forward by means of the lever and cam attachment and other analogous devices. These constructions I expressly disclaim, as where they are used the force of the explosion is either brought upon the pin on which the breech turns or is resisted by a surface on one side of the axis of the breech.

I claim the breech piece, I, and eccentric lever, B, working together as described, in combination with the breech seat, F, to which the axis of the breech is normal at the time of discharge, whereby the pin around which the breech turns is relieved, and loosening from recoil prevented.

SABOT FOR ROTATING SHOT AND SHELL—Wm. W. Hubbell, of Philadelphia, Pa.: I claim the construction of wooden sabot, substantially as described, adapted to relieve the friction of, and easily rotate the smooth spherical shot or shell of the common diameter, consequent weight, form, and extent of windage and bearing of its weight on the bore out of its usual size of smooth bored cannon under the conditions, as described.

BEDSTEADS—Wm. Huntress, of South Berwick, Me.: I do not claim the cords, slats, windlasses, or any of the parts, when used in the manner in which they have before been used.

But I claim the pins, P P, when placed in the underside near each end of the slats and interlaced with the cords, as described.

ATTACHING PADS TO SADDLE TREES—James Ives, of Mount Carmel, Conn.: I do not claim a hinged self-adjusting pad, as such a device was patented Feb. 5th, 1847, by Pope & Frasier.

I claim the peculiar construction of hinge joint described and shown, for connecting the pad to the tree, substantially as set forth.

OPERATING HEAD BLOCKS OF SAW MILLS—Joseph Kurtzeman, of Lancaster, Ohio: I claim connecting the dogs, C C, to the shaft, H, by means of the racks, a, and gearing, E F G, in combination with a toothed wheel, o, having the hollow hub or geared rim, b, attached, the wheel being placed loosely on the shaft, L, which is provided with the pawl, N, substantially as described, for the purpose specified.

WHEELWRIGHT'S MACHINERY—A. S. Macomber, of Bennington, Vt.: I claims the jaws, E, operated by the screws, H, worm wheels, F, and connecting rods, G, one pair of jaws being attached to an adjustable, bar B', the above parts being arranged as shown, for the purpose specified.

DIE STOCK FOR CUTTING SCREWS—Patrick McGlew, of Waterford, N. Y.: I claim the arrangement of one or more dies within a circular two-way ratchet, which is moved by adjustable pawls, as described, to secure the advantages specified.

ROTARY SHINGLE MACHINE—Jason Palmiter, of Jamestown, N. Y.: I claim placing a series of carriages, J, on the sides or faces of a polygonal wheel, G, and giving said carriages the proper feed motion by means of the racks, K, pinions, M, ratchets, N, and sliding bar, O, with pawls, b, attached, the above parts being arranged as shown, and in connection with the circular saw, C, substantially as described, for the purpose specified.

REPAIRING CIRCULAR SAW TEETH—M. L. Parry, of Galveston, Texas: I claim the top or mandrel, E, fitted within an adjustable socket, e, which is attached to an arm, D, the arm being secured to the frame, A, the above parts being arranged as shown for the purpose specified.

JAPANNING PINS—John I. Howe and Truman Piper, (assignors to the Howe Manufacturing Company,) of Derby, Conn.: We claim dipping a portion of the length of the pin in the compound, whilst inserted in a sheet of paper and with one end downward, and then subjecting them to the baking operation, substantially as described, in combination with the second dipping and baking in the reversed direction, to japan the remaining portion, substantially as and for the purpose specified.

And we also claim controlling the pin during the process, substantially as described, by sticking the pins into the sheet of paper through holes in a plate of metal, or equivalent substance, the said holes being of sufficient size for the free passage of the shanks or barrels of the pins, but not for the heads, so that after the first dipping and baking, by reversing the place and pulling off the sheet of paper, the pins will hang by their heads for the second dipping and baking, as set forth.

CASTING CAR WHEELS—Lucien H. Allen, (assignor to himself and E. M. Ivens,) of Tamagua, Pa.: I claim passing a volume of steam through the eye of a cast metal wheel, whilst the periphery is in the chill, whereby the contraction of the wheel as it cools is realized, in the manner substantially as and for the purposes set forth.

REPEATING FIRE-ARMS—Alexander Hall, (assignor to himself and James G. Caldwell,) of New York City: I claim the ring of chambers having a single spoke extending from its inner periphery to its hub, so that said ring may turn on a center support, make almost an entire revolution, and pass freely and truly through the mortise in the breech, where its chambers are in succession brought opposite, or in line with the bore of the gun, substantially as described.

I also claim so combining the bolt, e, with the ring of chambers as that it may be detached from its catch, and the ring turned to bring the next chamber in line by the hand which supports the gun, and without changing the hand from its supporting position, substantially as set forth.

ICE CREAM FREEZERS—Joseph Parrisett, of Indianapolis, Ind.; I claim the spiral scraper, D, in combination with the drop catches, c and d, for the purpose of regulating the movement of the can and scraper in the relation to each other, as set forth, when arranged substantially in the manner described.

MAKING GUTTA PERCHA TUBING—James Reynolds, of New York City: I claim constructing the mandrel with a joint, as described, and for the purpose as specified.

STICKING PINS—John I. Howe and Truman Piper, (assignors to the Howe Manufacturing Company,) of Derby, Conn.: We claim in combination with a guide, groove or grooves, and a follower, substantially as specified, the employment of a sliding frame for holding and shifting the sheet of paper, substantially as described, that the pins may be properly spaced and inserted in the sheet of paper, at right angles or nearly so with its surface, as set forth.

And we also claim, in combination with the guide groove or grooves, follower, and holding and shifting frame, substantially as and for the purpose specified, the employment of a perforated plate, substantially such as described, and interposed between the guide groove or grooves and the sheet of paper held in the frame, that the pins may be inserted simultaneously in the plate and in the sheet of paper, as set forth.

ATTACHING TEETH TO SICKLE BARS OF HARVESTERS—J. C. and L. C. Pluche, of Cape Vincent, N. Y.: We claim attaching the teeth, D, of the sickle to the bar, C, by the cleats, c, secured to the back ends of the teeth, the cleets being fitted in a groove, b, in the bar, C, substantially as shown and described.

SOUNDING WHISTLES FOR FOG SIGNALS—Rufus Porter, of Washington, D. C.: I claim the combination of vertical cylinders, or their equivalents, and whistles attached thereto, for the purpose of having loud sounds produced by the undulation of waves or swells, substantially as described.

METAL BEAMS—Joshua K. Ingalls, of Brooklyn, N. Y., (assignor to M. H. Howell, of New York City: I am aware that a wrought iron beam has been made with wrought iron corrugated web, said corrugations resisting compression in the direction of their length. I do not therefore claim that.

But I claim, first, the corrugated web when cast with or upon the top flanch and arranged with the bottom flanch or tie, in such manner as to afford flexibility to the cast portion of the beam, to accommodate its action to the tension of the wrought portion, in the manner set forth.

Second, I claim the tapering form of the corrugations in their hight, which gives a right line where the web attaches to the top flanch, with which it acts in resisting compression, and which increases the breadth of said corrugations, and consequently the flexibility of the web where it touches the bottom flanch or tie with which it acts in resisting extension.

RE-ISSUE

SELF-SEALING PRESERVE CANS—Robert Arthur, of Philadelphia, Pa. Patent dated Jan. 2d, 1856: I claim the employment of elastic packing, arranged in and retained by a groove of an acute form, or whose sides are in close proximity, in the manner and for the purpose described.

Railway Law.

A recent law passed by the Legislature of Iowa, provides "That trains shall come to a full stop on approaching crossings, under a penalty of $500 for non-observance, half of which sum goes to the informer. And in case that life or property should be destroyed by violation of the act, the penalty is double the value of the property so destroyed, and for every life lost, from $10,000 to $50,000, to be recovered by the representatives of the deceased, and to go to the widow and children, if there be any, or if there be not, then to the heirs of the deceased."

This law appears to be unnecessarily stringent. We do not exactly see the justice of paying a man double the valuation of his property. If his actual loss is made good, that is enough.

Neither do we perceive the wisdom of enriching the heirs of persons who are accidentally killed on railroads. Where a man who has a family dependent upon him, is killed, through negligence of the railroad corporation, it is well, perhaps, to require that the family shall be supported at the expense of the company.

One of the greatest blessings of our country is its railroads. It is unwise to hamper their operations by unreasonable and foolish laws.

A Steamboat Burned.

On the 10th inst., the steamboat *City of Newark* was burned down while on her passage from Newark to this city. The fire was first noticed in the boiler room, and the flames spread so rapidly that before the steamers *Achilles* and *Thomas Hunt*, which were in its vicinity, could reach the burning vessel, several passengers were scorched, and three ladies were drowned in an attempt to escape. There was the greatest consternation among the passengers, most of them being ladies, and by the rush to get into the life-boats, two were capsized, in one of which were the three ladies said to be drowned. Another account states that none were drowned —that all were saved. We hope no lives were lost, but were it not for the near proximity of the tug steamer *Achilles*, which left a ship it had in tow and immediately flew to relieve the panic-stricken passengers, there can be no doubt but a great number of lives would have been lost. This accident was undoubtedly caused by carelessness on the part of the firemen, or a defective construction of the boiler room. We hope the case will receive a full investigation.

Great Strike of Miners.

By recent accounts from Europe, we learn that forty thousand miners were said to be on a strike in the West of Scotland. Strikes for wages are the most absurd means that can be employed by operatives to attain their objects. They always end in disaster to the working men.

(For the Scientific American.)

The Sun.—No. 1.

