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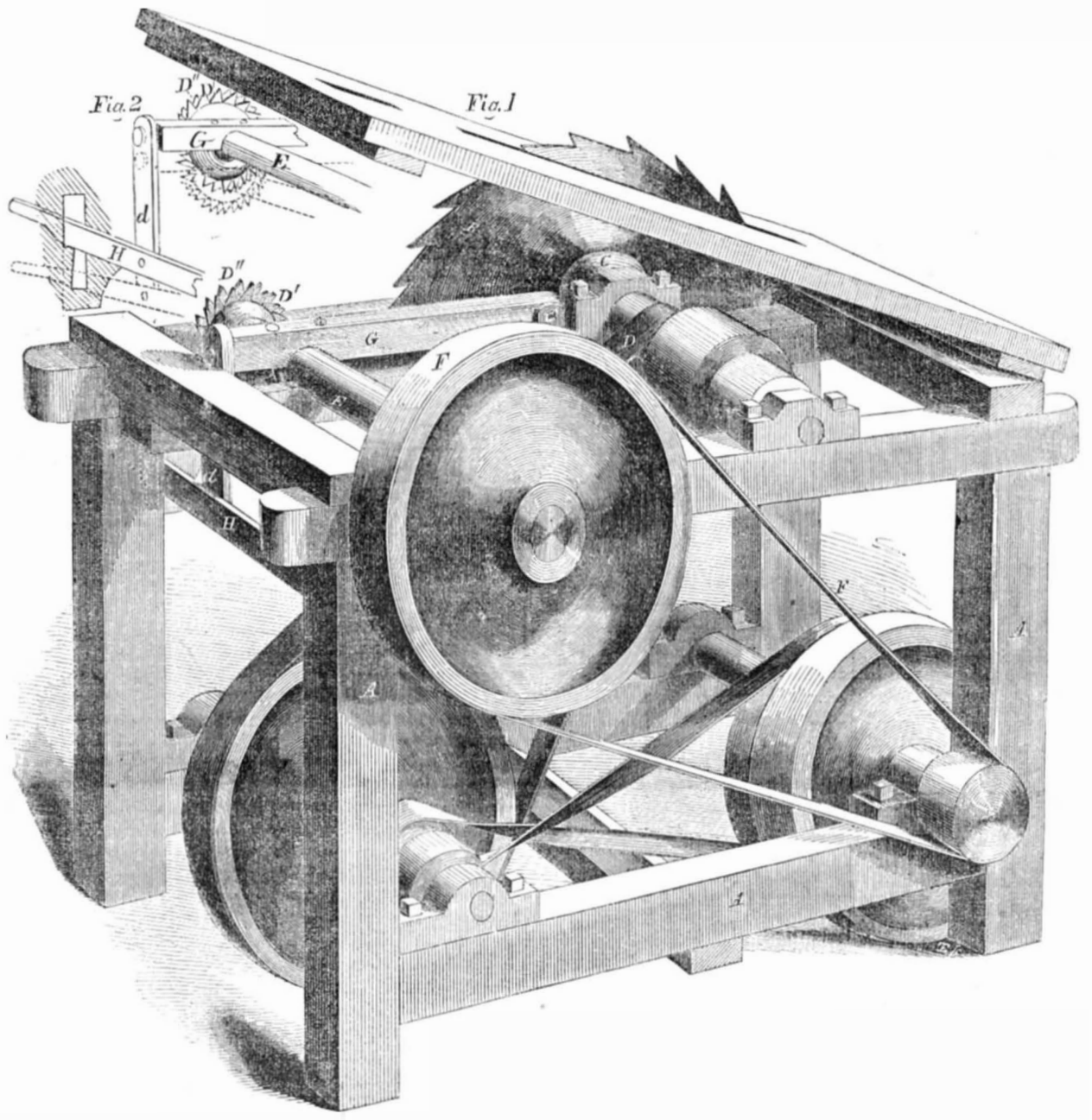
Motive Agents.—Hot Air.—A Singular Coincidence.

The number of the London *Mechanic's Magazine*, of Jan. 26th, which came by the *Persia*, contains an able criticism on the new hot air engine of Capt. Ericsson, by Dr. Benjamin Cheverton. It is indeed, singular, that the very views we presented, (and in many sentences the very same language) in the SCIENTIFIC AMERICAN of last week, are employed by him in pointing out the defects of this engine, and those of hot air as a motive agent. His article was written two weeks before ours, but his article was not read by us until ours was printed.

He states that he pointed out the fallacy of the Caloric Engine in a paper, read before the Institution of Civil Engineers when the ship *Ericsson* was pronounced a "triumphant fact." He is the only writer on the subject, with but one exception, who have reviewed the question as we have done. Many men of scientific reputation then wrote on the subject, and pronounced themselves in favor of hot air, proving by tremendous columns of figures, signs, and symbols, its advantages over steam, predicting the ultimate success of such engines, and the decay of steam power. Dr. Cheverton is more distinguished than any other person in England for experimenting with ether carbonic acid gas, and superheated steam as motive agents. He was engaged with Brunel thirty years ago, in the construction of a carbonic gas engine, just immediately after this gas was first reduced to a liquid by Davy, and when it was thought it would be a grand economical agent to supersede steam. This puts us in remembrance of asking the advocates of hot air why they do not use carbonic acid gas in preference to air. We have stated that the great bulk of air to be heated, in comparison with water, was one of the most serious objections to its use. The only rational argument ever presented in favor of hot air as a motive agent, is its inferior capacity for heat in comparison with steam raised from water. If air could be obtained in a condensible form, like water, then the obstacle to its use of "great bulk," would be removed. Since carbonic acid gas, therefore, can be obtained in a liquid form, and since its capacity for heat is even less than that of air, it being as ·2124 is to ·2669, why do not those who advocate the use of air as an economical motive agent on account of its inferior capacity for heat in comparison with steam, use this more economical gas. As the steam engine is as much, yea, more, of a differential than the air engine is, it exhibits great perversity of vision in those who advocate the use of hot air as a motive agent on account of economy by inferior capacity for heat, that they do not use a gas which, in this respect, is still more economical. They are walking behind Brunel, Brown, and Cheverton, who employed this carbonic acid gas thirty years ago as a substitute for steam.

Granulated cork mattrasses are now used in some hospitals for patients afflicted with inflammatory rheumatism. Cork being an excellent non conductor, it is said to be favorable to the cure of this disease.

IMPROVEMENT IN SAWING MACHINES.



Patent Sawing Apparatus.

The above engraving illustrates an improvement in machines for sawing up boards, and lumber of every description. It is the invention of Mr. J. F. Lovecroft, of Rochester, N. Y., and was patented by him Dec. 12, 1854.

This invention consists in a peculiar arrangement for feeding the stuff to the saw. A is the frame of the machine, B is the saw, C mandrel of same, D F driving belts and pulleys. E is the shaft upon which the feed wheels, D'D'' are placed. They consist of spur wheels, having teeth shaped somewhat like those of a saw. The teeth of one wheel, it will be observed, are placed opposite the open space between the teeth of the other. This arrangement increases the number of bearing points of the feed wheels, and prevents any marring or indentation, when thin stuff is being sawed.

The table top of the machine is thrown up, in the engraving, so as to afford a better view of the parts. There is a slot in the table top, through which the feed wheels, D'D'' project In sawing, the stuff is laid on the table, and rests upon the spurs of the feed wheels. A slow motion, towards the saw, is given to the shaft, E, which causes the feed wheels to carry the stuff up against the saws, with perfect accuracy, and without aid from the attendant.

By the push of a small lever, the feed wheels may, at pleasure, be depressed and thrown below the top of the table, thus becoming inoperative. This lever is shown at H, which is pivoted at one end, and terminates in a convenient handle on the side of the machine opposite to that shown. A connecting rod, *d*, extends from lever H, to bar G, which latter supports one end of shaft E. Bar G has a pivot at G', so that when the lever, H, is raised bar G is also elevated, and with it shaft E and the feed wheels, D'D''. If the lever is depressed, the feed wheels are correspondently carried down below the table top. This method of throwing the feed wheels in and out of operation in the stuff is convenient and quick. The arrangement also enables the operator to regulate the bite of the feed wheels upon the stuff, according as the stuff is heavy or light. The handle extremity of the lever, and the connection between rod *d*, bar G and shaft E, are plainly seen in figure 2

This invention, although quite simple, and cheap in construction, is nevertheless one of great utility. It can hardly fail to meet with general favor among that large portion of the working community for whose assistance it is intended. Any further information can be had by application to the inventor.

Zinc Paint.

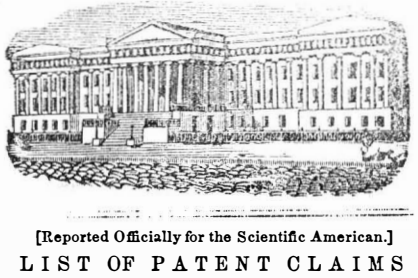
We have received a communication from D E. Goodell, of Pittsfield, Mass., in which he states, it is his opinion, and that of others, that zinc paint is more poisonous than white lead. He is a painter, and he judges from witnessing its effects upon himself and other persons.

He asks our opinion on this point, because it has been stated that zinc paint will not injure the human system like lead paints.

Pure oxyd of zinc used as a paint is not poisonous, as we understand it, therefore it is not hurtful to the system like white lead. But then, almost all zinc ores contain arsenic, and unless this is expelled in making the oxyd for paint, it (the paint) will be more poisonous than white lead. Mr. Goodell states it as his belief that it will never take the place of white lead for priming, but it is four times more durable for an outer coating, and will therefore still maintain its place as a valuable paint. He also states that it turns yellow much sooner than white lead. This should not be the case with pure white oxyd of zinc; and in our opinion it is a sign that the kind he speaks of contains arsenic, which becomes yellow by an increased absorption of oxygen. Arsenic forms the basis of the yellow in French green paint, and in the "sage green" of the dyer.

Plain Writing.

In writing for publication, persons should be careful to write in a plain bold hand, using no abbreviated words. In making a statement of facts, the correspondent—who knows what they are, and not the editor—should be careful not to use the stunted words lb. for pound, and bl. for barrel, or else write them pointedly plain, which very few persons do. Many great typographical mistakes have occurred from the use of abbreviated terms by correspondents of periodicals.



[Reported Officially for the Scientific American.]

LIST OF PATENT CLAIMS

Issued from the United States Patent Office

FOR THE WEEK ENDING FEB. 12, 1856.

CUTTING SAND PAPERS—William Adamson, of Philadelphia, Pa., ante-dated Aug. 12, 1855: I claim the arrangement and combination of the slitting drums, A and B, in the manner and for the purpose substantially as set forth.

SCISSORS—John Allender, of New London, Conn.: I claim in common scissors and shears, making or providing arms to the fulcrum to vibrate with and act upon each blade some distance upon the fulcrum to hold and keep their cutting edges in contact with each other, as described.

TONGUEING AND GROOVING TAPERING BOARDS—R. G. Barber, of Ballston Spa, N. Y.: I claim the movable bed, G, with shaft, D', and cutter, F', attached, said bed being operated substantially as shown and described, for the purpose specified.

WRENCH—William Baxter, of Newark, N. J.: I claim in wrenches, adjusting and securing the jaws, c c', of a diagonal wrench, by means of the screw, d, and joints, f G, as described.

POWER LOOMS—E. B. Bigelow, of Boston, Mass.: I claim the combination of the tension roller, f, the regulating rod, b, and the brake or holding lever, r, when co-operating substantially in the manner and for the purpose specified.

I also claim regulating the action of the delivery motion by the combined action of the tension roller, f, or its equivalent, the regulating rod, b, the pawl or feeder, q', and the series of catches or stops, f f, substantially as specified.

I also claim the method of holding the tension roller, or its equivalent, whereby the regulating rod, l, or its equivalent, is griped, substantially as specified.

Finally, I claim the mode of constructing the brake or holding lever, r, and combining it with the cam, r, whereby the said holding lever, r, is made to do the double duty of turning the let-off motion shaft, and holding the tension roller, or its equivalent, in the manner and for the several purposes set forth, and whereby also the apparatus, which regulates the delivery motion is made to act thereon, when the shed is open, and the tension roller at rest, substantially as specified.

BORING AND TURNING WOOD—Felix and Adolph Brown of New York City We claim, first, the support, F, guiding the extreme end of the boring tool, said support being acted upon by a cam in connection with springs or weights, in such a manner as to remain stationary until the boring tool has some little distance entered the wood, and is then made to go backwards in proportion as the wood is pressed forward, substantially as described.

Second, we claim the arrangement and manner of working, either the fixed knife, or the revolving saw, for the purpose of cutting off the finished work, in the manner specified.

Third, we claim the arrangement and manner of working the tools, 10 and 12, in connection with the movable slides, 11 and 13, attached to the fixed support, C, acted upon by their respective cams, H H', for the purpose and in the manner substantially as described.

PLOWS—John Clark, of Washington, D. C., and G. W. N. Yost, of Pittsburg, Pa.: We claim the revolving share cutters, B B', attached to the mold board, in combination with the bearing plate or strap, D, and the extension of the landside, or the equivalents of said bearing plate, D, and the extension of the land side, for the purpose of securing the free and certain revolution of the series of revolving share custers, B B', substantially in the manner and for the purposes set forth.

VALVES AND EXHAUST PASSAGES OF STEAM ENGINES—C. W. Copeland, of New York City: I claim the described manner of increasing the area of the passages for escaped steam by means of bars or their equivalents, making part of the valve, acting in conjunction with additional apertures or ports in the seat, substantially in the way and for the purposes set forth.