The sun, that vast illuminator, which imparts to us the light of day, and by his varying position in the sphere of the heavens, sways our annual seasons, bringing summer and winter alternately, is a stupendous globe, the center of our beautiful planetary world. It is separated from our globe by an immense interval; but this distance, great as it appears, is not immeasurable. If two observers, separated by a considerable distance on the earth's surface, view the sun at the same instant of time, his apparent place in the celestial sphere will not be exactly the same for both; but could his exact position for each station be ascertained, they would disagree by a few seconds of an arc. This difference in his apparent position, as seen from separate stations on the earth, is called his *parallax*. When he is observed in the horizon of one observer, and in the zenith of the other, at the same time, the difference in his apparent places is termed his *horizontal parallax*. The horizontal parallax of the sun, then, is the angle subtended by the earth's radius at his distance. Having ascertained the horizontal parallax of the solar orb, in the right-angled triangle made by the earth's radius as a base, and the two right lines drawn from the center of the sun to its extremities, we have one side—the earth's semi-diameter,—and the opposite angle, the parallax, given to determine the perpendicular, or distance of the sun from the earth's center. From the formulas of trigonometry, we find that in the right-angled triangle, the tangent of the angle opposite to the base, is to the radius as the base line is to the perpendicular. Applying this to the case under consideration, we find that as the tangent of the sun's horizontal parallax is to radius, so is the semi-diameter of the earth, to the distance of the sun from her center. It is very important that we should know the true distance separating us from the sun, within a small fraction of the whole; for upon the assumed value of this distance depends our determinations of the magnitude of the system in general. The mean equatorial horizontal parallax of this luminary has been determined very accurately from observations of the transit of the planet Venus across her disk in the year 1769. Its value deduced from these observations, is 8″·5776, which gives us about 24047 terrestrial semi-diameters, or, more exactly, 95,298,260 miles for the mean distance of the earth from the sun. We may safely affirm that we know our distance from the solar orb within less than a third of a million miles, or one-three-hundredth part of the whole.

Knowing the distance of a body, we have only to ascertain its apparent diameter in angular measurement, to compute its real linear diameter; for the angle subtended by any assumed measure of length, is always inversely as its distance from the vertex. The mean apparent diameter of the sun is found to be 32′. Now, as the equatorial diameter of the earth placed at the sun's mean distance would subtend an angle of 17″·1552, or twice the horizontal parallax of that luminary, by dividing 32 by 17·1552, we obtain 111·92, nearly, for the real diameter of the solar orb, the earth being taken equal to unity. The equatorial diameter of the earth being nearly 7926 miles, we ascertain that the enormous globe of the sun has a linear diameter of no less than 887,076 miles. The volumes of spheres are to one another as the cubes of their diameters; hence, (diameter of earth)^3 : (diameter of sun)^3 : : (volume of earth) : (volume of sun); from which, by substituting the numerical quantity, we determine the bulk of the solar orb to be that of the earth as 1,401,910 is to 1.

What an immense globe our central luminary is! Fourteen hundred globes of the size of our seemingly great terrestrial sphere, would not make up the volume of this one. He is about 28,000,000 times as large as the planet Mercury; 1000 times as large as Jupiter, which is by far the most voluminous of the planets; and has nearly 600 times the volume of all the planets, both primary and secondary, of the solar system, taken together. The whole diameter of the lunar orbit is but a little more than one half of the solar orb, so that if a globe was formed having the moon's orbit for its circumference, it would have only about one-sixth of the solidity of the sun. In fact, he is as large as the whole universe was once thought to be.

The mass of the sun is found to be above 355,000 times that of the earth; in other words, as a collection of matter, he has 355,000 times the weight of the earth; but, as we have seen, his volume exceeds her's in the much greater proportion of 1,400,000 times; hence, as the densities of bodies are to one another as their masses divided by their volumes, the sun's mean density can be no more than about 0·25: that of the earth being equal to unity. The matter of which the sun is composed, then, has a mean weight only one-fourth as great as that of the earth's constituent material, or is but a little more than one-third heavier than water. The forces of gravity on the surface of spheres are directly as their masses, and inversely as the squares of their radii which are the respective distances from their centers of attraction. By making the necessary calculations, we ascertain that a pound of matter on the earth, would, if removed to the surface of the sun, exert a pressure towards the center of that luminary equal to that of 28 pounds on our planet. Could a terrestrial inhabitant, weighing 150 pounds at home, be transported to the surface of the sun, he would be attracted towards the center of solar gravity with a force equal to that of 4200 pounds on the earth. He would be literally crushed beneath his own weight; but could he for a moment sustain this enormous pressure of more than two tuns' weight without inconvenience, he would be unable to move agglomerations of matter about him, several times less in mass than those he could tumble about with ease at home.

The surface of the sun, in the field of a telescope of adequate power, appears like an extensive luminous ocean. It has not the same degree of luminosity however, over the whole surface; on the other hand, large dark or black spots are frequently observed in the luminous area, as well as innumerable small ones or kind of mottlings scattered over his whole disk, and also others much brighter than the general field. The dark spots are sometimes called *maculæ*, and the small bright ones *faculæ* or *luculi*. The most interesting and conspicuous phenomena of the solar disk are its dark spots, which are frequently observable, having very large areas. The disk of the sun rarely appears to be without more or less of these spots, and sometimes many of them are perceived at the same time.

These spots which appear perfectly black in their interior, have a surrounding border or *penumbra* less dark than their central nucleus. Their penumbral border, which has generally the form of the enclosed black portion, is sometimes of a considerable breadth. Several dark spots are occasionally observed in the same penumbral area, some of which are of a considerable magnitude and others smaller. The solar spots are not permanent objects on his disk; for when watched from day to day, they are found to be almost constantly changing their dimensions; sometime expanding out so as to occupy much larger areas, and again contracting, and finally disappearing altogether. When they thus disappear, the central nucleus always shrinks up to a mere point or line, and then vanishes previous to the contracting penumbral border, which closes up, after a like manner, in its turn. Occasionally two or more spots break into one another and become a single one; and one has been observed to become divided into several. From these changes it is inferred that the luminous coating of the sun, whatever may be its nature, has a great mobility among its particles. The number and size of the solar spots are very various. The smallest space that can be seen on the solar face as a visible area, with the most powerful telescopes, has a linear diameter of 460 miles, occupying a second of angular measurement. Large spots have not only been frequently observed with telescopic instruments, but on several occasions, it is recorded, that they have been perceived by the naked eye. Spots have been seen having linear diameters of 16,000, 22,000, 45,000, and even 77,000 miles and according to the observations of some, of a greater extent than any of these. Mayer observed one 45,000 miles in extent, on the 15th of March, 1758; and more recently M. Schwabe has perceived several solar spots without telescopic aid. One of these observed in June, 1843, must have had a diameter of 77,000 miles. Could the planet Saturn be placed on the surface of the sun he would cover an area no larger than that of such a solar spot; although the volume of this planet is 800 times that of the earth. Groups of spots in common penumbra frequently occupy much larger areas. A group has been observed having a linear diameter of nearly 150,000 miles. Sir John Herschel saw a cluster of spots, at the Cape of Good Hope, in the latter part of March, 1837, which he calculated to comprise an area of 3,680,000,000 square miles.

Stillman Masterman.

[For the Scientific American.]

Restoring Fruit Trees Barked by Mice.

It is not as extensively known as it ought to be, that young fruit trees can be restored to full life and vigor after the bark has been stripped off all around their stock by mice. Last winter being unusually long, and severely cold weather, and the ground covered with snow for several months, it was evident, as soon as the snow had disappeared, that these little pests had made sad destruction among the shrubbery and young fruit trees generally.

In a little orchard of thirty trees which I had planted, of the best selected fruit, and had cultivated and trained with much care for six years, until they were beginning to bear, I discovered in the spring that the bark was completely stripped off nine trees, all around the stocks close to the ground, varying in width from three to six inches. I at once banked the earth around them, so as to protect the exposed wood from the weather. In the course of six weeks after, when the uninjured trees were beginning to put out their leaves, I concluded to try an experiment and to endeavor to restore those trees that were injured; four of them I operated upon in this way: I took a straight limb, of an inch in diameter, from an older tree, and cut off pieces of such a length as to reach the sound bark above and below the injured part. I then split off slabs of about three-eights of an inch thick, with the bark—being careful not to injure the bark. These I fitted nicely into the stocks of the trees—the ends of the girdled bark fitting close, so that the connection was formed and the sap conveyed past the injured parts.

The other five trees were so badly stripped that it required strips of from six to eight inches in length to form the connections.—These I treated differently. I took young sprouts of less than half an inch thick, beveled the ends, and then raised the bark of the trees with a sharp instrument, and inserted the ends of the sprouts in the incision, and then applied plenty of grafting wax to the injured parts. When this was done, I again banked the earth around them, and applied plenty of water to moisten it well. In less than a week the buds were perceptibly swollen; they afterwards put out leaves, blossomed, and the young fruit bids fair to come to perfection. They are all flourishing equally well with the others, and no person could tell from their appearance they had been injured in any way.

To save the trouble of thus doctoring trees, it would be well to apply tar, or any other preparation that would be offensive to the mice about the roots of trees at the approach of winter.

Samuel L. Denny.

Penningtonville, Chester Co., Pa.

How and Where Gold is Found.

The most productive auriferous quartz veins in California appear in hills of what is called "the secondary formation," and run from north-west to north-east. Some of these veins have a diameter varying from four to ten feet, and the vein is generally a solid mass. The smaller veins, which run in various other directions, and connect with the main leads, furnish the most of the gold for the placers. In the large veins the gold is found in small scales or octahedrons, closely connected with the quartz; and in the small veins the gold appears in large solid masses on the surface, in the interstices, and on the outside of the quartz. These smaller veins ordinarily contain clay, accompanied by gravel, iron, and arsenic, and in these materials gold is found free from quartz. United with quartz, the gold takes irregular forms, sometimes crystalline, and the auriferous pieces are usually surrounded with clay; this quartz is almost invariably accompanied by oxyd of iron and pyrites.

The solid veins can only be quarried with difficulty, and contain the gold intimately united with the quartz. In the smaller veins the pieces of quartz hang together, but can be broken apart by a light blow. It frequently happens that in a vein not more than ten or thirty inches wide, several divisions are found, each of which is separate and solid in a perpendicular line. The perpendicular spaces between are filled with clay, which is often rich in gold.

Experience has shown that gold is generally found in quartz veins which lie near the surface of the earth; and that the gold loses in quantity and quality as the vein recedes from the surface.

In those quartz veins which have a horizontal direction, and which are found entirely isolated from other veins, large amounts of gold have been found. But these veins are very rare.

Meat and Vegetables.

In an elaborate paper by Dr. Londe, of the Imperial Academy of Medicine, Paris, recently read before its members, he lays it down as a fundamental principle in the philosophy of diet, that the use of fresh meat daily, is necessary to the health of the working classes, although he admits that persons leading a comparatively idle life may do very well on fish, poultry, and other lighter forms of nourishment. In support of his opinion he produces a number of conclusive facts; the following is one: In 1841, the Rouen Railway Co., of France, having conceded the making of their line to English engineers, the latter brought over a band of English laborers, who performed one-third more work daily than could be got out of the French laborers. The latter were put upon a meat diet, similar to that of the English workmen, and in a short time were able to accomplish the same amount of labor.

Mental Condition of the Horse.

In a very interesting essay on "Body and Mind," in the last number of the Edinburgh *Review*, it is stated that many of the mental conditions of the human being are also observable in some of the lower animals. They sleep, they dream, they become insane. They have variations in temper. The horse will weep like his master, and the big tears course as rapidly down his cheeks, from grief or pain. In the disease *rabies*, the mental character of the horse is wonderfully changed. If before the disease he was good-tempered and attached to his groom, he will recognize his former friend, and seek his caresses during the intervals between the paroxysms of fury, and he will press his head against his bosom, and with a piteous look gaze upon him, as if beseeching relief from the dreadful malady. Yet in an instant his whole conduct will change into furious madness and singular treachery He labors under an intense feeling to destroy; and there appears to be a desire for mischief for its own sake.

Real Spirit Gas.

The *New England Spiritualist* states that under the direction of spirits, a new gas machine has recently been constructed in Boston, which will manufacture illuminating gas to eclipse all others ever brought before the pub lic.

This is, indeed, good news; too good, we fear to be true, The "spirits" have long been celebrated for their abundant manufacture of gas. But, unfortunately, it has always been of a bad quality. So bad, that it has befuddled some of our most intelligent men, ob scuring rather than illuminating their intellects.

The celebrated Dumoulin remarked on hi death bed, that he would leave behind him three distinguished physicians—Water, Exercise, and Diet.

New Inventions.

Preventing Boiler Explosions.

We have received a letter on this subject from Mr. Wm. K. Lewis, of the firm of Lewis & Brothers, Broad street, Boston, in which he states that "Clarke's Patent Self-Regulating Water Feed," and "Amsterdam's Fusible Plug," placed on a boiler will prevent explosions. "The *feed supply* will always work sure," he says, "if the engine is working, and the pump in good order." But if from any cause, the water should fall below the proper line, "the fusible plug will melt, and the steam escape through a tube into the fire-box and extinguish the fire." He recommends these safety apparatus for every boiler. The water feed apparatus has been attached to his boiler for several months, and it has never failed to perform its duty in a single instance..

In a recent number of the *London Engineer*, a new safety valve for boilers is described, and it appears to be a safety improvement. A small cylinder, occupying the place of the common safety valve, is bolted to the top of the boiler, and it has a small flange on its top, carrying a standard on which is secured the end of a lever working on a pin. In the small cylinder there is a packed piston, having its rod connected to the lever mentioned, a short distance from its jointed end. This lever is extended horizontally forward, and its other end secured to a spring balance, there is a small chamber in which there is a plunger valve inserted in a vertical tube passing down to the bottom of the boiler and open to the water. The rod of the valve is also connected to the lever mentioned. This valve covers the mouth of a bent tube, which passes down into the fire box. The spring balance is set at the pressure to be carried—60 or 80 lbs.—and the valve then covers the tube leading into the furnace. Whenever the pressure in the boiler on the small piston exceeds that at which the spring holds it down, the piston will rise, and also the valve which covers the mouth of the tube leading to the furnace. The superincumbent pressure of the steam then forces the water in the boiler through the tube into the furnace, and extinguishes the fire.

This apparatus differs from Amsterdam's fusible plug. The latter extinguishes the fire, when the heat of the boiler is increased by a deficiency of water: the former, when the pressure of the steam is increased.

Self-regulating Wind Mill.

Our engraving illustrates an improvement in Wind Mills, invented by Mr. James N. Brewster, of Princeton, N. J., for which application has been made for a patent. The improvement consists in a mode of regulating the angle of the sails or wings, so that if the wind increases in force and exceeds a given pressure, the wings will change position and present less resistance, thereby escaping injury.

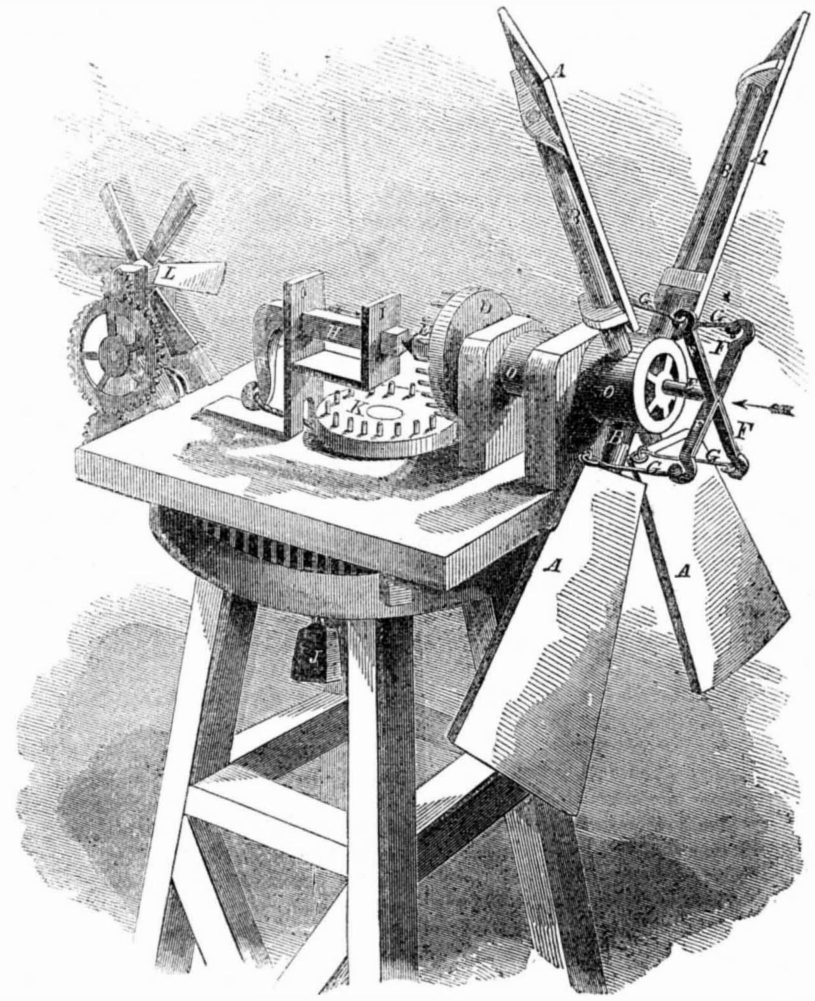
The wings, A, are pivoted to their arms, B. The hub, C, is hollow, its inner end being provided with a pinion, D. E is a rod passing through the center of hub, C, and terminating at its front or outer end in arms, F′. Each of these arms is connected by means of links, G, with the corner of one of the wings.

The wings are not hung with the arms, B, directly in their centers, but, a little on one side; when the wind blows, the tendency of the wings is to open back, draw the arms and rod, E, inward, in the direction of the arrow.

The inner end of E terminates in a point, which bears against another rod, H, which is supported in bearings, I; the crank part of rod H is connected by means of a cord, with weight J, the tendency of the meeting being to move slide H in direction of its arrow. The weight, J, is, in this manner, opposed to the pressure of the wind; when the latter exceeds the resistance offered by the weight, the wings will open and allow the current to pass by. A wind mill of this construction may be exposed to the violence of a hurricane, but its speed will not increase beyond a given number of revolutions. Weight J acts like the weight on safety valve, and only permits the accumulation of power up to a certain mark. K is a cog wheel that receives and transfers the power derived from D. L is a small auxiliary wind wheel which takes the place of the common vane or tail, and, by acting on the cog wheel, M, brings the arms, A, around so as to face the wind.

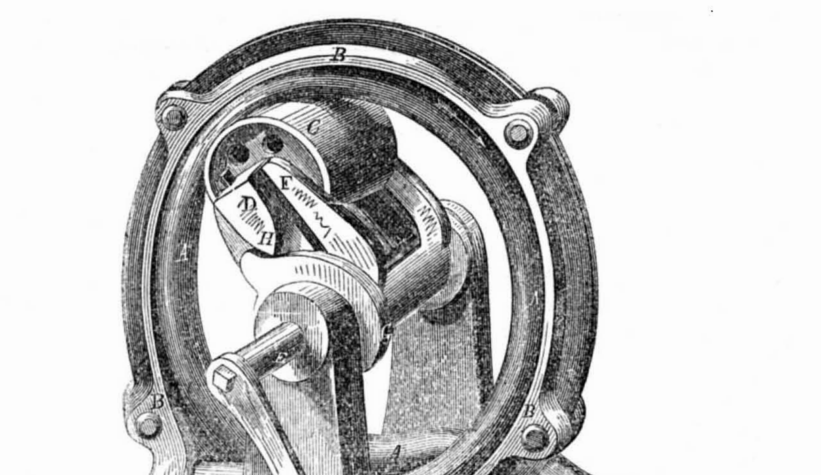
It will be observed that this wind mill is very simple in its parts, not likely to become

IMPROVED SELF-REGULATING WIND MILLS.



disordered, and economical of manufacture. It strikes us as an excellent invention. Self-acting wind mills are coming extensively into use; every improvement in them is a public benefit. Address the inventor for further information.

NOVEL ROTARY PUMP.



New Rotary Pump.

Our engraving illustrates an improvement in pumps of a rather novel character. No piston or valves of any kind are employed. The invention consists of a coil of india rubber pipe, A, placed within a metallic ring, B. The suction necessary to raise the water is produced by compressing the rubber by means of roller, C, against the ring, B. The roller is attached to bearings, D, in the arms, F, on shaft, E, rotary motion being given by the crank.

As the roller revolves in the direction of the arrow it presses the rubber tube, forces out the water in front, at A′, and thus produces a vacuum behind, which the water fills as fast as the roller advances. Cam G presses the roller, C, up against the rubber tube, B; the set screws, H, serve to adjust the degree of pressure given to roller, C. When the pump is not in use the handle is turned backwards from the direction of the arrow, which at once presents the lower side of the cam to the set screws, H, and thus removes the pressure of roller, C, upon the elastic tube.