SIGNALS FOR VESSELS—W. P. Craig and W, R. Rightor, of Newport, Ky.: We claim a range of lights placed in the forward part, and in the longitudinal center of a vessel, the foremost light being the lowest, and the following ones rising in succession above it, so as to present to an observer in or near the line of its course, a range of light, which is either vertical, or is directed obliquely to starboard or larboard, according to the course of the vessel.

REGULATING FEED GATES FOR MILLS, &C.—Clement Dare, of Cincinnati, Ohio: I claim the combination of the floats, 2 and 3, rods, 4 and 5, beam lever, 6, and sliding bar, 7, 7, and these in combination with the cam lever, 8, shaft, 17, lever 11, 11, and rods, 12 12, or their equivalents, for operating the gate, 13, in the manner and for the purposes substantially set forth.

STEAM CONDENSERS—James T. King, of New York City: I claim a condensing tank having a vertical partition, D, of any desirable depth, with the inlet steam pipe and a vacuum valve upon one side of the partition, D, above the water, and the escape steam pipe on the opposite side of said partition, so that the steam, before it can escape, must by its pressure force the water down one side of the partition, and pass up through the water in the other side, substantially as described.

OIL CANS—Levi S. Enos, of Olean, N. Y.: I claim the compact arrangement, with each other of the air tube, a, the discharging tube, e, the thumb piece, f, the spring, g, the valve rod, b, and the removable cover of the can, which enables the said operating parts to be easily withdrawn from the can, for examination and repairs, and as easily replaced again for service, substantially as set forth.

REMOVING INCRUSTATIONS OF BOILERS—W. E. Everett and M. M. Thompson, of New York City: We claim the described method of softening or softening and removing the deposit upon boilers, commonly known as scale, namely, by exposing the same to the action of steam, substantially in the manner specified.

ADJUSTABLE CARRIAGE SEAT—D. N. Flanders, of South Royalton, Vt.: I claim the additional revolving seat, B, hinged upon the bed piece, so that it will turn and assume the two positions already described, and thus make the carriage convenient for the accommodation of two or three passengers, as desired.

RAILROAD CAR AXLE—P. G. Gardiner, of New York City: I claim my improved car axle composed of a sheet of metal wound into a tubular form, with its ends welded to solid journal pieces, substantially as set forth.

STEAM COOKING APPARATUS—John S. Gallaher, of Washington, D. C.: I claim the construction of a gas cooking apparatus formed as skeleton frame plates, a a a a, having ventilating slots or equivalents, b b b b b b b b b, and the arrangement therewith of series of longitudinal and transverse jet tubes or pipes, in tiers, as in fig. 2, m m m m, together with the compound tubular valve pipes, fig. 9, and the combination of the above devices, with detachable, drawer-like ovens or baking apartments q q q q q, and fig. 1 1-2, substantially as set forth.

Second, I claim the construction of the central reservoir heater, d1 d1 d2 d2, and the steam boiler chest device, e e, f f f f, g g g, fig. 6, as described, and in application and use as set forth.

Third, I claim the compound suspension griddle device, fig. 3, and the ventilating diaphragm vessel, figs. 4 and 5, substantially as described, and used for the purposes set forth.

Fourth, I claim the air supply bellows or pump device, fig. 8, and the application and use of the same as described and for the purpose set forth.

STICKING PINS IN PAPER—Thaddeus Fowler, of Waterbury, Conn.: I claim the use of the form, fig. 3, for separating, arranging, and spacing the pins, when combined with the paper holder, D, for the purpose of transferring the pins to the prepared paper ready for sticking, when both are constructed, used, and made to produce the result, substantially as described.

Second, I also claim the combination of the paper holder, D, with the frame, A, when constructed, arranged, and used for inserting the pins into the prepared paper, substantially in the manner described.

SEED PLANTERS—Robert and William Gebby, of New Richland, O.: First, we claim constructing a corn planter with compound or double graduating feeding valve rod device Z Z Z Z * * * * 5, having a stirrer pin or spur, 14, and combined in operation with the actuating lever device, P P q q r r formed with the trigger, 3 3, and spur, V U, and spring hook or catch device, W W X Y Y, constructed and used substantially in the manner described.

Second, we claim the skimmer fender, G G, formed with a hinged flap or pressure plate, D D, and adjusting rod, E F G H, as described.

LUBRICATOR—Wm. Gee, of New York City: I claim a glass cylinder, H H, as described, protected by a brass or other metallic cylinder, I I, with openings to see the oil, and the tube, K, as described, passing up through the oil, which by radiating its heat, derived from the hot steam keeps the oil in a liquid state under all temperatures.

I claim the method described of preventing accidents of the glass breaking by the elasticity of the india rubber above and below the edges of the glass lubricator as packing, I I I I, as well as the diaphragm of india rubber, as described, the whole in combination as a lubricator, or to supply and regulate the flow of oil, and by sight enable the person attending to know when the oil or lubricating material is exhausted, and by the method described.

By the diaphragm, P P, I do away with the necessity of having ground metallic surfaces which are always getting out of order, this lubricator will answer for supplying vacuum, by opening the cock, x, the air passing up the tube, k, above the oil, which forces the oil out, and making a vacuum lubricator, which I include as part of my claim.

I do not claim, as packing, india rubber, as that has been used by myself, as well as others; nor do I claim cutting away the cylinder, to see through it, as that has been used by myself as well as others.

But I claim the india rubber diaphragm, P P, in combination with double cocks, N, cylinders, H H, and tube, k, and valve, D, handle, A, guide, B B, with other parts in combination and operation, as set forth.

POWER LOOMS—Elijah Hall, of Rochester, N. Y.: I claim locking and unlocking the reed by means of sliding bolts, g g, applied to the back of the lay behind the reed, and operated by connections with the connecting rods, B B, by which the lay is driven, substantially as described.

HAND PRESS FOR STAMPING LETTERS, &C.—Anson Hatch, of Forestville, Conn.: I claim so combining the arm which carries the stamp plate or form with the cam as that by vertical pressure on said arm, it shall move over the inking apparatus horizontally, or nearly so, to be inked, and then descend vertically onto the bed, to give the impression, and in returning pass above the inking rolls so as not to touch them, in the manner and for the purpose substantially as set forth.

CONDENSING STEAM ENGINES FOR PUMPING—Birdsill Holly, of Seneca Falls, N. Y.: I claim leading the eduction steam pipe of a steam engine into the suction pipe of a force or lift pump, substantially as described, whereby the condensation of steam is effected, and a partial vacuum produced, without a separate condenser and air pump, and in this engines employed wholly or in part to raise water without any additional expenditure or loss of power to raise the water to effect condensation.

COTTON SEED PLANTERS—J. L. Horn, of Edgecombe County, N. C.: I do not claim a distributing wheel, running upon the ground, nor do I claim projecting rims or flanges upon such contributing wheel.

But I claim the arrangement of the back and front guards, c1 c2, in combination with the distributing wheel, a, provided with the flanges, b b, and chargers, C C, placed at proper intervals, so that no seed can escape below the horizontal line, X X, except at the proper and lowest point, i, immediately in rear of the opener, e.

HANGING AND ADJUSTING CIRCULAR SAWS—Westel W. Hurlbut, of Utica, N. Y.: I claim, first, the arms, B B and B' B', as connected with the bearings, C C, and supported by the pins or centers, G G, in connection with the slide, k.

Second, the moving of the saw, A, either sideways or diagonally by the use of the slide, k, and the bolts, O and N, or their equivalents.

ELEVATOR FOR PUDDLERS' BALLS—Solon S. Jackman, of Lock Haven, Pa.: I claim the use of the pulley lever, p, and brace, q, in connection with the stem or supporter, r, and till plate, s, constructed and operated substantially as described.

WRENCH—Ferdinand Keehnold, of Bridgeport, Conn.: I claim the jaws, D, and lever, H, as constructed, operating in connection with the ratchet bar, G, in the manner set forth.

SEALING PRESERVE CANS—R. W. Lewis, of Honesdale, Pa.: I claim, first, the plate, E, as a means of protecting the cans' contents from the rubber packing.

Second, the combination of the projecting ribs, H, with the cap, A, constructed, combined and operated substantially in the manner and for the purpose specified.

PORTE MONNAIES—E. Lindner and C. Hoffman, of New York City: We claim the application and manner of connecting to the inside of the porte monnaie elastic bands or india rubber cords or springs, passing through the joint to the outside, so as to be able to attach the same to the finger, substantially as described.

DIAPHRAGM PUMP—John L. McPherson, of Clinton County, Ohio, and Jacob O. Joyce, of Cincinnati, Ohio: We claim, first, the application to piston of pumps of a corrugated diaphragm, which admits of greater length of stroke without over-straining the material, substantially as described.

We also claim, in combination with a corrugated diaphragm, the flaring or rounded followers, A, so that they will approach and take up the folds of the diaphragm in accordance with the length of the stroke given to the piston rod, as described.

We also claim the wedge-shaped valve, G, which lies loose in its seat, and rocks on its rounded base to open or close the passages, l L, as set forth.

ROTARY PLANER FOR FELLIES—C. H. Dennison, of Green River, Vt.: I do not claim the cutter head, e, nor the cutter bar, X, for both have been previously used.

But I claim the combination of the rotary bed, C, cutter head, e, and cutter bar, X, arranged substantially as shown and described, for the purpose specified.

WICK HOLDERS FOR ARGAND LAMPS—E. Mceller, of Newark, N. J.: I do not claim a spring clasp for embracing the wicks of lamps.

But I claim the peculiar mode set forth of holding the wick, and pressing it outwardly against the wick tube, in the manner and for the purposes set forth.

WRENCH—Elisha P. Newton, of Albany County, N. Y.: I wish to be understood as not claiming the toothed shank.

But I claim the arrangement of a semi-screw thread cut or counter-sunk in the shank, and the semi screw threaded stop or catch for working therein, by which means finer threads may be used, and the movable jar be brought closer up to the nut, and the stop or catch removed out of the way of the action of the wrench, they being arranged and operating in the manner as described and shown.

GRAIN HARVESTERS—Job Phillips, of Harrisburg, Pa.: I claim the self-adjusting platform hinged at front, and so governed in its motions at the rear by the short arm of the regulating side lever or equivalent thereof, as to maintain a fixed distance of the rear part from the ground while the front part is raised or lowered by the adjusting lever, as set forth.

SHIP'S COMPASSES—John Prime, of Washington, N. C.: I claim the method described of constructing the cover of compass boxes, by inserting the metallic ring, B, within the rim of glass with a band of India rubber or other elastic material between them to compensate for their unequal expansion and contraction, substantially as and for the purposes set forth.

CULTIVTOR TEETH—C. H. Sayre and G. Klink, of Utica, N. Y.: We claim so constructing a cultivator tooth that when made of tin or sheet metal a part thereof shall form a tubular shank, B, whereby said tooth may be drawn up and securely attached to the frame, substantially as described.

ENVELOPES FOR BOTTLES—John Seithen, of Coblenz, Prussia. Patented in England, Aug. 29, 1854: I claim the combination of mechanism, and the making of envelopes for bottles, as described.

SAFETY SPRING COUPLING—Edwin F. Shoenberger, of Marietta, Pa.: I claim the shape and construction of the coupling so that the shafts of the carriage can be attached to the axle by merely dropping the ends downward into the boxes in a vertical position, and their combination with the spring to prevent noise or rattling, substantially as described.

FLUXING BLAST FURNACES.—Christian Skunk, of State Lick, Penn.: I do not claim originality in the use of common salt in treating of iron.

But I claim applying and introducing common salt as a flux or solvent, or its equivalent into blast furnaces at the tuere, or any point below the tunnel head, in the manner and for the purposes described.

BOLT MACHINE—Timothy F. Taft, of Fitchburg, Mass.: I claim, first, the two side punches, operating simultaneously and equally upon opposite sides of the bolt, in combination with the intermittent rotary motion of the bolt holder, for the purpose of finishing the bolt head, with its center in the axis of the shank, as set forth.

Second, I claim the forward and back motion of the bolt holder, when the rod, A2, which ejects the bolt is supported at a point in advance of that on which the bolt holder vibrates, for the purpose of ejecting the finished bolt, as set forth.

GRATING GREEN CORN—Benjamin Taylor, of Philadelphia Pa.: I claim the flat or concave piece of wood or metal, A, with its opening scraper, G, and one or more rows of spikes, d, the whole being arranged and constructed substantially in the manner and for the purposes set forth.

HOLDING PAPER—Thomas Thompson, of Niversville, N. Y.: I claim the forming block, in combination with the rollers, k k', so constructed and arranged as to draw the material to be folded over said block, and fold it substantially as described.

EXTINGUISHING FIRES—Lea Pusey, of Philadelphia, Pa.: I claim the adaptation of the water spouts of buildings to the purpose by means substantially the same as those described.

BREECH-LOADING FIRE-ARMS—William H. Robertson & George W. Simpson, of Hartford, Conn.: We claim the sliding socket breech constructed and operated in the manner and for the purpose substantially as set forth.

We also claim the flexible spring check to prevent the passage or escape of gas in breech-loading fire-arms, in the manner substantially as set forth.

OIL BOX FOR AXLES WITH CONICAL JOURNALS.—William D. Titus, of Brooklyn, N. Y.: I claim constructing the cone or cones made close, with an internal oil or grease chamber, a, round a cylinder or tube, c, forming the center part longitudinally of the cone, and providing the said cone on its periphery at opposite ends and on reverse sides with sluices or openings, x and s, essentially as and for the purposes specified.