This is both a suction and force pump. It is extremely simple in construction, said to be very durable, and to possess, among others, the following advantages:—

It is not liable to get out of repair, and in case it should, it can be repaired by any one who can use a screw-driver. It has no valves, and can be used in pumping any kind of liquid substance, and can be put up easily without the aid of a plumber; it discharges the water after use, so that it will not freeze in winter; it can be put in the house if the well is out of doors, while the chain pump must be put directly over the well; it is a fire-engine for every house, although only costing about the same as an ordinary suction pump; being rotary, it can be easily driven by power. It is not affected by steam or any kind of acids, and will stand any climate. Messrs. George Denison and D. S Mcnamara are the inventors of the described improvements in this apparatus, for which application has been made for a patent. A part of the invention was patented to Denison & Bradley, April 17th, 1855. Foreign patents are in process of being secured. For further information apply to Asa Farr, Jr. No. 55 Cliff st., New York City.

Softening Hard Water.

In many parts of our country, the waters of the wells, springs, and some of the creeks, contain carbonate of lime (chalk) in solution, which makes them what is termed *hard*. There are also other substances in the water, such as sulphate of lime and the carbonate of magnesia—the latter prevailing in many parts of Ohio, &c.—but the carbonate of lime is the most common salt. An alkali like soda or potash renders water *soft*, but this is simply by neutralizing the carbonic acid in the water. We suppose that few persons are aware of an acid being the cause of all hardness of water, but such is the case. Such water curdles soap, and renders it unsuitable for washing, for supplying steam boilers, and when it is in excess it cannot be healthy as a beverage. A cheap and simple method of softening hard water, by the use of a little quicklime, according to Prof. Clark's process, discovered by him about fifteen years ago, was described in a former volume of the Scientific American, and has been of great value to many of our readers. As we now have many new subscribers, to whom the information must also be very useful, and as Prof. Clark has recently read a paper on the subject before the London Society of Arts, we give his process as follows in his own language:

"Supposing it was a moderate quantity of well water from the chalk strata around London that we had to soften, say 400 gallons. This quantity would contain 1 lb. of chalk, and would fill a vessel four feet square. We would then proceed by taking 9 oz. of burnt lime, made from soft upper chalk; and first slack it into a hydrate, by adding a little water. When this is done, we would put the slacked lime into the vessel where we intend to soften; then gradually add some of the water in order to form lime water. For this purpose, at least forty gallons are necessary, but we may add water gradually till we have added thrice as much as this; afterwards, we may add the water more freely, taking care to mix intimately the water and the lime water, or lime. Or we might previously form saturated lime water, which is very easy to form, and then make use of this lime water, instead of lime, putting in the lime water first, and adding the water to be softened. The proportion in this case would be one bulk of lime water to ten bulks of the hard water.

The manufacture of locomotives has been commenced at Rome, Ga., by Messrs. Noble. The Georgia railroad managers are models of sagacity, prudence, and honesty. The roads are all owned in the State, and free from debt.

Modd s must not exceed 12 inches in any of their dimensions. Inventors must be very careful to observe is, as the P. O. is sure to refuse them unless they conform to the rule.

Scientific American.

NEW-YORK, JUNE 21, 1856.

American Inventive Genius and Patent Laws

Up to the present week, no less than about twenty-three thousand American patents have been issued, averaging three hundred and sixty-two annually since the first general patent law was enacted in February, 1793. It has proved a blessing to our country, that soon after the Federal Government was formed, the great and wise men then at its head—Washington, Jefferson, Hamilton, and others—adopted measures to give an impetus to the inventive genius of our people by the passage of a patent law. Jefferson, who had a great taste for mechanical inventions, was then at the head of the Patent Board, and was very liberal in encouraging inventors. His far-reaching sagacity saw, in the future, his native country—then weak in power, and far behind in the arts—rising gradually into inventive grandeur and greatness, unsurpassed, if not unequalled, by any empire or kingdom. And were he now to awake from the tomb, he would perhaps exult more at the great improvements invented by his countrymen, and which have been fostered by the Institution which he founded, than any other of the acts of his life. Since then, the fame of American inventive genius has passed into a general proverb; while, before that period, our manufactures were rude, and our inventions, could almost be written with a cypher. Then our agricultural implements were either imported or copied from foreign models, now they lead the world. Our reaping machines and thrashers, are the admiration of Europe, and they reap the fields and tribulate the grain of Gaul and Albion.

The invention of the cotton gin has made an American product the clothing king of mankind. The steamboat has proved a civilizer of nations; and the American telegraph is fast banding all men in a community of interests. We might go on and specify invention after invention of our people, until we filled several columns, but *our* readers do not require us to be thus particular.

Our mind was directed to this subject by seeing "No. 15,000,"—(the number granted since the re-organization of the Patent Office, in 1836,) on a patent issued this week, and we have but thus briefly glanced at the subject, to put us all in remembrance of what our Patent Laws have done for our country. Most of those American inventions which now cause the hearts of our citizens to exult with honest national pride, never would have come to light but for the encouragement given to inventors by our patent laws. And since the present patent code—which is but the old one amended—came into existence in 1836, affording greater security in obtaining patents, improvements have increased in a greater ratio than before. The laws which fostered so many good and useful inventions, and warmed them into existence, form a noble national fabric. We do not say it is perfect, but it would be a sad thing for our country if it were uprooted and subverted by such a substitute as the new Patent Bill lately introduced into the Senate. Our people will never permit such a national calamity to occur.

American Life Boats and Military Wagons in Europe.

Major Vincent Eyre, of the Bengal Artillery, recently delivered a lecture in the United Service Institution. London, on Francis' Metallic Boats and Military Wagons, in which he passed a very high eulogium on their qualities and utility. Capt. Bevis, R. N., had experimented with one of the boats, and pitched it from a considerable hight upon a stone pavement, in Liverpool, where it was rolled by several men, and then battered with hammers, to damage it, but all in vain. It was afterwards set afloat, and with four men pulling, run against a stone pier several times, but suffered no further injury than a few dents and bruises. Capt. Bevis then made a most favorable report on it to the Admiralty Board.

One of Francis' Military Wagons was also brought before the British Ordinance Department by Col. Tulloch, R. A., and experimented with at Woolwich. It was first placed in the water with the whole of its running gear attached, weighing 700 cwt., and sixteen men got into it, weighing 2500 cwt., which brought it within one foot of the top. They tried to upset it, but could not. Many other experiments were tried, and all with astonishing success. These wagons were also favorably reported on to the British Government chief officials, but so stupid were they, that no notice was taken of them. This was not the case, Major Eyre said, with the French Emperor. He had heard of the favorable reports on their qualities made to the British Government, sent for Mr. Francis, examined his models, had experiments made in his presence, and at once ordered the establishment of a factory to build both the Life Boats and Military Wagons to supply the army and navy of France; and the British Government will soon, from necessity, be compelled to adopt them also.

We are now supplying the Army of England with American rifles, and we will, no doubt, soon be supplying it with American Military Wagons, and her Navy with American Life Boats.

As many of our readers may not be acquainted with the construction of these famous Life Boats, a description of them will be both instructive and interesting.

A thin sheet of galvanized iron, or copper, of the full half size of a boat, from stem to stern, is placed between two great dies of the proper form, and subjected to an enormous pressure by a hydraulic press. The sheet of metal is thus pressed into the shape of half a boat, and is corrugated fore and aft. The two opposite halves of the boat are thus first made, then rivetted together, and the boat is complete. It is to the corrugations of the metal that these boats owe their great strength, for they have no framework—no ribs, no timbers. The body of the Military Wagon is constructed on the same principle, and is water-tight, enabling it to float over rivers, transport guns, and form pontoon bridges. A factory for building such boats of all sizes has been in successful operation for some years, in the vicinity of New York, and from it has gone forth those boats and wagons which have astonished the best military and naval men of France and England, and opened their eyes to the inventive genius and "go-a-head" spirit of Brother Jonathan.

Patents.

The official report of claims of patents granted last week embraces a large number of inventions. Nineteen patents, or more than one-third of the whole number, were obtained through the Scientific American Patent Agency.

We propose to publish, from time to time, reports of the *sales of patents*, and we should be glad to have our readers lend us their aid. Whenever they hear of the sale of a patent right or portions thereof on terms of any importance, we should be glad to have them report the fact to us for publication, that is, if private interests are not likely to suffer thereby.

We believe that the publication of such reports has a tendency to increase the public confidence in good inventions, and also to lessen the difficulties of inventors in engaging the assistance of capitalists.

Accidents from Lightning, and Volatile Fluid Explosions.

Mr. E. Merriam, of Brooklyn, is a valuable man to the community. He is a great observer of natural phenomena, and a recorder of useful statistics. He has kept a record of deaths and accidents from the use of camphene and kindred articles for the purpose of illumination, since 1850, inclusive. From that time to the present 169 persons have been killed, and 279 wounded. He has also kept a record of those killed by lightning for the past 14 years. During that period this record gives an aggregate of 750 deaths by lightning on land, only one person being killed in a building furnished with lightning conductors.

Early Wheat.

New wheat of excellent quality has been brought into the market at Augusta, Ga.

Notes on Patented Inventions.—No. 10.

India Rubber Manufactures.—Caoutchouc, also called gum elastic and india rubber, is produced from the syringe tree of South America. The substance was first brought to Europe in 1735 by some French astronomers, who were sent to Brazil to make astronomical observations. It is found abundantly in Para, Brazil, and Quito, and has recently been found in Asia. Considerable quantities of it are now obtained in Java, Penang, Singapore, and Assam. In some places hundreds of miles are covered with the trees. The caoutchouc oozes out of them in the form of a milky juice. The sap of the tree is laid on a mold in successive layers, which are allowed to dry, and are formed into bottles and cakes, in which form it is exported. The natives of South America make boots, syringes, and tubes of it. The tubes are used as torches; they burn with a good light, and emit but little odor.—According to Faraday, its composition is, Carbon, 87·2, hydrogen, 12·8—a hydro carbon. It melts when exposed to a heat of 248°, is resolved into vapor at 600°, and may be condensed into the liquid *caoutchousine.*

On page 118, this volume, SCIENTIFIC AMERICAN, there is an article on this subject by Chevalier Claussen, in which he describes the india rubber tree as belonging to the same species as that which produces gutta percha, and that compounds of the same nature may be made by mixing starch and gluten with tannin and some resinous substance.—Caoutchouc is dissolved in ether, in sulphuret of carbon, in warm naphtha, turpentine, and rectified empyreumatic oils. It is also soluble in many of the fixed oils. Alcohol will precipitate the caoutchouc in a pure milky form from an ether solution.

In 1770, a cubic inch of india rubber was sold in London for 75 cents, to rub out pencil marks. It was not used to make water-proof fabrics until about the year 1800. These were first invented by Charles Mackintosh, of Glasgow, who applied a naphtha solution of it to the surfaces of two pieces of cloth, then laid them together, passed them between rollers, and thus cemented them together. A "Macintosh" was the name applied for many years to a water-proof coat. Dr. Ure, although well aware of Mr. Macintosh's invention, coldly passes it over in his Dictionary. It is supposed that personal feeling was the cause of this, as Dr. Thomson and Ure were once rival chemists in Glasgow, and Macintosh was the friend and pupil of the former. The fabrics of Macintosh had a most disagreeable smell, still he was the first person who established india rubber manufactures in Britain, and perhaps the world. He afterwards removed his factory to Manchester, England. Various kinds of goods made of india rubber soon afterwards began to be manufactured in England, but they were all decidedly objectionable to use, until the grand discovery of sulphurization was made; for this, the world is indebted to an American inventor.

This substance, or rather, compounds of it, is now manufactured into so many articles of beauty and usefulness, that it forms an object of no small wonder to witness the rapidity with which such manufactures have sprung into existence.

The first American patent for india rubber manufactures only dates back to 1831. It was granted to George H. Richards, of Washington, D. C. He claimed obtaining the india rubber in its native fluid state (the juice from the tree) and applying it to articles to render them water-proof. In 1834, Patrick Mackie, of New York, secured a patent for covering ropes for railroad inclined planes with india rubber. Such ropes had been in use in England before that date. He also obtained a patent in March, 1836, for dissolving india rubber in naphtha and sulphate of zinc. This appears to be the first patent taken out for mixing a sulphate with india rubber.

In January, 1835, George D. Cooper, of New York, obtained a patent for covering ships, and houses (under the shingles) with sheets of india rubber, to prevent leakage. This invention has been proposed a thousand times since.

In October, 1835, Wm. Atkinson, of New York, was granted a patent for cutting india rubber in a paper cutting machine preparatory to dissolving it.

In August, 1836, E. M. Chaffee, of Roxbury, Mass., obtained his important patent for softening india rubber, and applying it to cloths without dissolving it, by pressing it between heated rollers. This was a great improvement for cheapening the manufacture.

In June, the succeeding year, 1837, Charles Goodyear, of New York, received the first patent for depriving such goods of their stickiness, by washing their surfaces with an acid metal solution, such as copper dissolved in strong nitric acid. This was applied to the surfaces of the fabrics, and after it had acted on them for a certain period it was washed out The specification states that this rendered india rubber fabrics capable of resisting solar and artificial heat at the ordinary atmospheric temperature, and that they might be washed afterwards in turpentine, and not rendered *tackey.* In the same patent the use of lime combined with india rubber was also claimed for bleaching the material and rendering it white.

In December, 1837, Stephen C. Smith, of New York, obtained the first American patent for the manufacture of india rubber boots, shoes, and overshoes. It simply embraced covering leather boots and shoes with a thin sheet of india rubber cemented with a solution of the same substance; they were not vulcanized.

In July the succeeding year, 1838, Charles Goodyear was granted a patent for the same kind of manufactures—boots, shoes, &c. They differed from Smith's boots and shoes in being wholly made of gum elastic and fibrous material, and were tanned or cured by the metallic nitric acid solution, according to his patent of June, 1837. These shoes were, no doubt, a very great improvement upon those made under Mr. Smith's patent.

In February, 1839, a patent was granted to Charles Goodyear, as the assignee of of Nathaniel Hayward, of Woburn, Mass., for combining india rubber with sulphur. The sulphur is described in the specification as being mixed with the oil of turpentine, in which the india rubber was dissolved, (about a tea spoonful of the flour of sulphur to the pound of india rubber,) or it might be mixed with the pulpy mass when rendered plastic by heated rollers, or by pressing it into sheets of rubber when soft. The fabrics thus made were afterwards to be submitted to the process of Mr. Goodyear, namely, the action of a metalized acid, as already described, for removing the odor of the sulphur. None of these processes of curing or tanning india rubber embraces what is now understood by the term vulcanizing, which consists in submitting a compound of sulphur and india rubber to a high degree of steam heat. In 1839, neither Goodyear nor Hayward had discovered this. The application of the steam heat to sulphur rubber compounds is claimed as an English discovery. We do not know whether a compound of the *sulphate of zinc* and india rubber has ever been submitted to the vulcanizing process of steam heat, but we think such a compound so treated, would produce vulcanized india rubber. If so, then Patrick Mackie has not received sufficient credit for his invention, as he obtained the first American patent for use of a sulphate mixed with india rubber. Hayward, who made the valuable discovery of india rubber sulphurization does not receive credit for it, but C. Goodyear, the assignee. Dr. Ure, in his Dictionary, ascribes it to him and so does the public. The patent has expired; an extension was refused while Mr. Hodges was Commissioner of Patents.

In 1841, C. B. Rogers and E Arnold, assignees of N. Chaffee, secured a patent for manufacturing india rubber balls. The claim embraces the peculiar method of making such balls hollow.

The same subject to be continued next week.

Recent American Patents.

Improvement in Saw Mills.—By John M. Carlisle, Williamston Springs, S. C.—This is an improvement for moving the carriage, or feeding the log up to the saw; also for setting the log. The mechanism which effects these changes is self-operating, and thus much of the labor of attendants is saved.

Machine for Slotting Reed Boards of Melodeons.—By Jeremiah Carhart, of New York.—The reed board, in melodeons, is that portion upon which the vibrating metallic tongues or reeds are placed. The reed board is slotted for each reed. The slots are all of different sizes, varying regularly with the sound to be produced.

This invention consists of a self-acting machine. It cuts the slots in the reed board at the proper distance apart, varies the length of the slots, and does the whole work with unerring precision. The impovement is applicable to various other kinds of slotted work. Mr. Carhart is the inventor of several highly ingenious and valuable improvements in machinery for manufacturing musical instruments. The firm of which he is a member, Messrs. Carhart & Needham, are extensive manufacturers of melodeons.

Novel Seed Planter.—By Geo. A. Meacham, of New York City.—This is a seed planting contrivance which is attached to the heel of one's boot, and is so arranged, that by the act of walking, the grain is dropped and planted in the ground. The seed is contained in a belt worn around the waist. A flexible tube conducts the seed down to the planting apparatus. Farmers may henceforth dispense with their cumbersome planting machinery. To plant their crops they will only need to slip on a pair of these magic boots, and leisurely stalk over the soil. Horses' feet may be supplied with shoes of the same sort, and the animals become thus converted into four-legged, self-moving, seed planters. Verily, the march of improvement is onward!

Improvement in Harness Pads.—By James Ives, of Mount Carmel, Conn.—Consists in a peculiar construction of hinge joint, whereby the journal of the pad can be confined in the bearings of the tree without the aid of a pin This is a simple and utile contrivance.

Manufacture of Gutta Percha Tubes.—By James Reynolds, of New York City.—After the percha is cast into tubes, they require to be drawn over a mandrel and through a die, in order to equalize the thickness of the material, harden it, &c.

This invention consists in a bulb-headed mandrel employed in combination with a stationary die of peculiar form. It also consists in certain means of providing for the convenient and speedy introduction of the mandrel to a long piece of tubing, and the ready introduction of the tubing to the die.

Hub Clamp.—By A. S. Macomber, of Bennington, Vt.—Consists in clamping the hub during the tenoning operation, upon a suitable bed, by means of jaws attached by pivots to bars. One of these bars is adjustable. The jaws are operated by means of worm wheels, screws, and connecting rods, arranged so that the hub may be quickly clamped and again released, at pleasure.

Improved Rotary Pump.—By John Broughton, of Chicago, Ill.—The distinguishing characteristic of this pump is, that it is composed of a solid eccentric piston fitted within a barrel, which barrel has an oscillating movement derived from the rotary movement of the piston. The piston, by its rotation, combined with the oscillation of the barrel, is caused to move reciprocally towards and from each end of the barrel, and thereby, without the aid of valves, alternately to form a vacuum to draw water through a suitable inlet, and force it out again through a suitable outlet.

New Tool for Watchmakers and others.—By William Hart, of Mayville, Wis.—This is a neat and curious combination tool, so formed that when arranged in one position it may be used as a hand vise, in another, as a pair of callipers, and in another, as pair of plyers.

Blind Opener.—By Hiram Collins, of Salisbury, Mass.— his is a contrivance for opening and closing window blinds from the inside of an apartment, without raising the window. On the window frame, within, there is an ornamental knob, by turning which, in one direction, the blind opens, and in the other, it closes. Nothing can be more convenient. The operation is effected by means of a rod, which extends from the knob in a downward oblique direction, through the frame to the blind; the end of the rod is here bent up into a hook shape and enters the blind. This is a very simple and effective invention for the purpose.

Novel Improvement in Pocket Books.—By J. O. Dickinson and Robert Bate, of Hudson, Mich.—Consists in attaching a number of small sharp hooks to the outside of the pocket book, so that if a rogue attempts to steal the purse the hooks will catch in the cloth and defeat the trick. Genius has, in all ages, proved herself superior to villainy. This example of her supremacy is the very latest.

Improvement in the Manufacture of Gutta Percha.—By James Reynolds, of New York City.—This invention is for covering telegraph wires with gutta percha, making ropes, &c. It is a rotary force pump of peculiar construction, so arranged as to draw in the gutta percha when heated to a liquid state, and then force it out through suitable dies. The machine operates with a uniform forcing movement, and is so arranged that it cannot become clogged up with the percha.

Head Block for Saw Mills.—By J. Kurtseman, of Lancaster, O.—Consists in operating the dogs and head block from one and the same shaft, by means of gearing arranged so that the head block may be adjusted to set the log properly to the saw, and the dogs also adjusted at the same time, the parts being all self-acting.

Improvement in Car Wheels.—By Wm. R Thomson, of Cleveland, Ohio.—The inner ends of the spokes, where they meet together in the center, are enlarged or clubbed, so as to form a hub; they are also made to dovetail firmly together. Thus arranged, they are placed in the fire, heated, and firmly welded at the center. Great strength and solidity is thus obtained.