CLOTHES CLAMPS—William H. Towers, of Philadelphia, Pa.: I claim forming slits, D, at the upper portion of the clothes clamp as represented and described, in such a manner as to give an increased degree of elasticity to the upper portion of the jaws, G, between which the clothes are clamped, and enable said jaws to be opened sufficiently to admit the clothes and line between the grooves, A, in the same, and to detach them therefrom without scraping the clothes with the sides of the lower slit, by pressing the prongs formed by the upper slit together, as set forth.

CUTTER HEADS FOR PLANING MACHINES—Loison D. Towne, of Worcester, Mass.: I do not claim a wedge for holding or spreading the cutters, as this is not new.

But I claim the clamping or holding of the cutters between the brace and sides of the cutter head, by means of the conical or wedge-shaped form of the plug and braces or their equivalents, and whether said head be made solid or made in two or more sections, substantially as described.

RAILROAD SWITCH.—James Whitcomb, of Detroit, Mich.: I claim the enlargement, substantially as described, for the long switch rail, when connected with a short switch bar.

RAILROAD CAR COUPLINGS—S. W. Wood, of Washington, D. C.: I claim constructing the buffers of railway cars in such manner that the coupling rod may be dropped into its place from the upper surface or sides, said connecting rod consisting of a single piece of wood or metal, being independent of, and not in any way fastened to the buffers, while it is retained in position by its own gravity, substantially as described.

HARVESTERS—Geo. W. N. Yost, of Pittsburgh, Pa.: I do not claim springs for holding the cutter bar against the upper portion of the finger, as in the patent of Sylvester Colburn.

But I claim combining with the cutter bar of harvesters a series of friction rollers, when said rollers are kept constantly pressed down on the cutter bar, by means of springs, b' b', for the purpose and substantially as set forth.

MASTIC ROOFING—C. C. Hoff, of Albany, N. Y., assignor to E. P. Russel, of Manlius, N. Y.: I claim preparing the canvas with the soluble and earthy matters, in the manner set forth, and then covering the same with tarry resinous material and carbonacious compound, in the manner and for the purpose set forth.

CONCAVING CIRCULAR SAWS—James M. Kern, of Morgantown, Va.: I claim the making of a dish-shaped saw from a flat circular saw plate by cutting away a portion of the interior of the plate, and drawing a portion of the remaining metal into the space thus cut away, by which the desired concavity may be obtained without cutting out to the periphery of the plate.

PEGGING BOOTS AND BOOTS—Alfred Swingle (assignor to Elmer Townsend) of Boston, Mass.: I claim the new arrangement of the cutting knife with respect to the peg wood carrier and the peg receiver, and so as to operate against the side of the peg wood and cut it from side to side, as specified.

I also claim arranging or combining with the cutting knife and the handle as described a spring stop or catch, so applied as to operate and retain the knife in position to shut off communication between the feeding trough and the peg receiver under circumstances as stated.

I also claim arranging in front of the peg receiver and front of the knife a waste receiving and discharging chamber or mouth, the same being made to operate as specified.

POTATO PLANTERS—Charles Morgan (assignor to Samuel Emlen) of Philadelphia, Pa.: I do not desire to claim especially the use of forks in potato planters for extracting the seed from a hopper, as such is described in the specification of Enoch Woods, Jan. 10, 1845.

But I claim the form, m, and plunger, S, with its projections, U, in combination with the hopper, H, said fork and plunger being operated simultaneously, substantially in the manner and for the purpose set forth.

CALDRONS—Henry Newsham, of Baltimore, Md.: I claim constructing a caldron by giving the bottom thereof an arched form, in the manner described and for the purpose specified.

GEARING FOR FEED ROLLERS OF PLANING MACHINES—Chas. Burleigh, (assignor to the Putnam Machine Co.,) of Fitchburg, Mass.: I claim the toothed links, H and G, constructed and operating in the manner substantially as set forth.

RE-ISSUES.

SEWING AND STITCHING STRAIGHT SEAMS—I. M. Singer & Edward Clark (assignees of J. J. Greenough,) of New York City. Dated originally Feb. 21, 1842: We claim, as the invention of J. J. Greenough, first, the feeding of the article to be stitched automatically forward to the needles, so as to determine thereby the length of the stitch, by means of the apparatus described, or any known mechanical equivalent therefor.

Secondly, the employment of a weight or its equivalent, to draw out the thread, substantially as described.

Thirdly, the combination of pincers to draw the needle and thread through the article being sewed.

Fourthly, for the purpose of working with two needles at the same time, I claim giving to the pincers a simultaneous lateral movement to change the needles from one pair of pincers to the other, as described.

Fifthly, the stop motion consisting of an arrangement of apparatus described, for stopping the machine, when the thread breaks or becomes too short.

POLISHING STONE, METALS, &C.—Albert Broughton, of Malone, N. Y. Patented originally Nov. 7, 1854. Antedated Oct. 24, 1854: I claim the within described polishing process, viz.: a process by which the friction of the surface of the rotary polishing wheel, upon the surface of the articles operated upon, will impart rotary movements to said articles, substantially in the manner and for the purpose set sorth.

SPIKE MACHINES—A. M. George, of Nashau, N. H.—Patented Dec. 18, 1855: I do not claim the jaws, B B', nor the toggle, C, with heading die attached, and variable at pleasure, for they have been previously known and used.

But I claim the friction roller, f, and lever, I, to which the cutter, k, is attached, when said roller and lever are placed upon adjustable centers, or pivots, or rods, e i, in combination with pointing dies inserted in the jaws, arranged substantially as shown and for the purpose specified.

DESIGNS.

PRINTING TYPE—Lawrence Johnson, of Philadelphia, Pa.: I do not desire to confine this design to the exact form or size of the letter shown, nor to the number of stars, or to the color of the ground.

But I claim the forming on the face of the printing type such figures that the letters printed therefrom shall represent in the colored portion of each letter a colored ground with white stars, and in the lower portion alternate white and colored stripes, substantially in the manner shown.

MOLDED BRICKS—J. M. Thompson, of Philadelphia, Pa.

GATES—Hermann E. Wesche, (Assignor to Robert Wood,) of Philadelphia, Pa.

BOTTLE CASTERS AND EGG CUP STANDS—R. Gleason, Jr., (assignor to R. Gleason & Sons,) of Dorchester, Mass.

COOKING STOVES—Saml. Pierce, of Troy, N. Y., and J. J. Dudley, of Yonkers, N. Y., (assignors to Cox, Warren, Morrison, & Co., of Troy.)

STOVE PLATES—Sanford Burnham, (assignor to Cox, Warren, Morrison, & Co.,) of Troy, N. Y.

COOKING STOVES—Saml. Pierce and Sanford Burnham (assignors to Cox, Warren, Morrison, & Co.,) of Troy, N. Y.

Straightening Bent Shafting.

MESSRS. EDITORS—Thinking the following will be of service to many, as it was to me, and that, as I have found many valuable facts in your paper from others, I reciprocate favors.

I had a shaft 9 feet long, 3 inches diameter, that was sprung somewhat out of line; it had bearings on ends, pulley in center, revolutions 429 per minute, pulley 2 feet 8 in. face. Driving at that speed the shaft labored much, and something had to be done. I tried to straighten with sledge hammers, together with a heavy strain in center; struck on the round side, but could not move it, when one of my workmen (G. B. Price) suggested light taps with a small hammer, on the opposite side, and, to my astonishment, a few light taps along the concave side brought the shaft perfectly in line.

Doubtless this is known to mechanics in that line; but it was new to me, and quite recently I was conversing with one of the best practical millwrights and machinists in this section, about straightening of Page's saw mandrels, and he advised "heat to cherry red, and strike with sledge on block of wood on round side." By the last method there is great danger of doing the shaft serious injury, by getting even worse crooks in it. But by the expansion of the concave or short side from light blows, the shaft is at once brought to its former position, without even removing it out of the boxes. If the above will help any of your numerous readers out of a difficulty, it answers the end I design.

DANIEL HIMTON.

Kinston, N. C., Feb. 7, 1856.

Proposed Enlargement of the City Hall.

Messrs. B. & I. Buckman, of this city, have recently shown us an extensive plan for the enlargement of the present City Hall. It is proposed to have the present City Hall form one side of an immense building, the other three sides of which are to be built, being counterparts of it, and facing four hundred feet each on Broadway, Center, and Chambers streets, leaving in the center an octagon court, measuring one hundred and seventy feet across. The extension will reach within one hundred feet of Broadway, and within twenty five feet of Chambers street, and to include the Hall of Records, the materials and style of architecture to be preserved, so as to harmonize with the present City Hall.

It is proposed to add one story, and if necessary, to have the whole surmounted by a spacious circular gallery, to be used as a receptacle and exhibition room for pictures, statuary, &c., presented or belonging to the city. The interior arrangements for court rooms, &c., are very perfect, and it is believed that after the city and United States offices have been supplied there will be room for a General Post Office. There will be a wide entrance for processions on Chambers street, which can pass in review round the court, and make their exit by the same route. The estimated cost is about two and a half million dollars.

Report of the Commissioner of Patents for the Year 1855.

U. S. Patent Office, Jan. 31, 1856.

Sir—In obedience to the requirement of the 14th section of the act of March 3d, 1837, entitled "An act in addition to the act to promote the progress of science and useful arts," I now proceed to report the facts therein required, showing the transactions of this Office during the past year, and its condition at the commencement of the present.

The total number of applications for patents during the year 1855 is 4435; the entire number of patents issued, 2024; the whole amount of fees received, $176,380·57; the aggregate of expenditures, $179,540·33; excess of expenditure over fees, $3,159·76.

But by the act of March 3, 1855, the money which had been previously taken from the Patent Fund for agricultural purposes, amounting to $40,078·78, was refunded. Adding this to the amount of fees received shows the whole amount of income during the year to be $216,459·35, which exceeds the total expenditure $36,919·02.

The receipts and expenses of the Office for the past year, together with the present condition of the Patent Fund, will be seen by reference to the following statements:

Statement of moneys received at the Patent Office during the year 1855.

Received on applications for patents, re-issues, additional improvements and extensions, and on caveats, disclaimers and appeals,	$162,120 00
Received for copies and for recording assignments,	14,227 57
Received for old sash,	33 00
Total,	$176,380 57
Amount reimbursed to Patent fund, per act of 3d March, 1855,	40,078 78
	$216,459 35

Statement of Expenditures from the Patent Fund during the year 1855.

Salaries,	$67,629 08
Additional compensation per act of 22d April, 1854,	2,229 50
Temporary Clerks,	31,938 19
Books for the Library,	830 45
Contingent Expenses,	36,764 82
Payments to Judges in Appeal Cases,	450 00
Refunding money paid into the Treasury by mistake,	225 00
Refunding money on Withdrawals,	39,473 29
Total,	$179,540 33
Excess of Receipts over expenditures,	$36,919 02
Excess of Withdrawals this year over last,	$5,333 33

Statement of the Patent fund

Amount to the credit of the Patent Fund, January 1, 1855,	$25,593 52
Amount paid in during the year, including $40,078 78 reimbursed to the patent fund by the act of 3d March, 1855, being the amount heretofore paid out for Agricultural Statistics, &c.	216,459 35
Total,	$242,052 87
From which deduct amount of Expenditures during the year,	179,540 33
Leaving in the Treasury 1st January, 1856, the sum of	$62,512 54

From the following table it will be seen how rapidly the business and revenues of the Office have increased during the past fifteen years.

Table exhibiting the business of the office for fourteen years, ending December 31, 1854.

Years.	Applications filed.	Caveats filed.	Patents issued.	Cash rec'd.	Cash exp'd
1841	847	312	495	$40,413 01	$23,065 87
1842	761	291	517	36,505 68	31,241 48
1843	819	315	532	35,315 81	30,776 96
1844	1,045	380	502	42,509 96	36,344 73
1845	1,246	452	502	51,076 14	39,395 65
1846	1,272	448	619	50,264 16	46,158 71
1847	1,531	533	572	63,111 19	41,878 35
1848	1,628	607	660	67,576 69	58,905 84
1849	1,955	595	1,076	80,752 78	77,716 44
1850	2,193	692	995	86,927 05	80,100 95
1851	2,258	760	869	95,738 61	86,916 93
1852	2,639	996	1,020	112,056 34	95,916 91
1853	2,673	901	958	121,527 45	132,869 83
1854	3,324	868	1,902	163,789 84	167,146 32
1855	4,435	906	2,024	176,380 57	179,540 33

Increase of Patent Business.

The augmentation of the number of *applications* has been greater during the past year than at any previous period. That the increase in the number of *patents* is not proportionably great is due to the fact that at the commencement of the year 1854 there were 823 cases undisposed of in the Office, so that the whole number of cases acted upon during that year exceeded four thousand. At the beginning of the year 1855 there were but 89 cases on hand, and on the first day of the present year only 66.

There are papers in the Office to show that less than fifty years since the annual income of the Office was only about $1500, and that for the seven years previous to 1826 the aggregate amount secured was about $42,000, or an average of $6000 per annum. These facts, taken in connection with the last of the above statements, will show with what a constantly accelerated rapidity the march of invention has been progressing for the last half century.

Hereto will be found appended a classified list of all the patents which have been granted during the past year, together with an alphabetical list of the patentees and their places of residence; also a list of all patents which have become public property during the same period.

Illustrated Report.

In addition to the classified list of the patents granted within the year it has long been the practice to furnish in the report a brief description of each of those patents, so as to present a general idea of its nature and purpose. To render these descriptions more intelligible, illustrations have been added in the reports for the two past years. This seems to have met with general favor, and the present report is prepared in the same manner. I trust it will also meet with the approval of Congress.