Shingle Machine.—By Jason Palmiter, of Jamestown, N. Y.—In this improvement there is a large wheel, the surface of which is angular or polygonal in form. The blocks of wood, from which the shingles are to be cut, are fastened to carriages on these polygonal surfaces, and revolve with the large wheel. The blocks, as they revolve, are carried against a circular saw, which cuts off the shingles. There is a self-acting arrangement for feeding the blocks.

Potato Digger.—By Amos L. Grinnell and John Z. Williams, of Willet, Wis.— Consists of a series of iron prongs or forks pivoted together like a pair of scissors or oyster rakes. The prongs are open when thrust into the ground, but in the act of pulling them out, their lower ends come together, and the potatoes are thus lifted from the hill.

Implement for Drawing the Teeth of Circular Saws.—By M. L. Parry, of Galveston, Tex.—Consists in having an adjustable stop or mandrel fitted in the upper part of an adjustable arm. Said arm is attached to the frame in which the saw arbor is fitted, and so arranged that the stop or mandrel may be introduced between the teeth of the saw, so as to form a rest or anvil on which to hammer the saw.

Improvement in Harvesters.—By J. C. Pluche and L. C. Pluche, of Cape Vincent, N. Y.—Consists in dove-tailing the teeth to the sickle bar, so as to give additional strength. The back ends of the teeth are furnished with cleets, and the sickle bar is grooved to receive said cleets. The cleets and groove are made in dove-tail form. Thus the teeth are firmly secured to the sickle bar, and may be readily attached or detached for sharpening or repair.

Seed Planter.—By C. O. Luce, of Freeport, Ill.—The seed is sown by centrifugal action. It is introduced into the center of wheels having hollow arms, like a turbine water wheel. The improvements consists in the employment of valves placed in the conveying tubes, and used in connection with the distributing wheels whereby the discharge of grain during the planting operation may be accurately regulated.

Recent Foreign Inventions.

Hardening the Surface of Porous Stones.—W. A. Gilbee, of Paris, has secured a patent for impregnating porous stone with a silicate of potash, which, when dried, renders the stones hard and of a glassy surface. The solution is first applied at a strength of 7 degs. Baume's hydrometer—and finished with liquor of 12°. Care is taken not to stop up the pores of the stone suddenly; therefore, for some stones, the solution is applied at first by sprinkling, then finished by steeping the stones for a few hourr in a tank containing the liquor. After being saturated, the stones are dried in an oven heated up to 300° Fah. The stones are also heated and thoroughly dried before being operated upon. The silicate of potash is formed by dissolving pure white sand in a strong potash lye—it is soluble glass.

Machine for Blacking Boots.—F. Ayckbourn, of London, has invented a machine for the foregoing named purpose. It is made of a framework of wood, with concave brushes on spindles surrounding a step on which the boot is placed. A trough containing blacking is set beside each brush to supply it, but which are moved out of reach by touching a rod when sufficient blacking is put on. The brushes are made to do their work of blacking and polishing, by simply turning a crank handle, by a person while standing. He has but to place his booted foot on a step and turn a crank, and by a few whirlabouts, his boot from a muddy brown hue, will be developed into a black shining mirror.

Winding Silk from Cocoons.—R. A. Brooman, (Editor of the London *Mechanics Magazine*, has taken out a patent for some foreign inventor, for winding silk freely off cocoons, which appears to be a good improvement. A neutralizing agent to the stickiness of the silk, is applied, which permits the various fibers to be easily wound upon bobbins, by removing their adhesiveness. This agent consists of alcohol, or glycerine, water, or oil mixed with ox gall. It is applied in the water in which the cocoons are generally placed for winding, or in any other suitable manner.

Hoof and Horn Dust for Manure.—William A. V. Macduff, of Scotland, dries horns and hoofs slowly, until they are brittle, in a heated or close chamber, and then grinds them into dust between rollers, or between stones, and uses the product for manure, either alone or mixed with bone dust. This manure is rich in nitrogenized matter, but it cannot be produced cheap. Macduff has obtained a patent for a manure for which which it will be very difficult to find material enough.

New Construction of the Cornish Pumping Engine.—Cornish mine owners, by rewards and premiums, have brought out those improvements which have given the Cornish Engine its high character for economy in the consumption of coal; and yet there are one or two evils connected with its operations, which, up to the present time, have never been surmounted, and continually involve great expense. The steam in the Cornish engine simply raises a heavy plunger, which then descends by its own gravity, (single strokes,) and with a terrible velocity when the stroke is long. Appliances are therefore necessary to obviate the evils of great concussions, and besides, the engine has to be set on a mass of solid masonry of a considerable hight in order to withstand the shocks.

W. Fairbairn, of Manchester, Eng., has recently introduced a new engine for pumping purposes, which, from an entirely novel form of construction of some of the arrangements, thoroughly obviates the expense of high buildings and massive masonry. In place of the single working beam above the cylinder, there are two placed below, one on each side the engine, resting on a platform level with the ground, and in some instances below the mouth of the pit. In case the engine should miss a stroke through an accident in the pit, the shock is received upon a massive oak transverse spring beam, which passes under the cylinder, and rests upon the foundations of the engine house on each side. A corresponding spring beam is fixed in the pit, to receive the fall of the pump rods, whenever they happen to pass beyond the limits of the stroke in their descent. This modification in the arrangement has the advantage of making the foundations sustain the weight and shocks of the engine direct, and causes a great saving in the original cost. The principle of the engine itself presents no material difference from those of ordinary construction, and the arrangement is compact, simple, and effective; it is worked by double beat valves, and is so arranged as to cut off the steam at any part of the stroke.

Photography under Water.—In the *Journal of the Society of Arts*, W. Thompson, of Weymouth, Eng., gives an account of the means he adopted for taking a photograph of the bottom of the sea, in Weymouth Bay, at a depth of three fathoms. It appears that the camera was placed in a box, with a plate-glass front, and a movable shutter to be drawn up when the camera was sunk to the bottom. The camera being focussed in this box on land for objects in the foreground, at about ten yards or other suitable distance, was let down from a boat to the bottom of the sea, carrying with it the collodion plate, prepared in the ordinary way. When at the bottom the shutter of the box was raised, and the plate was thus exposed for about ten minutes. The box was then drawn into the boat, and the image developed in the usual manner. A view was thus taken of the rocks and weeds lying at the bottom of the bay. Mr. Thompson anticipates that it will be a ready and inexpensive means of arriving at a knowledge of the condition of piers, bridges, piles, structures, and rocks under water.

The Prejudices of Tradesmen.

A very common opinion, existing among all classes of tradesmen, is, that a person not practically acquainted with any certain branch of mechanical art, is incapable of improving it. Such opinions have been the means of fixing trade prejudices in the minds of practical mechanics not at all times creditable to their general intelligence and good sense. Thus, while lately reading some accounts of the transactions of the old "Society of Mechanics and Tradesmen," in this city, the very discreditable record is left to make posterity sneer at the exclusiveness of its ancient members, viz., that Robert Fulton applied to be admitted a member and was *refused*, because he was not a practical mechanic. We believe this prejudice is not so exclusive, as it was in bygone years, and it is becoming less so every year. So many excellent improvements have lately been made by persons not practically engaged in the trades to which their inventions related, that they have extorted general admiration as real practical men, by the practical usefulness of their improvements.

In conversation, recently, with a very ingenious and intelligent molder, respecting some very desirable improvements required in his trade, he stated that in all likelihood, they would be invented by persons not practically engaged in the trade, and the reason he gave for this opinion was a very good one. "Those engaged in the trade," he said, "being educated to certain methods of operating, were less likely to devise entirely original improvements." This opinion, however, cannot be taken as a rule, but such results have occurred many times to our knowledge. In what we have said, we wish to inculcate the lesson, that trade prejudices, oftentimes, do injury to very worthy men, and should therefore be eschewed Robert Fulton was an amateur artist, but he could sketch and devise machinery, and he had original qualities of mind, without which the mere mechanical skill of hand, would never advance science or art a single step; and yet he was refused to be recognized as a practical mechanic by a New York Association, although he laid the foundation of that mechanic art for which New York is more distinguished than any other, namely, constructing steamboats.

To Take Ink Stains out of Linen.

There are various chemicals, capable of extracting ink stains from linen, but the most simple and convenient, when the stain is comparatively fresh, is the juice of lemons, applied to the spots, then washed out with warm water. Some use common salt with the lemon juice, but this is of no use unless the salt is decomposed by the citric acid of the lemon uniting with the soda of the salt, thereby setting its chlorine free, which is a most powerful bleaching agent.

Lemon juice was long used (and is by some yet) by straw hat bleachers, for removing iron stains from leghorn hats, but oxalic acid has nearly superseded it The latter is much superior but is dangerous to keep in families where there are children, as it is a poison. Muriatic acid (old spirit of salt) is a more powerful extracter of ink stains than either citric or oxalic acids, but it is unsafe in the hands of others than experts.

TO CORRESPONDENTS.

E. I. M., of Ohio.—A great many plans have been projected to construct "common road engines," some of which have been put in practice, and, after a short trial, abandoned. An individual in this city, with more zeal than wisdom, has undertaken to demonstrate the feasibility of a plan, which thus far meets with little favor from those who are thoroughly posted up in regard to this subject. It has even been proposed to establish a line of steam carriages on the principal thoroughfares of this city. This is, of course, a ridiculous absurdity, and is scouted by sensible men. We consider it impracticable to carry out the system on common roads. We do not doubt that carriages can be made to operate; this has been already done, but not with success. We advise you to drop your meditations on this subject, as we believe you will meet with disappointment.

O. C., rf Pa.—You will perceive by the number on this paper that the volume will close in eleven weeks. We do not accredit traveling agents to solicit subscribers. Instead of this system—which has never worked well with us—we offer a series of Cash Premiums for the largest lists of subscribers. We shall, undoubtedly, pursue this system on the coming volume, and it is a good time for you to begin to prepare your lists. We hope there will be a general movement among our readers to enter upon the competition for our prizes.

E. C. C., of La.—It is a little singular that a patent should have been issued in England for identically the same process as you describe, and at about the same time. The English inventor claims the method of hardening fatty or oily substances, by subjecting them to the action of a small proportion of sulphur or phosphorus at a high temperature. We are not aware that any patent has been issued here, and if you can ante-date the foreign patentee you can secure the invention.