Officers of the Patent Office.

The act of the last session authorizing the appointment of six additional principal examiners, limited the countinuance in office of two of that number to the end of the present session unless further extended by a new law. I deem it indispensable to the prompt transaction of the business of the Office that the present force should not be diminished.

The number of applications in 1854 were twenty-five per cent. greater than in 1853, and the increase during the past year is more than thirty-three per cent. of the whole number of applications of the year previous. This increase during the past year alone is sufficient to furnish employment for three principal examiners and as many assistants, reckoning by the average number heretofore acted on by each set of examiners. If anything like the same ratio of increase is to be continued hereafter, the present number of examiners will, before the end of the present year, be found inadequate to the discharge of the duties which will devolve upon them.

Still, there are grave objections to a further increase of the number of principal examiners. The system is already overgrown in that respect, and seems almost imperatively to demand some modification to give it a proper harmony and uniformity of action.

Each of the twelve principal examiners has charge of certain prescribed classes of cases. They necessarily act, to a considerable extent, independently of each other, and possessing very different minds and views they follow different rules of action and of decision.

Examinations and Rejections.

The multiplicity of business in the Office renders it wholly impossible for the Commissioner to exercise a personal supervision over the decision in each of the numberless cases presented for official action. When the Examiner reports in favor of granting a patent it is issued without further question or examination.

In case of the *rejection* of an application the law and the practice of the Office permit an appeal to the Commissioner and finally to one of the Judges of the Circuit Court of the district. But such appeals are attended with much trouble and expense, so that in most cases—especially when the applicant resides at a distance—a rejection by the Examiner is in point of fact final. Under such circumstances the importance of correctness and uniformity of decision upon the first examination can hardly be too highly appreciated. This cannot reasonably be hoped for under the system now in operation, and the more that system is extended the greater the evil becomes.

Proposed Appointment of an Examiner-in-Chief.

To remedy this difficulty several plans have been suggested, but they generally resolve themselves into one of the two following or modifications thereof:—

1st. The appointment of an *Examiner-in-Chief*, whose sole duty would be to review the actions of the present Examiners, with a view to introducing correctness and uniformity of decision. As a modification of this plan it has been sometimes proposed to increase the number of Examiners-in-Chief to three—some one of whom should make a final decision upon each of the various questions, which should first be fully and clearly presented by some of the members of the corps of Examiners as now constituted, and who might, all three, act conjointly on appeals and other cases of unusual difficulty.

Proposed Indiscriminate Issue of Patents.

2d. To return to the former practice of the Office—making the duties of the Examiners simply advisory, and allowing a patent in all cases, provided the applicant should finally insist upon it, notwithstanding the opinion of the Office as to its invalidity.

Difficulty of Finding Suitable Officers.

The main objection to the former of the above plans grows out of the difficuly of obtaining competent and suitable persons to fill the chief places. I doubt whether there is a situation under the government for which it would be more difficult to find a suitable incumbent. Qualities would be required for the satisfactory discharge of such a duty which are rarely found united; a well-trained capacity for comprehending and investigating all subjects connected with natural and mechanical philosophy, and a high order of legal acumen and experience. The difficulty is still further increased by the fact that very few of our lawyers have ever turned their attention in this direction. The law relating to patents is less understood by the profession than any other branch of that noble science. And as the cherished rights of inventors are to be submitted to the sound discretion of these officers, habits of patient and laborious investigation and the high moral qualifications of integrity and impartiality are quite as indispensable as those of an intellectual character.

If the difficulty of securing the services of persons possessing a union of all the abovementioned qualities could be overcome, the plan we are now contemplating would probably be the readiest and most judicious mode of effecting the desired improvement of the present system; but the doubt of success in such an effort is so great, that something in the nature of the second plan, as above stated, seems worthy of some consideration.

That plan, however, would necessarily be subjected to some important modifications before it would be admissable. When a meritorious inventor has obtained a patent which proves of high value, there are not wanting unscrupulous men who are willing to trespass upon his well-earned rights. To permit a person of that character to take out a patent—valid on its face—for precisely the same invention would be not only countenancing intentional wrong, but the Office would almost become a participant in a design to impose upon the public. Persons taking assignments of either patent would have no sufficient means of distinguishing between the spurious and the true, and would be as likely to purchase property in the invention from the infringer as from the real inventor—both being armed with the same evidence of legal ownership. This would be nearly akin to authorizing forgery, and counterfeiting by law.

Granting Invalid Patents.

But if every patent granted contrary to the opinion of the Office were required to bear conspicuously upon its face the evidence of that fact; or if the option of the applicant to demand a patent were limited to cases which would authorize no infringement of any pre-existing American patent, the difficulty above intimated would, to a great extent, be obviated. Perhaps even where an application was held by the Office to conflict with the rights of a previous patentee, the applicant might be permitted to insist upon his patent after due notice to the patentee, and a full opportunity given him to contest, in some proper Court, the validity of the patent sought by the new applicant.

Should anything of the kind above intimated be adopted it would doubtless be proper to provide a means by which any patent wrongfully claimed and granted might be invalidated and cancelled. In fact, some provision of this nature would seem eminently proper and valuable under any system of patent laws.

The modifications we have last been considering would relieve the Office from much of the judicial labor now devolving upon it, and would render the same high order of qualifications and experience less absolutely essential in the Examining corps. Most of the legal controversies now arising in the Office would be turned over to the courts of law, which are not only so much better qualified to adjudicate, but which possess the requisite machinery to investigate and conduct such matters, so as to lead to a result more satisfactory than can be done here.

Rights of Inventors.

All our republican notions of propriety revolt at the idea of making the substantial rights of property of any citizen depend upon the mere discretion of an executive officer.—Such a system seems rather Asiatic than Anglo-Saxon in its type and origin. The present Patent Laws are certainly, to some extent, liable to this objection. It is true, they provide, in some manner, for bringing many of the decisions of the Office before the regular judicial tribunals; but when an application which should be patented is rejected by the Office, no opportunity is allowed the applicant for showing the justice of his claims before a Court or jury. If he has a natural right to what he has created, may he not, in such circumstances, be regarded as having been "deprived of his property without due process of law," and without the intervention of that great constitutional bulwark which he regards as a birth-right—a fair trial before a regular judicial tribunal?

That he has now the privilege of appealing to the Judge of the Circuit Court does not change the case essentially. That Judge is only (for the occasion) a part or parcel of the Patent Office; he does not hear the case anew, but founds his opinion upon the necessarily imperfect facts and statements which are presented to the Office.

The question of patentability is often one of the most delicate and difficult that can ever arise before any tribunal. A resort to the testimony of experts is frequently essential to a just and correct decision. The law now makes no provision for this or any other kind of testimony. No witness is obliged to appear or to give testimony unless he does so at his own option, and even if he swears falsely there is no statute penalty.

Without the means of proving the practical working of his machine, or without any other legal testimony, the inventor sometimes provides himself with a few certificates, or exparte affidavits, sometimes of doubtful authenticity, and always regarded with suspicion, and presents himself before the Office; is rejected; appeals to the Judge—who has no adequate means of arriving at a correct conclusion—and thus is frequently deprived of his rights without an opportunity of establishing them in the manner guaranteed to all other citizens.

Nor ought it to be supposed that these are matters of trivial moment; at least, they are not so to the individual most immediately interested. To him, the offspring of his mental energies are something more than property; they are his children, for whom he has labored through much of the fairest portion of life's meridian, and on whom he relies for consolation and support in the evening of its decline.

That he has now no sufficient opportunity of establishing his rights before a properly constituted tribunal, is doubtless a great defect in the present system. Whether that defect shall be remedied, and if so, in what manner, will be for Congress to determine.

The above suggestions are not intended as proposing any definite plan for modifying the present laws, but merely as presenting the difficulties experienced, and furnishing some hints which may serve as a basis for future consideration by the body to whom the matter is submitted.

[The remainder of this interesting Report will appear next week.]

Death of an Inventor.

John H. Manny, of Rockford, Ill., the well-known inventor of improvements in reaping machines, died at his residence on the 26th ult., of consumption. His death, it is said, occurred on the very day when the news reached his residence of the successful issue of the suit in his favor against McCormick. A grand prize medal was awarded to Manny's reaper at the Paris Exhibition, and Prince Napoleon, it is stated, commended it over all others.

Correction.

Our attention has been called to an error of misplacement in the article "Zinc and its Uses," on page 162. The thirteenth line in fourth column, down to the first paragraph, should be placed at the top of the column.

The steamer *Canada* had arrived at Halifax when we went to press, but brought no news of the missing steamship *Pacific*.

New Inventions.

Captain Whitaker's Improvement in Propulsion.

We have several times had occasion to call the attention of our readers to the successful experiments of Capt. Harry Whitaker, on Lake Erie, in the propulsion of vessels, and we now present an illustration of his method, which is secured to him by Letters Patent of the U. S., bearing date Oct. 18, 1853. Foreign patents have also been taken out.

Capt. Whitaker's plan consists simply in the application of common propellers to the sides of vessels, instead of at the stern. He proposes to remove the cumbersome paddle wheels, and to substitute in their place small propellers, worked by light, rapid, high pressure steam engines. He also proposes to employ one, two, three, or more propellers on each side, according to the size of the vessel and the speed which is desired to be attained. He believes that ocean steamers thus propelled may be driven at a speed hitherto unknown, and with greater safety, less expense, &c. The results of his experiments certainly afford some foundation for this belief.

In our engraving A is the guard of the vessel, B the propeller, C, driving cranks of same, D, steam cylinders, and E, boiler. The inventor's intention is to drive the propeller at a very high velocity.

The contest that has been going on for several years past between the paddle wheel and screw, gathers interest from repeated trials, and the comparative results obtained would seem to indicate that the palm of victory, both in regard to speed as well as economy, is soon, if not already, to be awarded to the screw.

The following details, which we condense from the London *Artizan* will show the results obtained from these two modes of propulsion in the steamships *Himalaya* (screw,) and *Atrato* paddle.)

	Himalaya.	*Atrato.*
Leng h at load line,	335 ft. 6 in.	315 ft.
Breadth, extreme, -	46 ft. 1 in.	42 ft.
Tunnage, B. M., - -	3550 ft.	2271 ft.
Nominal H. P. of Engines,	700 ft.	900 ft.
Diameter of screw and paddle,	15ft.	35 ft. 6 in.
Cubic contents of both cylinders, for one double stroke, -	362 ft.	1807 ft.
Total heating surface in boilers,	10,910 sq. ft.	16,460 sq. ft.
Displacement, - - - -	3220 tuns.	3070 tuns.
Pressure of steam in boilers,	14 lbs.	17 lbs.
Speed in statute miles, per hour,	15.87 miles.	16.08 miles.
Gross indicated horse-power,	2050	3070
Slip of screw and wheel,	15 pr. ct.	23 pr. ct.

It would seem from the foregoing details, that 2050 H. P. economized by the screw, propelled the *Himalaya* at nearly the same speed as 3070 H. P., transmitted by paddle wheels, propelled the *Atrato*. These vessels are both built of iron, and are said "to offer in all respects a fair exposition of their respective methods of steam propulsion."

It is to be regretted, however, that we have no data by which we can judge of the comparative cost of these two vessels, beyond the fact that the screw propeller of the *Himalaya* weighs a little over ten tuns, and the cost of which is said to be under £400, while "on the other hand there is the ponderous beam or side lever engines, necessarily complex and bulky, with the feathering paddle wheels, each probably weighing 70 tuns, and costing not less than £5000."

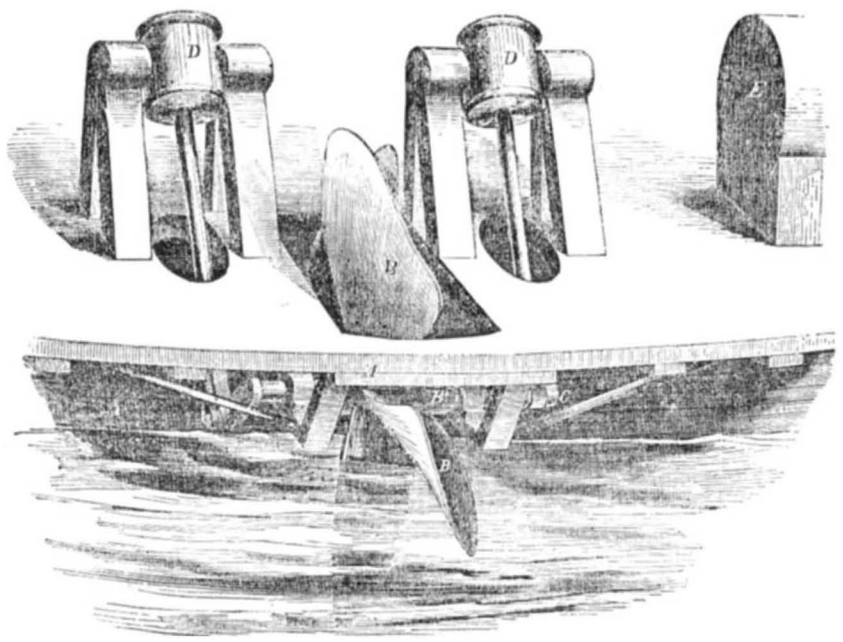
Another experiment made by the Peninsular and Oriental Steamship Company, (British,) is also worthy of note in this connection, of which it is said "the experiment has not only been successful, but the result is sufficiently extraordinary to merit the attention of scientific men." It appears that the steamer *Sultan*, in 1851, with paddle wheels and engines of 420 horse power, made an average speed of 10·71 knots per hour. Her paddle wheels were subsequently displaced by the screw, and her engine power reduced just one-half, (210-H. P.,) when she produced an average speed of 10·47 knots per hour, and this enormously disproportionate force, which produced a speed very nearly equal to the paddle wheel, was not the only advantage gained by the change. In place of carrying *eight* days' coal as before, the *Sultan* is now able to stow fuel for *sixteen days* consumption, has greater accommodation for passengers, and 150 to 200 tuns more cargo space than she had before.

We could give other instances with like results, but we shall proceed at once to speak of the steamer *Baltic*, which has now closed her second season upon our upper lakes, and which we believe, as yet, is the only practical exponent of the principle of propulsion illustrated by the engraving at the head of this article. The *Baltic* is a full freight model of about 900 tuns capacity, and was originally built a paddle wheel boat.

Capt. Arthur Edwards, her enterprising owner, being favorably impressed with the novelty and feasibility of Capt. Whitaker's plan of placing screw propellers upon the two sides of boats, determined to make the application to the *Baltic*.

Accordingly she was dismantled of her old engines and paddle wheels and side screws and new machinery substituted. The engines taken out of the *Baltic* had a cylinder 35 5-8 in. diameter, with 8 ft. stroke, equal to 55·4 cubic feet. Her new cylinders are 26 in. diameter, and 3 ft. stroke, equal to 11·06 cubic feet each, or 22·12 cubic feet for both—about 40 pr. ct. (with the same pressure of steam) of her former power, while the whole of her new

IMPROVEMENT IN THE PROPULSION OF VESSELS.



machinery weighs less than 60 tuns. But notwithstanding this great reduction of power, her speed has greatly increased, and in addition, she is able to carry 200 tuns more freight, and all this with not over a moiety of her former expense for fuel.

We have been furnished with a large mass of testimony to prove the practicability and success of this new mode of propulsion, but we can only find room for the remarks of Mr. Samuel Hathaway, who is a constructor of engines, and was formerly chief engineer of the *Baltic*. He says:—"I was first engineer of the steamer *Baltic* up to the last of July, 1854, and assisted in putting up her engines and side propellers. I am satisfied by practical knowledge that it is the best application of power to the propulsion of boats ever made, and I believe she can run fourteen miles per hour, carrying five hundred tuns, and I believe four such engines and propellers placed upon a boat of same tunnage, built light and sharp, would run from twenty-five to thirty miles per hour. We find no difficulty in reversing the engines and propellers—they have stood the test in heavy gales, light and loaded without the least break or give. They steady and raise the boat and cause her to roll much less than paddle-wheels. The blades are well-protected and will not break by striking logs or drift-wood, as has been proven in the case of the steamer *Baltic's* wheels."

Further information may be obtained on application by letter, or otherwise, to Capt. H. Whitaker, the inventor, at Buffalo, N. Y., or to D. D. Deming, New York City. Models may be seen at either place.

The Rays of the Sun.

The inquiry by "Perdex," was made through the columns of the Scientific American Feb. 2nd: "Do the rays of the sun lose any of their caloric in passing through free space." A peculiar answer was given to it in the succeeding number by W. Partridge, as follows: "If the rays of the sun lose none of their caloric in passing through free space, any planet, however distant from the sun, possessing an atmosphere of equal density with ours, would be equally warm." Respecting the above inquiry, and the above conclusion of Mr. P., Albert Waldron, of Breakabeen, N. Y., says, "the light and heat of planets is according to the square of their distances from the sun.—The proportion of light and heat of planets in our system—the earth being 1—is, Mercury, 6 1-2; Venus, 2; Earth, 1; Mars, 1-2; Jupiter, 1-27; Neptune, 1-900. The rays of the sun do not lose their heat in passing through free space, because there is nothing to which they can impart any heat." These are the general views of scientific men.

C. E. Moore, of East Port, N. J., in answer to "Perdex," states that he has been up far above the clouds and found the sun to shine as hot as in the valleys. "Snow-capped mountains," he says, "are of a conical shape, and reflect the rays of the sun from their sides, leaving their tops exposed to cold, and they are very often covered with clouds, which obstruct the rays of the sun."

The idea relating to the reflection of the sun's rays from the sides of mountains, leads to the conclusion that all valleys—even those between snow capped mountains—must be very hot. W. H. Knight, of Norwich, N. Y., presents the same views as Mr. Waldron. Alluding to the rays of the sun diverging into space, and fewer of them reaching the distant than nigh planets, and also losing none of their caloric, he says, "distant planets cannot be as warm as nigh ones, unless the rays of the sun actually generate and accumulate heat and light in a geometrical ratio on their passages to distant planets."

Well, they cannot do this. This subject embraces the laws of transmitting heat from a heat generator (like a stove or grate) to other objects. There is something exceedingly subtle relating to the rays of heat. It is considered by astronomers that free space between the planets is at least 64° below zero, and yet the heat passing from the sun in rays through this cold space, is asserted to heat the earth and distant planets. We cannot give a satisfactory answer to the question "What is a ray of heat," but we know that it only warms a solid and opaque body that intercepts it. On page 2, Vol. 10, Scientific American, there is an illustrated article explaining the law of heat radiation.

Heat and Cold—Balls of Snow.

Since the publication of the article on the above subject, in the Scientific American of the 2nd inst., we have received a number of communications on the subject. One from T. Barrows, of Dedham, Mass., alluding to the intense cold of this winter, states that he never saw the sky so brilliant and clear by day and night before. He attributes the cause of the cold to the hundreds of thousands of tuns of powder which have been burned at Sevastopol, and other places, having put into circulation large quantities of nitrous gas. "If saltpeter and salammoniac," he says, "be put into a given quantity of water at 50° Fah., it will reduce its temperature 50°." He therefore concludes that the gases of the exploded gunpowder named have exerted a great cooling influence upon the atmosphere, both in Europe and America. On account of the pure cold air this winter, he is of opinion that cholera, yellow fever, and the potato rot will not be so prevalent during the present, as in former years.

W. H. Gardner, of ———, in a letter states that if electricity produces heat and cold, "we cannot tell how." That is true. He considers heat to be "the result of causes, and cold the original or first condition of matter." He is right about heat; but his theory of cold is not so good. He says "the tendency of all matter is to become cold; the atmosphere cools during night, and the human body when life leaves it. The earth, air, everything loses heat as soon as the producing causes are withdrawn. I believe, if the earth were deprived of internal causes of heat, it would become a frozen mass."

No doubt if the causes which produce heat were removed from our earth, it would become a frozen mass; but it would also become as hot as a furnace if the causes which produced cold were also removed. Heat is a natural condition of matter, and so is cold. Whatever we find in nature, heat, cold, or anything else, is a natural condition. What are the causes, that is the question?

A letter from E. W. Dean, of Norwich, Ct., gives an account of a curious formation of snow balls which took place on the 1st, in that part of the country, extending for the length of ten miles by one in breadth. There was a pretty solid body of snow on the ground, and on this there had fallen a lighter stratum.—This was the snow which was formed into snow balls varying from one inch up to fifteen in diameter. He believes this phenomenon was caused by a south wind, which blew violently for a short time, after the snow was slightly softened by it—the wind rolling the snow into balls on the ground. This is a pretty good explanation.

The Water Wheel Railroad.

We have received letters from two correspondents about the Italian water wheel, for traveling up the Alps, and carrying trains of cars to the summit, a project which we scouted, and said that such a stupid method as described by the London *Athenæum*, was, in all likelihood, not a correct account of the plan. Our correspondents assert that the thing can be done, and one states, that with a rope attached to the shaft of the wheel, and extending to a post at the head of the inclined plane, it is easy to see that the rope would be wound round the shaft, and thus draw the wheel up. In 1822, a boat was built to ascend the rapids at Trenton, N. J., on this principle of action, for towing the "Derham boats" up the falls. He says the water wheel boat could take two or three boats up with it, but it was "abandoned for want of patronage." The other correspondent maintains that the thing can be done, and that he can run up Niagara's falls with a boat if the rails could be fixed to hold the wheel.

It is well known that a body can be moved in a contrary direction to that of the power which propels or drives it; and force is often applied in this manner, which is a totally different principle from moving a body directly against and thereby overcoming the power which drives it. There are mechanical vagaries, and the Alpine railroad water wheel is no doubt a dazzling display of such. The making of the wheel travel to the top of the incline, thereby involving a constant decrease of the propelling power as it ascends, while the resistance is constant, is a *bright* idea, in comparison with employing the whole power of the water constantly, as we pointed out, by a stationary wheel. The climbing water wheel, on its cog rails, would have a fine time of it descending the incline. This action it would have to perform for the amusement of spectators, not for profit to its owners.

Incrustations in Steam Boilers; and Hydraulics and Power of Water.

Articles on these subjects will appear in the next number of the Scientific American.

Scientific American.

NEW-YORK, FEBRUARY 23, 1856.

The Patent Laws—their defects and remedies.—Highly important reforms proposed.

In accordance with an intimation sometime ago expressed, we herewith present, for the consideration of our readers, the draft of a Bill embodying some very important changes in the Patent Laws. It is proposed to endeavor to obtain the action of Congress upon the subject, during the present session.

This Bill is far from containing all of the reforms and alterations that, in our opinion, are needful for the establishment of a healthy patent system; still, it embodies all that, in our judgment, ought, at the present time, to be attempted. Whatever of excellence there is in our existing laws, was obtained, not by the passage of one single sweeping reformatory enactment, but rather by the adoption of a very few new laws at one time. A sufficient period was always allowed to elapse between the introduction of every new plan and the advent of further innovation, to make it certain that the previous legislation was correct Let us continue to follow out this good example, making, gradually, change after change, until the whole system, renewed and revised, becomes as vigorous and perfect as it is possible for human wisdom to render it.

The most prominent changes contemplated in the annexed Bill are as follows:—

The separation of the Patent Office from the control and influence of other governmental departments. Heretofore the Patent Office has been more or less supervised and governed by outsiders. It has always been furnished with a nominal chief officer, who, becoming fully acquainted with its necessities and operations, ought, of course, to be allowed to be the proper judge and regulator of its affairs But such has not been the case. The Secretary of the Interior is, at present, by law, made the close guardian of the Patent Office, and of the Commissioner of Patents. In past numbers of our paper we have shown the great injury that inventors have suffered from this miserable connection. Let us tear it asunder at once, and erect the Patent Office into a bureau of itself, independent of all others.

The next reform embodied in this bill is contained in Section 4, and is intended to give additional security to patent property. It provides that a patent, once granted, shall not be disturbed by the claims of a new applicant, unless the latter makes himself known within the reasonable period of six months.

The present laws require the Commissioner of Patents, even after an application has passed safely through the rigorous examination demanded by law, and has been duly issued, *to grant*, on request, *a second patent for the same invention*! The new applicants are only required to prove that they invented the same thing a week, a month, or any length of time before the original patentee. Thus it has happened that a poor inventor, deluded with the idea that his patent possessed some value because regularly issued, has, within a few years after obtaining his patent, managed to establish himself comfortably in the manufacture of the patented article. In the midst of prosperity, his operations have been suddenly knocked in the head by the grant of a new patent for his improvement to subsequent applicants; and by a warrant of injunction from the courts, which cannot be disregarded, his liberty to use the grant for which he had paid the government is wholly taken away. These new claimants seize upon and carry off the fruit of his toil, leaving him ruined and cast down, without remedy.

In such cases the government not only sets a high premium upon knavery and indolence, but actually punishes the inventor who uses diligence to secure a patent and hastens to introduce his discovery to the world. Laws of this kind have a very discouraging and depressing effect upon inventors, while they seriously impair the value of patent property.—The extent and nature of this evil is, we observe, quite fully discussed by the Commissioner of Patents, in his annual report, published in another column

The fifth section of this act reduces the patent fees to foreigners, and invites the people of all nations to visit our shores, and spread abroad among our millions a full knowledge of their new arts. We shall not waste words in refuting the selfish doctrines of exclusionists, who seek to drive strangers away, and to innoculate our patent system with sprouts of Chinese or Japanese eccentricities. Inventions are but the representatives of knowledge.—Does the poor scholar stand less chance of education to-day than fifty years ago, because schools and colleges have increased in number? Does the poor inventor stand less chance of success, to-day, in consequence of the great number of existing patents, than he did fifty years ago, when patents were uncommon?—Certainly not. On the contrary, our own observation, and positive knowledge, leads us to assert that an increase of inventions has always tended to the direct benefit of inventors. Such will always be the case. Away, then. with all restrictions that tend to prevent our country from becoming the great depository of knowledge and art.

The remaining sections of the bill propose the reduction of the caveat fee so that inventors may obtain a preliminary security for their inventions on more moderate terms than are now admitted. Some other minor items of reform are also set forth.

We call the attention of inventors, and all who are interested in patents, to this document. We shall be happy to receive suggestions of additions or arguments against the measures proposed, from every quarter of the land. We invite the closest scrutiny. It is our earnest desire to provoke discussion on the subject, and to bring to bear upon it the light of as many minds as possible. In this way only may we expect to arrive at a reform which shall be a true one, and therefore permanent.

A BILL

To Amend the Several Acts now in force in Relation to the Patent Office.

SECTION 1ST—*Be it enacted by the Senate and House of Representatives in Congress assembled*, That from and after the passage of this act the chief officer of the Patent Office shall be known and designated as the Superintendent of Patents, in lieu of Commissioner of Patents, which latter office is hereby abolished. All the powers and duties heretofore exercised by the Commissioner of Patents shall, in future, be exercised by the Superintendent of Patents.