J. E., of Pa.—We cannot perceive any advantage to be obtained in the use of syphon spouts to conduct water to a horizontal wheel. Your plan is new, but inferior to common methods. No power to propel a vessel could be obtained by your syphon tube passing from the bow to the stern of the vessel, for the velocity of the water and that of the ship will be just equal.

E. S. W., of Ill.—It has been proposed to us a number of times to condense air in huge cylinders by windmills and store its power for use. The plan would be difficult to carry out, and also expensive. It would be better to use the windmill to pump water from a low to a higher level reservoir; but this also is an old proposition, and would be expensive to carry out.

J. McK., of N. Y.—If you get Smees' work on Electro-Metallurgy, it will give you the information respecting plating. It is published by John Wiley, this city.

O. R. E., of Pa.—You have not stated your question, in relation to injecting a gallon of water into a heated boiler, with sufficient clearness to enable us to give you a precise answer.

N. N., of ——.—You do not seem to be aware of the fact that it has been attempted to navigate balloons by sails, and taking advantage of different currents of air.

P. W., of Mass.—You have been anticipated in your invention by the patent granted by the English Government to Sir James Murray, of Dublin, for improvements in deodorizing cod liver oil so as to render it more agreeable to use. This patent was granted in 1853, and has become void under the law, he having neglected to pay the "Third Year" duty upon it of £50.

H. H. R., of Texas—We are not acquainted with the person nor the work of Wyman the ventriloquist. Gutta percha composition for belts is made of black lead mixed with that substance. It is not sold as a compound. A file with two shanks is not new.

G. H. L., of Scipio—Mr. W—— obtained a patent in March, 1855, for a stump puller. We do not see anything wrong in his circular.

A. H. N., of Me.—Address R. A. Vervalen, of Haverstraw, N. Y., respecting the brick machines. We cannot tell why your circular saws are so far behind others in the quantity of work they execute. Perhaps it is owing to the quality of the timber. Your oak may be hard, knotty, or twisted. We hope that fortune will once more smile upon your efforts, and like Job, your latter days be most prosperous and happy.

A. B., of ——.—You will find all that we know of the subject in the articles now publishing relating to india rubber.

E. B. M., of Miss.—Mr. Wise has published a work on the history and practice of aeronautics. It is published by J. A. Speel, Philadelphia. If you write to the author at Lancaster, Pa., he will give you the information about it. It requires about a cubic foot of gas to raise an ounce. We hope you have made a good discovery.

H. H. A., of Ill.—Brewster's Optics is the best work with which we are acquainted, but it does not give such full information on the construction of optical instruments as would enable you to manufacture them.

S. Crump, Pittsford, N. Y., wishes to purchase a Jacquard loom.

J. N. P., of Va.—A hand seed sower such as is described in your letter of the 9th, does not cover anything new or patentable. We have had a model of essentially the same thing in our office. We cannot, therefore, advise you to make the application.

C. F. B. E., of ——.—You had better not send your sketch to us for preservation. Your best course is to preserve it among your papers. As you did not furnish your residence we could not write to you.

John B. Bell, of Shelbyville, Ky., is respectfully informed that we are not engaged in the sale of clover harvesters. Will some of our readers be so kind as to write to Mr. Bell, giving the price and such other particulars about this machine, as will be useful for him to know.

E. H. B., of ——.—Your sketch certainly does not illustrate the moon's supposed rotation and revolution with the same face presented to the earth, but quite the reverse.

R. J., of N. Y.—You cannot obtain any advantage from the use of a syphon in drawing water to drive a wheel.

C. W. J., of C. W.—You are much mistaken if you suppose that any saving of fuel can be effected by the use of high pressure steam. You can use a more compact engine, that is the only object gained.

A. McD., of Tenn.—It is easier to color cotton than flax, but the same drugs and processes are employed for both.

E. P. W., of Ohio—We have seen it stated in almost every paper in our country that some wheat obtained from unwrapping a mummy 3,000 old retained its vital principle, and when sown yielded a good crop. The statement appears improbable, but it may be true.

J. B. W., of Ohio—James Hughes, Cambridge City, Ind., is the patentee of a hominy mill; you had better address him upon the subject. $2 received.

J. C., of Ohio—You can procure melodeon reeds of Carhart & Needham, of this city. We could not explain to you intelligibly how to make them.

J. B. P., of Ind.—The offer of $10,000 for the best marble sawing machine *was* made by Mr. Manly, and the Patent Agent, in Washington, who told you that it was only a trick of ours, uttered a falsehood, and he knew it to be one when he made it. You will oblige us by giving the Agent's name.

H. T., of R. I.—The wood of the willow tree is the best for making clogs, or wooden shoes. It is light and tough. You should cut it down in the fall, and dry it well before using it.

E. D. & G. D., of Mass.—We will re-publish your advertisement in the same number in which the engraving appears. We hope to get your engraving in next week.

H. C. R., of Pa.—We received your model about three weeks since, and as there was no name on it, nor any accompanying explanation, we could get no clue whatever to its origin. Inventors would save themselves and us much trouble and annoyance if they would always attach their names and residence to their models. They can be marked with ink, but it is better to attach a card to them. This is easily done, and should never be overlooked. We have examined your invention with care, and we are obliged to inform you that it does not embrace anything novel. Paddles arranged with cranks to be operated upon by an eccentric, whereby they are made to enter and leave the water in a vertical position, are well known. In Vol. 5, of the Sci. Am. we published an engraving of the same thing. If you can gain access to that volume you will find several engravings of paddle wheels, which may be interesting to you. We are out of that volume.

J. A. W., of N. C.—H. Schlarbaum, No. 290 Broadway, is the person to whom you refer as the manufacturer of model steam engines.

Money received at the Scientific American Office on account of Patent Office business for the week ending Saturday, June 14, 1856:—

J. H., of Ind., $55; J. A., of Tenn., $25; G. & H., of Ill., $45; A. W. B., of Iowa, $50; J. H., of S. C., $100; G. W. LaB. & Co., of N. J., $250; H. & A., of Miss., $20; S. E. H., of N. Y., $55; P. A., of N. J., $10; N. M., of N. Y., $50; J. A., of London, $100; S. & B., of Wis., $30; J. Mc A., of Ga., $50; S. & B., of Mich., $25; J. & B., of N. Y., $250; B. I., of N. Y., $250; B. M., of Pa., $30; M. L. P., of Texas, $25; M. & N., of Conn., $25; A. & B. N., of N. Y., $10; E. T. H., of Pa., $25; C. S. P., of Conn., $30; J. P. & Co., of Conn., $60; H. H. C., of Pa., $25; J. B., of Ill., $25; E. A., of Conn., $50: D. F. K., of Vt., $45; J. A. S., of Tenn., $15; D. C. W., of Pa., $30; A. O. B., of Ky., $30; G. L., of N. Y., $30; M. O. C., of C. W., $500; W. S., of Wis., $30; H. A., of Ill., $52; A. G. B., of Ct., $30; R. E., of N. Y., $25; J. R. P. of N. Y., $500: J. W. R., of Me., $25; E. D. C., of Mich., $30; J. H. G., of N. C., $35; J. K., Jr., of N. J., $25; T. G. B., of N. Y., $30; J. G. B., of N. Y., $15: F. J. F., of N. Y., $25; J. F. H., of N. Y., $20.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, June 14:—

J. A., of Tenn.; G. & H., of Ill.; W. G. C., of O.; A. W. B., of Iowa; C. & T., of Wis.; J. K., Jr., of N. J.; H. L. & Co., of Pa.; T. G. B., of N. Y.; W. F., of Mass.; J. G. B., of N. Y.; M. L. P., of Tex; W. & N., of Conn.; F. J. F., of N. Y.; B. & P., of Ind.; J. B., of Ill.; H. H. C., of Pa.; J. F. H., of N. Y.; D. F. K., of Vt.; J. E. C., of Me.: R. E., of N. Y.; N. M., of N. Y., (2 cases); J. W. R., of N. C.

Important Items.

To the Unfortunate—We are no longer able to supply the following back numbers of the present volume Nos. 6, 12, 14, 15, 17, 18, 19, 21, 22, 23, 24, 25, 27, 28, 29, 30, 34, 35, and 37. Such numbers as we have to furnish, are gratuitously supplied to such subscribers as failed to receive them; and we would take occasion to state, that any person failing to receive their paper regularly, will confer a favor by notifying us of the fact. Missing numbers should be ordered early, to insure their receipt, as an entire edition is often exhausted within ten days after the date of publication.

Models—We shall esteem it a great favor if inventors will always attach their names to such models as they send us. It will save us much trouble, and prevent the liability of their being mislaid.

Patent Claims—Persons desiring the claim of any invention which has been patented within fourteen years can obtain a copy by addressing a letter to this office stating the name of the patentee, and date of patent when known, and enclosing $1 as fees for copying.

Receipts—When money is paid at the office for subscription, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a bona fide acknowledgment of the receipt of their funds.

Literary Notices.

London Quarterly Review—This excellent review for the present quarter contains eight very fine essays.—The first is on British Family Histories, and is very interesting. A review of the Haldanes—two rich and pious brothers, who, it may truly be said, sold all they had and devoted it to the cause of Christianity—is the noblest essay in this number. Published by L. Scott & Co., No. 54 Gold st.

Terms of Advertising.

4 lines, for each insertion,	$1
8 " " "	$2
12 " " "	$3
16 " " "	$4

Advertisements exceeding 16 lines cannot be admitted neither can engravings be inserted in the advertising columns at any price.

☞ All advertisements must be paid for before inserting.

Science and Art.

The Use of the Eyes.

The proper adjustment of the light is very important to the close reader and student. Alternations of light and darkness distress weak eyes, and debilitate those which are sound. The sudden transition from dark to light rooms, the degree of light in the study room, the manner in which the light falls upon the page, are all important considerations, though apparently trifling in themselves. Too little light debilitates the eye and compels over-action, while too much dazzles and confuses, and causes a morbid sensibility of the organ. The student should not, after sitting in the dark to meditate, suddenly commence his studies. There should be sufficient light to see easily. The light should be equally distributed, and not reflected or concentrated. The practice of wearing green shades is bad, unless there is a deficiency in the prominency of the eyes or a peculiar weakness of the sight. Reading or writing by twilight or moonlight, and looking at lightning, are attended with danger to the sight. Sitting in front of a window with a book on the knees, sitting with the back directly to any open window, and permitting strong light to fall immediately upon the paper, holding a candle between the eye and book, are all practices likely to debilitate the sight. The light should fall obliquely from above, over the left shoulder.