SEC. 2ND—*And be it further enacted*, That all control heretofore exercised over the Patent Office by the Secretary of the Interior shall cease, and the Superintendent of Patents, in addition to his present powers and duties, shall have and exercise all those which have heretofore devolved upon the Secretary of the Interior in connection with the Patent Office.

SEC. 3RD—*And be it further enacted*, That the salary of the Superintendent of Patents shall be the same as that of the Superintendent of the Coast Survey.

SEC. 4TH—*And be it further enacted*, That the law rendering it the duty of the Superintendent of Patents to declare interference between any unexpired patent and any new application for a patent, and to issue a patent to the new applicant on the production of satisfactory proof of priority, shall, in future, only be applicable to such unexpired patents as were granted within six months next preceding any new interfering application for a patent. But if it shall appear that the invention described by the new applicant had been caveated by him, prior to the time of granting any unexpired patent, then it shall be the duty of the Superintendent of Patents, on request, to declare an interference in the usual manner, and on the production of satisfactory proof of priority, to issue a patent to the new applicant.

SEC. 5TH—*And be it further enacted*, That the right to apply for any patent, design, or re-issue, shall be enjoyed equally by citizens and aliens, and the fees required of aliens shall be the same as required of citizens of the United States.

SEC. 6TH—*And be it further enacted*, That in future the duty for a caveat shall be ten dollars, no part of which sum shall apply towards the subsequent payment of the patent fee. The duty for a design patent shall, in future be ten dollars. The law requiring the return of a portion of the duty in case of the rejection of an application for a patent, is hereby repealed.

SEC. 7TH—*And be it further enacted*, That the Superintendent of Patents is authorized to restore to the respective applicants, or otherwise dispose of such models belonging to existing design patents as he shall think unnecessary to be preserved. He is further authorized to dispense, in future, with models of designs where the design can be sufficiently represented by drawings.

SEC. 8TH—*And be it further enacted*, That the authority vested in the Superintendent of Patents for the collection of agricultural statistics and other agricultural purposes, be, and the same is hereby transferred to the Secretary of the Interior. The tenth section of the act of 1837, (relating to agents for models,) is hereby repealed.

SEC. 9TH—*And be it further enacted*, That all acts and parts of acts heretofore passed which are inconsistent with the provisions of this act, be, and the same are, hereby repealed.

Report of the Commissioner of Patents.

The regular annual report of the Commissioner of Patents, to Congress, has made its appearance, and will be found in another column of this paper. It is a most able document, exhibiting throughout the same remarkable perspicuity, terseness, and vigor which so essentially characterize all the writings and habits of the author, and which he so successfully manages to infuse into the officers and affairs of the Patent Office.

It will be observed that the business of the Patent Office, during the past year, has, by far, exceeded the transactions of any previous twelvemonths. The total applications made for patents in 1855 reached the enormous number of 4,435 cases, which was more than one thousand greater than the year before, and more than double the number applied for in 1850. Notwithstanding this extraordinary increase, the business of the Patent Office, under the wise administration of Judge Mason, has been conducted with a rapidity and precision that is truly wonderful. On the first of January, 1856, there were only 66 applications remaining on hand undisposed of. When the Commissioner came into power in 1852, there were nearly one thousand applications remaining on hand in arrears, and the department was exceedingly disordered and confused.—Applicants for patents were generally obliged to wait from four to twelve months, and sometimes longer, before an official decision could be had. At present the inventor suffers no delay. Within a month after his case is presented at Washington, the result is made known.

A large portion of the Commissioner's report is devoted to a discussion of some of the existing evils of our Patent system, and of the changes needed to meet the circumstances.—The Commissioner displays a most thorough knowledge of the whole subject, and presents a number of important and truly practical suggestions. The right of inventors to property in patents, and their right to demand and receive legal protection in that property, is set forth in a most masterly manner. The folly of the existing regulation, which imposes a very high tax on foreign inventors, and thus drives them away from the country, is clearly stated.

Our limited space prevents us from making further comments upon the report. We commend it to the attention of our readers, trusting that they will carefully read and inwardly digest the valuable information which it contains.

Ohio against the Woodworth Monopoly.

CLEVELAND, Feb. 8, 1856.

MESSRS. EDITORS,—I am very happy to inform you that Ohio is ahead in opposing the further extension of the Woodworth monopoly, and that you may see what is doing I enclose you the report made by C. B. Giffin, Special Committee, and also the resolution which was adopted by the Legislature by an overwhelming majority.

While at your office in December last, I informed you that the citizens of this State were fully aroused to the necessity of putting an effectual extinguisher upon this odious and oppressive monopoly.

The remonstrances in circulation are filling up with the names of our best citizens; in fact, almost the whole community will give their names, if an opportunity is only afforded them to do so.

Your St. Louis correspondent expresses great fears for Ohio. Let the citizens of other States follow our example, and the monster monopoly will be effectually slain.

Mr. Cartter, chairman of the committee on patents in the House of Representatives, author of the famous adverse report of 1851-2, considers it impossible, in view of all the facts, to procure a further extension of this patent.

Yours truly, CHARLES L. SHEPARD.

THE RESOLUTION PASSED BY THE OHIO LEGISLATURE.

"WHEREAS, we believe the object of our present Patent Laws to be protection to the inventor, and not the establishment of a monopoly that may tax the industrial pursuits of the country at pleasure; and whereas, we believe the renewal a second time of the patent on Woodworth's Planing Machine would violate the spirit and design of all our laws relating to patents, and fix an unjust and oppressive tax on mechanical pursuits of the country, therefore,

Resolved, by the General Assembly of the State of Ohio, That our Senators in Congress be instructed, and our Representatives in Congress requested, to resist, by all honorable means in their power, the renewal of said patent upon the application of William W. Woodworth, or any other person or persons in his behalf."

Referred to C. B. Giffin.

[We hope this resolution will be adopted by every state legislature now in session. The time for action has arrived. Let the sovereign seal of public indignation against this monster be firmly and eloquently expressed everywhere, and let the remonstrances be sent to Congress without delay.

The following Representatives have been appointed by Speaker Banks as a Committee on Patents:—E. B. Morgan, N. Y.; C. C. Chaffee, Mass.; S. A. Smith, Tenn.; R. T Paine, N. C., and J. R. Emrie, Ohio.

These are believed to be upright men, who will act honestly in the matter. All they require is the firm expression of public opinion against the scheme of the memorialist, and there will be no need of apprehension that the extension will be granted. Send on the remonstrances, and if more blanks are wanted we will supply them.

Recent American Patents.

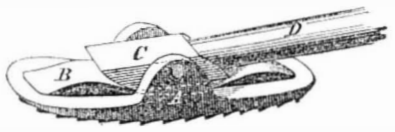
Improvement in the Mariner's Compass.—By John Prime, of Washington, N. C.—Singular as it may appear, there has always been more or less difficulty in rendering the box in which the compass is placed water-proof, and some disadvantages are the result. During a storm the rain sometimes settles on the face of the glass which protects the compass, and afterwards finds its way down into the box. Here it slowly evaporates, when dry weather comes, and deposits in the shape of moisture on the underside of the glass, thus obscuring the compass from the eye of the helmsman, leaving stains, &c. The present improvement consists in placing an oval lid or cover composed wholly of glass upon the compass box, the lid having ledges, like any common box cover. To allow for the atmospheric expansion and contraction of the compass box there is a ring of rubber placed between the cover and the box.

Improvement in Condensing Steam Engines—By Birdsill Holly, of Senecca Falls, N. Y.—All of the condensing steam engines now in use are provided with a condensing chamber into which the exhaust steam is introduced and condensed, by contact with jets of cold water. An air pump is employed for keeping up a constant vacuum in the condenser, and also for conveying the water resulting from the condensation into the hot well. The condensing apparatus, taken altogether, is quite expensive, and uses up a considerable portion of the power of the engine. The present improvement consists in dispensing with the air pump and condenser, and in connecting the exhaust or eduction pipes with the boiler feed pipes.

The steam will thus be exhausted by vacuum, as before, will be condensed by contact with the feed water, and pass onward into the

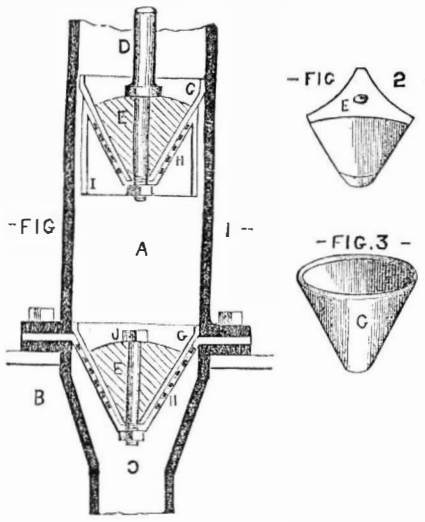
boiler. This plan effects an important economy in fuel, for the whole heat of the exhaust steam is imparted to the feed water, while the water of the boiler is used over and over. The invention is not claimed as a substitute for the condenser in the larger kinds of engines. It is particularly applicable to steam pumps or pumping engines, for feeding boilers and other purposes, and when applied to boiler feeders it condenses every particle of the steam used to drive the pump, and returns it to the boiler, giving the whole of its caloric to the feed water.

Improved Peg Cutter—By Samuel R. Jones, of York, Penn.—This improvment is illustrated in the annexed cut. It consists in the application of a wave-shaped spring, B, to the



top of an ordinary peg cutter, A. The handle is shown at D, terminating in a double lever end, C, which is pivoted to the cutter as shown. The spring causes the cutter to lay flat or closely hug the surface of leather to which it is applied, no matter what the position of the handle may be, so that all parts of the inside of a boot or shoe, toe and heel included, can be cleaned out with perfect facility. The inventor is also enabled to adopt the rasp form of teeth on the cutter, which is superior to the saw shape or grooves. This contrivance reduces the pegs and elevations caused by awl holes, simultaneously, leaving the inside of the boot free and smooth for the foot.

Improvement in Pumps—By Joseph Weis, of Bordentown, N. J.—This invention consists in a peculiar form of valve, whereby all hinging and flapping is done away with, and greater durability, with other advantages, secured.



In our engraving, A is a portion of the barrel of the pump, C the suction pipe. I is a light cylindrical piece of metal, somewhat less in diameter than the bore of the pump, to this cylinder is secured a perforated metal cone, H, inside which is placed a cone-shaped piece, G, of leather, gutta percha, india rubber, felt, or other similar substance, fig. 3. The cone, G, is so arranged that its upper edge shall fit the bore of the barrel, A; inside the cone is placed a three-winged wedge, E, fig. 2, and through this wedge is bolted the end of the pump rod, D, in such a manner as to secure the cylinder, I, perforated cone, H, elastic cone, G, and wedge, E, together. The above forms the bucket of the pump. The valve is constructed in nearly a similar manner, the perforated cone being secured between the flange of the barrel and that of the suction pipe, and the wedge and elastic cone attached to the perforated cone by an ordinary bolt.

On the descent of the bucket, the water in the barrel passes through the perforations in the cone, H, and through the circular space between the barrel and cylinder, I, causing the elastic cone, G, to collapse into the spaces between the wings of the block, E, and allowing a free passage for the water to the upper portion of the barrel. Immediately on the bucket being raised, however, the elastic cone instantly recovers itself, and pressing against the sides of the barrel, prevents the return of the water, and at the same time becomes a bucket of the most efficient kind. The action of the elastic cone in the lower valve is similar to that of the upper bucket. The above invention is applicable to every description of pump, either for common lifting purposes, or for forcing against the heaviest head of water.

Tongueing and Grooving Machine.—By B. J. Barber, of Ballston Spa, N. Y.—This improvement is designed for the tongueing and grooving of lumber of irregular widths. At present, in order to tongue and groove boards by machinery it is necessary to reduce them all to the same width. If a board is wider at one end than at the other it must be cut to an equal width throughout. In sawing logs into boards there is always a good deal of waste in trimming the timber down to the right dimensions. The present invention consists in making the feed table of the machine adjustable, so that it will rise or fall, according to the form of the stuff to be tongued. This permits the feeding in and working of boards that are larger at one end than at the other, with perfect facility. In western countries and localities where every foot of lumber saved is an object gained, this improvement will prove of much value.

Improvement in Looms.—By Elijah Hall, of Rochester, N. Y.—This invention consists in certain means by which the reed is secured rigidly in the lay at the time of beating up the filling, and also during the whole time that should be occupied by the flight of the shuttle; but from the time when the shuttle should have entered the shuttle box till the lay has nearly arrived at the end of its forward movement, the reed is liberated to such an extent that it will afterwards liberate itself entirely and swing back if the shuttle should be obstructed or fail to pass entirely through the warp. All injury to the cloth, which would otherwise occur, is entirely prevented. This improvement is designed to take the place of the protector in common looms, and to enable the loom to work faster than at present.

Recent Foreign Inventions.

Improved Process of Engraving.—The following described process is condensed from a description in the London *Mechanic's Magazine.* The inventor, M. G. Devincenzi, of London, has devoted himself for several years to the art of producing engraved surfaces for printing and embossing, and has taken out two patents. The process has been submitted to a committee of Becquerel, Chevreul, and Seguier, eminent men of the Academy of Sciences, Paris, who have reported on it favorably.