Color of Paper for Reading and Writing.

Many afflicted with weak eyes, suppose that writing on white paper strains the eyes more than paper of a green or blue color. They also suppose that books printed with black ink on a white ground, are more difficult to read than if the paper were colored green or light blue. This notion is a mistaken one. Chevreul, in his great work on color, states that black and white contrasted, as black letters on a white ground, are the most favorable to distinct vision. He says, "black letters upon a white ground present the maximum of contrast of tone, and the reading is made in a perfectly distinct manner, without fatigue, by suffused daylight." Gray tinted paper is the most unfavorable to distinct vision, for printing on. Next to white paper, on which to print black characters, light yellow and light green are the best colors for distinct vision—the green paper is better than the yellow for reading by candle light, but the latter is the best for reading by day.

What England is Worth.

The material wealth of England is set down in value at £1,447,000,000. Its cultivated soil is valued at £1,700,000,000, its mines at £120,000,000, its dwellings and factories at £450,000,000, agricultural implements, live stock, and manufactured goods each over £200,000,000, and its mercantile shipping at £40,000,0000.

We have seen the above paragraph in a number of our exchanges, but it is no criterian of England's wealth. The only true wealth of nations is "industry wisely directed." The most fertile soils and the richest mines would be but barren wastes without labor.

Curing Baldness.

In an old number of the *Foreign Medical Journal*, it is stated that baldness had been cured by using a liquid of good brandy poured upon sulphate of copper. The solution was applied to the bald parts once per day. The hair began to grow in a week after the first application. We give this for what it is worth. It may be suitable to particular, but not general cases.

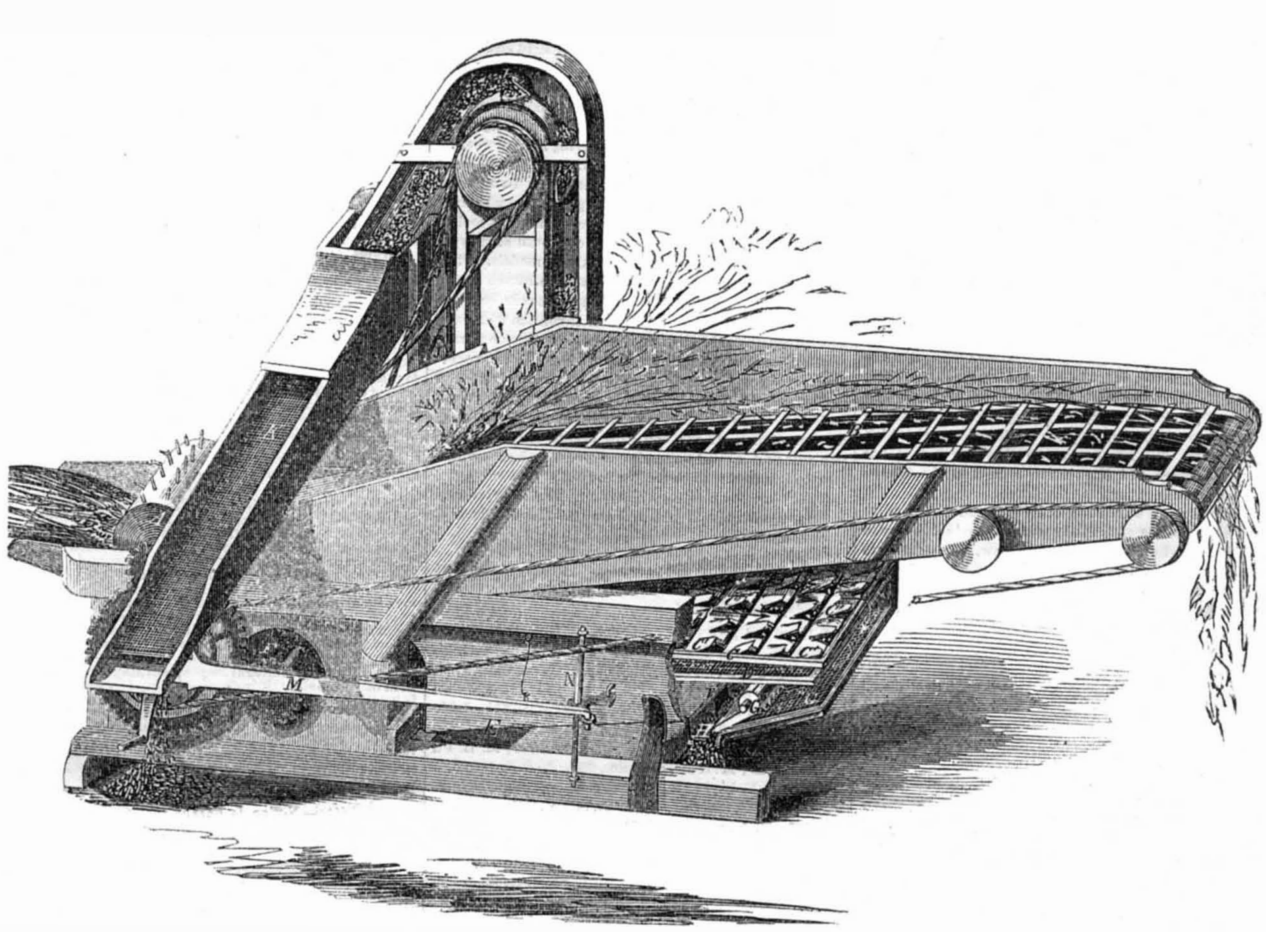
The steamer, *U. T. Cushing*, has left Philadelphia, for a voyage to Chicago, Ill. She goes up the St. Lawrence and through the Lakes—an extraordinary voyage.

Steam Power Done For.

The London *Morning Chronicle* announces that a great experiment was recently tried at Vincennes, in the presence of Gen. Lahitte and the officers of the fort. The *Chronicle* says:—"The secret of compressing and governing electricity is at length discovered, and that power may therefore now be considered as the sole motive henceforward to be used. A small mortar was fired by the inventor at the rate of a hundred shots a minute—without flashing, smoke, or noise. The same power can, it seems, be adapted to every system of mechanical invention, and is destined to supersede steam, requiring neither machinery nor combustion. A vessel propelled by this power is said to skim the water like a bird, and to fear neither storm nor hurricane. The inventor has already petitioned for a line of steamers from L'Orient to Norfolk, in the United States, which passage he promises to accomplish in forty-eight hours!"

Just think of it; skimming over the ocean at the rate of sixty-two miles per hour. Gen. Lahitte, you are the man for America if you can do this. But although Jonathan is almost a disbeliever in impossibilities, he must plead incredulity in the above until the General makes his first voyage.

GRAIN SEPARATORS.



Improved Grain Separator.

The principal novelties in the inventoni herewith illustrated, consist in the construction of the chaff screener, and in a new method of rubbing out the grain from such heads as happen to pass through the thrashing cylinder without being wholly separated.

The grain is fed into the thrashing cylinder, A, in the usual manner, and the straw traverses up the endless carrier, B, and falls off, as shown, while the chaff and grain pass on to the screen, C. This screen is covered with tongued ribs, made of sheet metal. The tongues, C', are slightly bent up, and are larger at their base than at their points; consequently, when the customary shaking motion is given to the screen, the chaff and heads will advance in direction of the arrow, while the grain sifts through and falls upon screen D, down which it rolls into a receiving box at E.

The light chaff is blown off from screen C, and from other parts of the apparatus, during the various stages of the operation, by means of a fan at F, which sends its blast through all the screens, and effectually cleanse the grain. The unthrashed heads, stones, etc., fall from screen C down to screen G, and the heads are thoroughly rubbed by the toothed rubber, G', until the grain separates; the chaff is blown away, but the stones, weeds, heavy chaff, &c., roll out from trough, H, while the clean grain falls down through tube I into receiver E. A screen (not shown) is placed over trough H, on to which the stones fall, the grain passing through the screen into tube I. From the receiving box, E, the grain is raised by elevators, J, and passes down over screen K, thoroughly cleaned and separated, into measures or bags, ready for market. The required vibration of the screens is accomplished by means of rods, M N, &c. Springs are employed to relieve the shock of the vibrations.

The method of rubbing unthrashed heads is good, as it saves the complication and expense involved when mechanism is employed to carry the grain, stones, weeds, &c., back to the thrashing cylinder for re-working. This separator is strong and compact in all its parts, certain and thorough in operation, economical for manufacture.

Many of the ordinary separators are liable to choke up, and if the chaff screen breaks, they are not easily repaired. In this machine these objections do not exist; owing to the nature of the construction, the straw, chaff, and grain are rapidly carried away, so that no choking can take place; any of the tongued ribs of the chaff screen may be replaced without trouble.

On a recent trial, we are informed that one of these machines thrashed and delivered the clean grain at the rate of two bushels per minute, or over 1000 bushels per diem; it was also driven with less power than other machines. Price from $300 to $320 complete; power required, eight horses. Mr. Alfred Belchamber, of Ripley, Ohio, is the inventor, of whom further information may be obtained. Patent applied for.

Effects of Cleanliness.

Count Rumford, the celebrated practical philosopher, whose writings have been of greater value to mankind than the abstruse speculations of a host of metaphysicians, thus describes the advantages of cleanliness:—

"With what care and attention do the feathered race wash themselves, and put their plumage in order; and how perfectly neat, clean, and elegant they do appear. Among the beasts of the field, we find that those which are the most cleanly are generally the most gay and cheerful, or are distinguished by a certain air of tranquility and contentment, and singing birds are always remarkable for the neatness of their plumage. So great is the effect of cleanliness upon man, that it extends even to his moral character. Virtue never dwelt long with filth; nor do I believe there ever was a person scrupulously attentive to cleanless who was a consummate villian."

Convention Respecting Guano.

A Convention of Agriculturists met at the Smithsonian Institute on the 10th inst., to hold consultations about obtaining guano at a less cost. Were it not for the enormous tax imposed upon every tun of it by the Peruvian Government, its cost would be comparatively low. This tax should be reduced, and our government is endeavoring to induce the Peruvians to do so. But we are afraid that this will not be easily brought about, as the tax is partly imposed to pay a national debt.