The metal best adapted for this kind of engraving is zinc. It is employed in thin plates which are ground with sifted sand, and the design is made on it with ink and the lithographic crayon. The design being executed, the plate is prepared as if it were to be used for lithographic drawing. For this purpose it is steeped for a minute in a decoction of nutgalls, washed with pure water, and covered with a weak solution of gum arabic. The plate is then moistened with a sponge, the design is effaced with turpentine, and a lithographic cylinder covered with a varnish is rolled over it. The varnish accurately covers all lines made by the designer. The varnish should have the following qualities:—1. Of not injuring the design. 2. Of adhering strongly to the plate. 3. Of not being attacked by the chemical agents employed for engraving.

The varnish well known as "Brunswick black," mixed with essence of lavender, is preferable to all others. This varnish is composed of asphalte, boiled linseed oil, litharge, and turpentine. When the varnish is dry, the zinc plate is put in communication with a copper plate at the distance of 05 of an inch, after which they are steeped in a solution of sulphate of copper marking 15 degrees; a voltaic pair is thus formed; the sulphuric acid resulting from the decomposition of the sulphate of copper dissolves all the parts of the zinc which are not covered. More or less depth is given to the engraving, according to the kind of design. Crayon designs are generally engraved in four or five minutes, and those with the pen in six or seven minutes. Sulphate of copper does not produce any alteration in the most delicate drawings, and does not act on the varnish.

This method of engraving may be applied to all the other processes, by means of which a design may be reproduced, such as to draw on paper and afterwards transfer the designs to plates. The impressions of lithographic stones, copper, and steel plates, may be transferred. By this method it will not be difficult to transfer from an old impression on to metallic plates, and thus obtain other stereotypes of old books.

Regulating Safety Valves and Dampers of Steam Boilers—S. Smith, of London, patentee. The nature of this invention consists in having the steam in the boiler press on one surface of a column in a bent tube, which is fixed at one end to the boiler. The other end of the bent pipe is attached to a pressure gauge consisting of a hollow chamber, which is divided by a flexible partition or diaphragm of thin steel, above which a stem is placed, the upper end of which, when it is raised beyond a certain point, acts on the lever of the safety valve and lifts it, and in like manner, either by a cord or wire, the pressure gauge gives motion to the damper, so as to close it more and more as the pressure of the steam in the boiler acts more on the diaphragm of the pressure gauge, which diaphragm is resisted externally by a coiled spring.

The Cotton Culture of Europe, Africa, and America.

In the kingdom of Naples and the islands of Sicily abont 4,2000,000 pounds of cotton are raised annually, and it is said that attempts are about to be made by a Mr. Clegg, from England, to cultivate it more extensively in Sicily. The consumption of cotton in Great Britain amounts to about 915,200,000 pounds annually, most of which is obtained from America. Various attempts have been made by Manchester merchants to obtain an adequate supply from India, but hitherto, all these efforts have failed of success. The French government has also endeavored to make Algeria a cotton-growing country; they, also, have failed of success. The Hon. Wm. Elliott, of South Carolina, Commissioner to the Paris Exhibition, paid great attention to the Algerian cotton culture, and made a report to Governor Adams on the subject. In commenting upon this report the Charleston *Mercury* says:—

"It has been our duty, in the course of the last twelve years, to examine more than one project for supplanting the cotton of the Southern States in the markets of Europe. It is remarkable that all these projects have proceeded on one fundamental idea, that if cotton of a given quality can be produced in any region, then the product of the United States can be dispensed with. On this idea, twenty years of experiment and failure have signalized the desire of British manufacturers to escape their dependence on American cultivators.

Their premises were wrong. Cotton can be produced everywhere in the warm regions of the world. But it can be produced *profitably* only where the soil, climate, and organization of labor give to its cultivation peculiar advantages. Hence we have always attached but little consequence to what are called "successful experiments" in cotton culture.

Among these experiments the most systematic and formidable are those of the French Government, the most intelligent government in the world in directing scientific and economical experiments, in which it has been engaged for fourteen years in stimulating the culture of cotton in Algeria. They started with the advantage of all the experience of the United States in their possession. They obtained our most choice seeds, and our most perfect modes of culture. With this knowledge they commenced the growth of cotton in Algeria. They have stimulated it by not only the smile of government favor, but by enormous premiums. On these terms they have succeeded in forcing a very considerable product of cotton in Algeria.

But the actual price at which Algerian cotton is furnished to the French manufacturers is a sufficient commentary on this long, favorable, and anxious experiment. Orleans cotton is furnished at the price of 45 cts. per lb., and fine Sea Island at $1·30. This is the present state of the competition between the United States and Algeria."

This price is four times higher than that of American cotton. Algerian cotton thus far, therefore, has been an expensive experiment.

A Great Steamship.

The new steamer *Persia*, which recently arrived at this port, as noticed by us last week, is the largest mail steamship at present afloat, being 60 feet longer than the famous *Great Britain.* She is the first iron ship built by the Cunard Co. Line for a Royal Mail packet. The rule which was in force a few years ago, by the British Government, against the use of iron steamers, has been abrogated. She is of tremendous length, being 390 feet from figure-head to traffail, and 360 feet in the water. Her extreme breadth across paddle boxes is 71 feet; hull 45 feet; depth 32 feet. Her paddle wheels are no less than 40 feet in diameter, the greatest of any steamship in service, but two feet less than those designed for the *Vanderbilt* (now getting in her machinery at the Allaire Works.) The *Persia* was built from stem to stern, and completed throughout, at the engineering works of Robert Napier, in Glasgow, Scotland. She was launched on the 3rd of July last, and made her trial trip on the 8th of last month. Her registered tunnage is 3,500 tuns, but she is over 5,400 tuns burden. Her hull is of immense strength; the iron plates of her bottom are nearly an inch thick; and her ribs are ten inches deep, with double angle irons at their outer and inner edges.—She is built on the life-boat principle, being divided into seven water-tight compartments.

Her engines are of the old side lever kind (walking beams working upward,) the same as are employed on all the Cunard steamers. The steam cylinders are 8 feet 4 inches in diameter; the stroke of piston is 10 feet. There are eight tubular boilers fired amid-ships from 40 furnaces; and she has also two Donkey engines, for feeding them. The engines are stated to be of 1200 horse power; but her engineers use the divisor 44,000 lbs. to estimate a horse power.

The decorations of the great saloon are rich especially in very beautiful paintings in the panneling, executed by D. McCalman, Glasgow, on polished slate—an art of the same nature as fresco painting—which we would like to see introduced into our country.

(For the Scientific American.)

Corn Stalk Cutter.

Your correspondent "Farmer" asks for a Corn Stalk Cutter, simple in construction, durable, and effective. We have in use a home-made one of our own invention, which would, no doubt, meet his wishes. With a two-horse power we can cut and grind in one day corn fodder sufficient for our stock of thirty-five cows, for at least two weeks. The corn stalks, after the process, are reduced almost to the fineness of chaff, and the cattle eat the whole of the products when mixed with three quarts of meal each per diem, and they keep in good condition with no other food.

Our machine consists of a wooden wheel (iron would be preferable) three feet in diameter, with two knives attached to the side, equi-distant from each other, and terminating at the rim. The fodder is fed to the machine at right angles to the face of the wheel, but below a horizontal line from the shaft, so that the knives cut with a drawing motion, thereby requiring less power. The cut fodder falls into a funnel-shaped box, at the lower end of which is a wooden cylinder set with teeth projecting 1-4 of an inch, and revolving as near as possible to a steel plate, firmly fixed parallel to the cylinder; this cylinder is driven from a pulley on the end of the shaft of the wheel above. The fodder as it comes from the cutter is thus rasped into small pieces, and even the outside of the stalk is rendered soft and digestible.

If such a machine is patentable, perhaps we might make the fortune out of it that "Farmer" predicts, for it certainly does better work than any machine for the like purpose we have been able to obtain, and we have tried several kinds, all of which were unsatisfactory.

"Farmer" is welcome to make a machine from our pattern, the cost of which was about $15, and if well made we will guarantee he will be perfectly satisfied. There will be no danger of its getting out of "kilter," and the tallest kind of corn that grows in the We st can be "chawed up" quite as readily as the "suckers" that grow in these parts.

M. & C. Painter.

Owing's Mills, Md., Jan. 26, 1855

TO CORRESPONDENTS.

F. C. M., of Mass.—Arranging car brakes in such a manner as to bring them to bear when the bumpers come together, as the train begins to slacken, is not new. It has often been proposed to us. Without some convenient shifting arrangement the train could not be backed when required.

M. C. F., of Ohio—The employment of one loose wheel on a railway axle, so as to avoid danger of breakage when turning curves is not new. There are more than 20 inventors of it.

W. P. G., of N. H.—The Commissioner of Patents has no power to annul an existing patent. He can order an interference between an existing patent and a pending application for a patent for the same invention, and require testimony from each party, in order to substantiate the question of prior invention. If the applicant for the pending case can prove priority of invention, the Commissioner exercises the right to grant the second patent. The evidence produced in the interference would confer a prima facie right of invention upon the successful party.

A. H. G., of C. W.—There is nothing patentable in your eccentric movement. Friction rollers have been applied to cams in various ways, sometimes in pairs with compensating arrangement. The use of atmospheric counterbalances is old. They have been applied to act by compressing the air, and by producing a partial vacuum.

R. R., of N. Y.—The vibrating harrow is new in its arrangement. A principle is not patentable, but a contrivance is.

E. N. P., of N. H.—The arrangement proposed by you for preventing cars from running off the track is new in minor particulars, but we do not see how it can be carried into use with the present arrangement of switches and cross tracks.

D. T., of N. S.—Your method for obtaining the center of circles is very good,

H. P. T., of Mass.—Copal varnish is used for mahogany. You can purchase it ready made in any quantity at paint stores.

G. N. F., of Pa.—Could you not use catechu as part of the tanning material. Lime water gives the bark a yellowish red color. We have had a number of inquiries like yours.

E. B. F., of Ill.—The tread of a railroad wheel is coned for the very purpose you suggest,

L. R., of N. Y.—The power was applied to steam carriages on common roads by the rods being connected to cranks on the axle. We do not know what you mean by "the friction of the wheels applied to draw the carriage." How can friction propel a carriage when it is caused by the force propelling the carriage.

W. J. P., of Wis.—At present we do not know where you can obtain good yellow and vermillion smalts.

T. J., of Va.—Give us the number of cogs in your wheels and pinions, and then we can tell you the speed of the attached shafts.

J. H. W., of N. Y.—Your combination of the wind mill and steam engine is not patentable, because they do not necessarily belong to each other. You simply use the boilers of the steam engine to compress air by the windmill.

E. A., of Mass.—Whitewash is a solution of lime, but all the lime in it is not held in solution by the water; it only takes up a small portion of it.

J. McD., of Mich.—You can make your wheel of the form proposed to run submerged in water, but it will be just as well for you to use any of the common improved turbine wheels. It will require 1308 cubic feet of water per minute to give you twelve actual horse power. A third above the theoretic quantity is counted.

J. L. F., of Me.—We should not desire to become custodians of correspondence between yourself and those illustrious personages the Emperor of France and Russia, and His Royal Highness Prince Albert. Your safest channel of communication will be through the United States Legations.

C. C. T., of Wis.—Your request came too late; the edition was all published before your letter came to hand. There has not been sufficient published, however, to prevent your taking patents in foreign countries, or to invalidate such patents as have been secured.

P. S., of C. W.—In the construction of the proposed tunnel under the English Channel from Dover to Calais, it is intended to employ iron tubing similar to the plan suggested by you. We do not see any chance whatever for patentable claims upon it.

B F. Rea, of Lafayette, Ala.—Desires to procure the best rice hulling machine in use.

W. W. G., of Va.—It is necessary to have assignments of patents recorded in the Patent Office at Washington within three months after their execution.

A. T. B., of Me.—We are not in the habit of giving certificates as to the practical value of inventions, all we say of them is published through the Sci. Am. If we should give a certificate in one case it would establish a precedent for us to give more, and such calls would become numerous. You will see upon reflection that we could not undertake to do this without involving us in trouble.

D. L., of N. J.—You are mistaken respecting the comparison of the water wheel railroad and the wind mill boat. With regard to the boat the resistance was constant, and equal to the power; but on the water wheel railroad of sixty feet incline, the power of the water is continually diminishing on the wheel as it ascends, but not the resistance.

J H. W., of Me.—By reference to No. 15, this Vol. Sci. Am., you will find a notice of Prof. Gillespie's recent work on surveying, which is the best work of the kind with which we are acquainted.

W. T. C., of N. Y.—We do not know of any publication that treats especially upon stone work, statuary, carving, &c.

P. P., of N. Y.—A rotary blower constructed upon the principle of a propeller, would not embrace the subject matter of a patent. It would not be regarded as novel.

J. P. F., of Ind.—We fully understand the sketch of your alleged improvement in rotary engines. We do not consider it as possessing novelty or utility sufficient to justify an application for letters patent. We have had sketches of rotaries in our hands which presented essentially the same arrangement.

V. C., J., of Mich.—Herring's work on paper making is an English publication. We saw it noticed in the London *Atheneum*, but do not know where it can be procured.

G. M., of Wis.—Any lawyer in your town can prepare an assignment to convey back a patent right. We have not a copy of the patent laws to send you. We are entirely out, and do not intend to publish another edition until there is some decision about amending the law during this Session of Congress.

M. W. Jenkins, of Jonesboro, Ala.—Wishes to procure the best lathe for turning wagon spokes. Also the best boring and mortising machine. Will some of our readers please to inform Mr. Jenkins on the subject.

J. & Z., of Va.—Tubular axles and spokes for carriages are not new. There would be no chance for you whatever to procure a patent on them.

J. S. B., of Ill.—The very best way to keep the water in a steam boiler agitated, is to have the feed pump going continually; and be careful in trying the valves and cocks when heating up and working. The Woodworth people assert that Fay's machine is an infringement of their patent, but we are not acquainted with any decision in their favor.

G. K., of Mass.—We are not acquainted with the merits of Clark's water indicator for steam boilers, as made by Messrs. Whiting & Co.

Money received at the Scientific American Office on account of Patent Office business for the week ending Saturday, Feb. 13, 1856:—

S. H., of Texas, $30; S. & B., of N. J., $60; J. C., of Mo., $35; J. G. McM., of N. Y., $25; H. B., of N. Y., $400; A. M., of N. Y., $50; J. G., of N. H., $25; H. & A., of Mass., $25; S. H. P., of Conn., $25: A. E. C., of Pa., $20; S. & B., of Pa., $25; S. G., of Pa., $30; H. A. C., of Mass., $30; W. S. G., of N. Y., $30; W. B. G., of N. Y., $30; R. A., of O., $25; I. C. G., of N. J., $10: T. B. W., of Pa., $25; W. D. M., of La., $30; M. & J. H. B. & Co., of of N. H., $30; J. M., of Pa., $130; S. H. of Ia., $25; D. H. T., of Mass., $25; C & P., of N. Y., $125; C. W. P., of N. J., $25; T. J. P., of Ill., $30; W. S., of Iowa, $25; A. G., of Ill., $30; J. C. G., of O., $12.43; W. M., of N. Y., $15.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, Feb. 16:—

S. H. P., of Ct.; A. E. C., of Pa.; J. H. W., Jr., Tenn.; J. G., of N. H. H. & A., of Mass.; S. & B., of Pa.; J. G. McM., of N. Y.; M. B., of L. I.; D. H. T., of Mass.; J. C. G., of N. J W. M., of N. Y.; S. H., of Ind.; C. L., of Cal.; A. W., of N. Y.; G. & H., of N Y.; T. B. W., of Pa.; J. M., of Pa.; C. W. P., of N. J. W. S., of Iowa; R. A., of O J. B. E., of Ia.

Important Items.

Back Numbers Volume XI—We are no longer able to supply complete sets of the present volume. The numbers which are entirely exhausted are 6, 12, 14, 15, 17, and 19. Any other numbers up to the present we are able to supply to any who may wish them. Those who order the back numbers from the commencement of the volume will receive such as we have, and their subscription will be entered up enough longer to compensate for the numbers which we are unable to supply.

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.

Science and Art.

Copper; its Nature; Babbitt Metal.

Many persons suppose that those bearings for the shafts of locomotives, and heavy machinery, which are generally called "Babbitt metal," embrace a peculiar patent alloy. This is not so; the name is incorrect. The patent is not for the metal or composition of the boxes, but the method of making them. They are composed of a hard case or shell, such as iron, and are lined with a soft metal which forms the shaft bearing. The hard shell or case prevents the soft metal from being squeezed out by the pressure of the journal. Such boxes, by the use of the soft metal bearings, such as composition of lead, tin, and copper, cause less friction than if the bearings were of harder metal. We have been given to understand that such boxes were employed in the Staten Island Print Works in 1833.

An eloquent writer, one apparently well acquainted with his subject, thus describes the nature of copper, in a recent number of the *North British Review*:—

"Let any one who has a slide lathe at command—furnished with drills, and the other usual appliances—try his hand, for example, on a mass of copper. How queer a temperature does this metal show when you would apply tools to its idiosyncrasy; try to drill it; try to file it; try to cut it; try to plane; try to planish; roll it out, or stretch it over a mandril. These things—all of them—may indeed be done; but with what care and choice of means are they to be effected. In one case you must soothe the surface with oil, or with tallow and wax; in another, the least smear of oil causes it to "buckle up," and all is spoilt. Under one operation, a bathing with milk is good; in another, a touch of the workman's saliva is more effective than anything else.—The tool you apply to it must be neither hard nor soft beyond the limits of straw tempering. But now anneal it; how kindly, after coming forth from the furnace, does it yield itself to the workman's will, but if you indiscreetly strike it with a hammer for a few times only, then, and as in an instant, you find that the molecular constitution of the entire mass has undergone an instantaneous transformation, and it has become sonorous, elastic, non-plastic."

In the two articles on "Copper and its uses," which have appeared in our columns, we would correct the word *many* in the first article alluding to the ores of our country sent to Swansea, and substitute the word *some*. We know that very little of our copper ores go to England; almost all are smelted at home. The mining of copper and its ores is very toilsome and expensive. Blasting is out of the question in pure copper lodes, and the ore rock is exceedingly hard to penetrate.—Copper will always be a dear metal, unless some great improvements in the art of mining be discovered.

Important about Milk.

The *Western Agriculturist* contains the following, which appears to be useful and sound experimental knowledge relating to milk:—

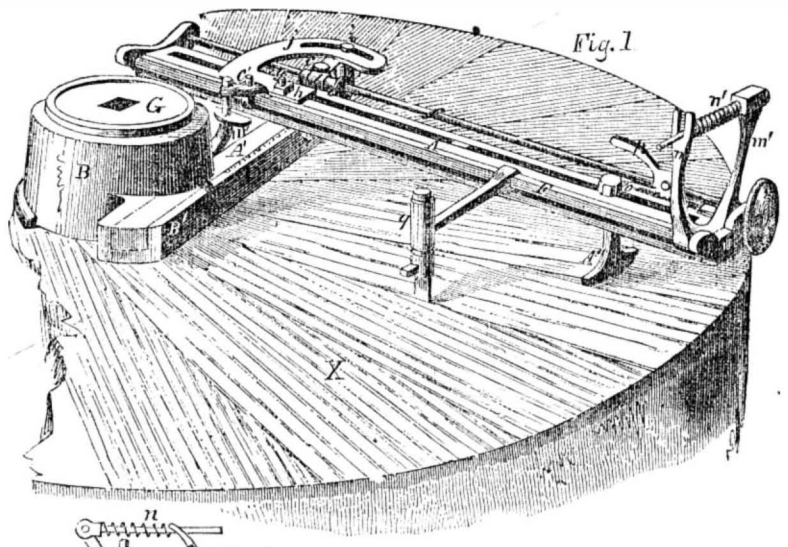
"Cream cannot rise through a great depth of milk. If, therefore, milk is desired to retain its cream for a time, it should be put into a deep, narrow dish; and if it be desired to free it most completely of cream, it should be poured into a broad, flat dish, not much exceeding one inch in depth. The evolution of cream is facilitated by a rise, and retarded by a depression of temperature. At the usual temperature—50 deg. Fah.—all the cream will probably rise in thirty-six hours, but at 70 deg. it will, perhaps, rise in half that time; and when the milk is kept near the freezing point the cream will rise very slowly, because it becomes solidified. In wet and cold weather the milk is less rich than in dry and warm, and on this account more cheese is obtained in cold than in warm, though not in thundery weather. The season has its effects. The milk in spring is supposed to be the best for drinking, hence it would be the best for calves; in summer it best suited for cheese; and in autumn the butter for keeping is better than that of summer; the cows being less frequently milked give richer milk, and consequently more butter. The morning's milk is richer than the evening's. The last drawn milk of each milking, at all times and seasons, is richer than the first drawn."

Telegraph for Preventing Collisions.

The Montreal *Pilot* states that Mr. McLaughlin, of Quebec, has invented an instrument by which two trains approaching each other upon a railway can be fully warned of their danger. Upon the mile posts along the road side are dial plates with an index, connected with a telegraphic wire extending the whole length. A train starts, and the first car as it passes each post, touches a portion of the instrument, and causes the pointer to move to a number indicating the mile at which the train may then be.

A similar method of making the locomotive thus operate a line of signals on a railroad, has been proposed to us a number of times by correspondents. Supposing something should go wrong with this telegraph as well as the locomotive, what then? An independent electric telegraph is the best.

IMPROVEMENT IN DRESSING MILLSTONES.



Dressing Millstones.

The invention illustrated by the accompanying engravings is designed for the purpose of re-grooving or threading the faces of millstones, used in grinding flour. After the stones have been in use for a time the grooves become worn down or dulled, and must then be renewed. To chisel them out by hand would be a long and tedious job, yet it is only within a few years that mechanism has been taught to do the work.

The apparatus here described is provided with a sort of hub or head piece, B, through which the mill spindle passes, the picking machine resting upon and revolving with the stone. When the upper stone is to be dressed it is turned over face up, and made to revolve. The motion of the spindle operates the picking apparatus, and cuts the necessary threads or grooves.

This machine is specially intended to cut parallel furrows, although, by a slight change, it will cut in exactly radiating lines, if desired. The pick hammer, *q*, is operated by a peculiar cam, which is put in motion by the mill spindle. The cam is so arranged as always to impart a uniform force to the pick hammer. A very convenient combination of parts exists whereby the force applied to the hammer may be instantly increased or diminished; there is also an excellent method of shifting the banner from one thread to another, regulating the distance, depth, width of the furrows, &c.

Having alluded to some of the uses and advantages of the invention, we will now describe its parts. Fig. 1 is a perspective view, showing the apparatus applied and ready for use on a mill stone; fig. 2 is a side section; similar letters in both figures refer to the same parts.

The bed piece, A, which carries the pick shaft, F, is attached to a sliding piece, A', which is fitted to slide in a straight grooved way, B', which is arranged tangentially to, and permanently attached to the head piece, B. This sliding piece carries a short upright shaft, *c*, provided with a loose pinion, *a*, which gears with a fixed rack, *b*, on one side of the way, B', and to this pinion is secured a bevel gear, *d*, which gears with another gear, *e*, on a shaft, *f*, which is arranged parallel with the bed, A. The bed, A, is supported partly by the sliding piece, A', and partly on a small standard, A'', near one end. By turning the shaft, *f*, by hand, rotary motion is given to the bevel gear, *d*, which through the pinion, *a*, and rack, *b*, gives a longitudinal movement to the sliding piece, A', and in this way, after a straight furrow or thread has been made by the movement of the pick along the shaft, F, the bed, A, with the pick, can be moved to make a new thread or furrow without turning the head piece, B, thus keeping the pick shaft in a parallel position, and producing parallel threading.

In order to enable the direction of the threading to be varied, the bed, A, is made movable on a pivot, *g*, which is secured in the sliding piece, A'. When adjusted at the required angle to the sliding piece, it is secured partly by a nut, *h*, on the pivot, *g*, and partly by a screw, *i*, which passes through a slot in a stay, *g*, attached to the bed, and screws into a small post, *k*, on the slide. The bed, A, is slotted longitudinally in order to enable it to be adjusted in that direction upon the pivot, *g*, and to enable the pick to work on either side of the head piece, B. The stay, *j*, must not move longitudinally with the bed, and therefore it is made detached, and fits to the longitudinal slot of the bed with a feather, *r*, which gives it rigidity laterally.

In order that the feed movement of the sliding piece, A', may be produced in all positions of the bed, A, and the shaft, *f*, the bearing, *b*, of the shaft is carried by the upright shaft, *c*, which turns freely as a swivel with any movement of the bed on the pivot, *g*. The bevel gear, *e*, fits to the shaft, *f*, with a feather and groove, to allow the shaft, *f*, to slide to admit of the longitudinal adjustment of the bed, the hub of the bevel gear being the immediate bearing of the shaft, and the said hub fitting to the swivel bearing, *l*, in the shaft, *c*. In order to operate the pick shaft, F, from the cam, G, which fits to the top of the mill spindle, in an effective manner, in all the changes of position of the sliding piece, A, and at the same time to preserve an uniformity of the force of the blow, the cam, G, is inverted, and a secondary lever, *m*, is applied between the said cam and the arm, *c'*, of the pick shaft, to throw up the said arm, and lift the hammer. The fulcrum, *m'*, of this secondary lever is attached to one side of the sliding piece, A', so that the lever must always bear the same relation to the said arm, *c'*, and the said lever crossing the cam on one side of its center, is capable of having a very considerable longitudinal movement without changing its effective relation with the cam, owing to the enclosed projections, *s s*, of the cam being of the same hight from their innermost to their outermost extremities, as is shown in fig. 2.—To increase and graduate the force of the blow of the pick, a spiral spring, *n'*, is applied to act upon an arm, *n*, on the pick shaft, the said spring being wound round a rod connects with a lever, *m''*, which is adjustable by means of a wedge attached to a rack, *o*, which is moved by a sector lever, *p*, to throw the wedge more or less under the lower arm of the lever, and thus throw the upper arm more or less forward to give more or less force to the blow.

This invention is ingenious, but simple. It saves a large amount of labor, is easily managed, and its cost of construction is not great. It ought to become a general favorite among millers. The improvement is the invention of S. W. and R. M. Draper, of South Dedham, Mass., on which an application for a patent is pending. For further information address the inventors as above.

American Cotton Manufacturers.

The New Orleans *Picayune* states that five thousand bales of cotton were recently shipped from that city to Boston on the *Isaac Boardman*—the largest cotton cargo ever sent to Boston. Another vessel,—the *Merrimac*—cleared at the same time for Boston, with 3600 bales. Other ships were loading with smaller quantities for the same destination, thus showing that the New England factories were doing, or are about to do, an active business.

The Newburyport (Mass.) *Herald* states that there are in that county 22 mills, with 244,073 spindles, consuming in a year 14,426,605 pounds of cotton, producing goods to the value of $6,000,232, and affording constant employment to 5235 operatives—1549 males, 3686 females.

There is further, at Lawrence, a de laine establishment, in which 200,000 pounds of cotton are used, or about one-third of its raw material, where 300 persons are employed; and at South Danvers there is a cotton bleachery that has a capital of $150,000 and employs 60 hands.