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Pyroligneous Acid or Wood Vinegar.

When wood is subjected to destructive distillation or is greatly heated in close vessels, an acid liquor oozes over with the tar and gaseous products. This acid liquor is the pyroligneous acid. It is really an impure vinegar, from which acetic acid can be obtained, and the method employed is as follows: The pyroligneous acid freed from the tar, naptha, &c., is saturated with chalk or powdered slacked lime, filtered, and evaporated in suitable vessels. By this means an impure acetate of lime is obtained. This is gently heated to destroy the oily matter without injuring the acid, and then mixed with sulphate of soda or salt cake as the manufacturers call it; this affords a beautiful acetate of soda, in solution, which is then drawn off from the remaining sulphate of lime. The solution is heated, evaporated to dryness, re-dissolved and crystallized, and by these means the acetate of soda is procured in crystals. These crystals are then placed in a retort with oil of vitriol and heated, when acetic acid distils over, which being the active principle of vinegar, this useful acidifier can easily be made from it, and of the very best quality. The charcoal which remains in the retort in which the wood is distilled is excellent, and is largely used for the manufacture of gunpowder.

Saw Teeth.

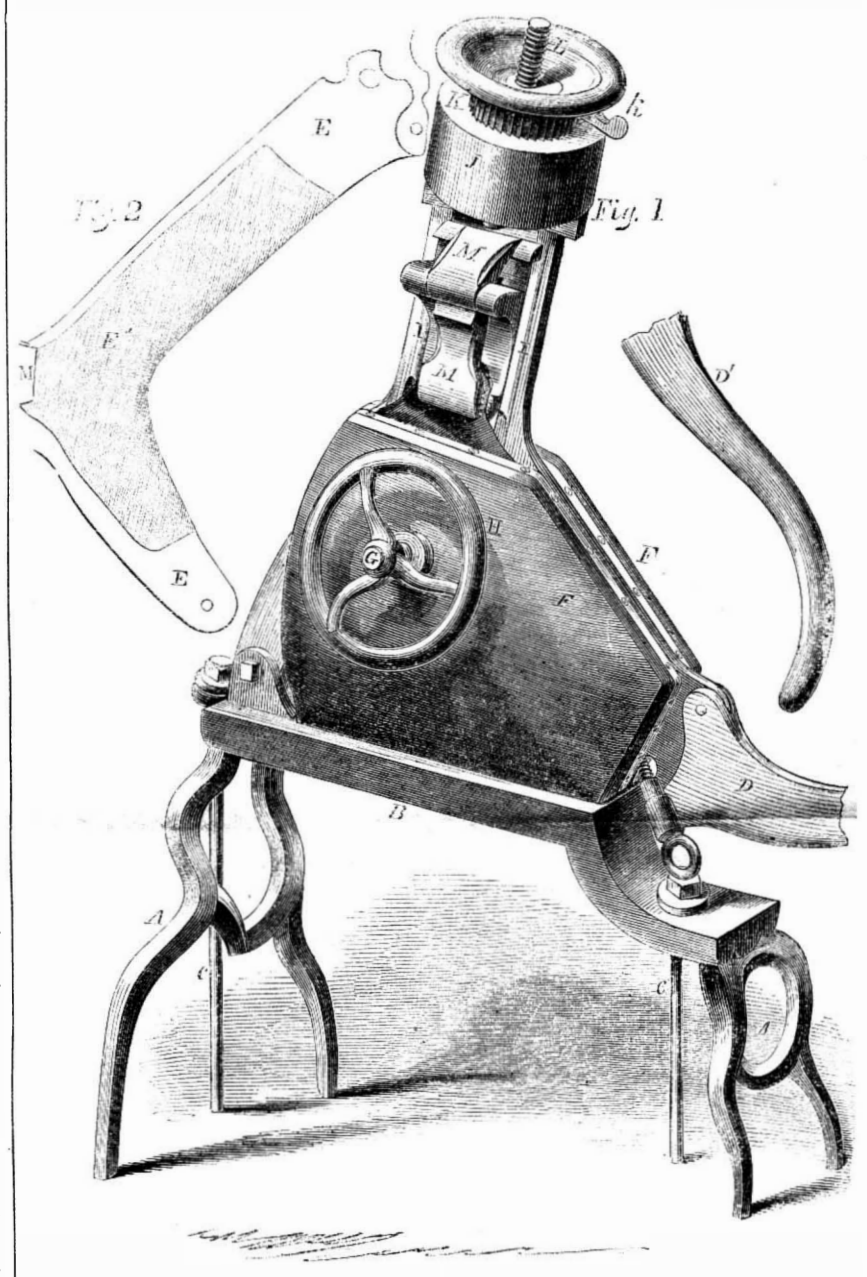
A Tennessee correspondent, after informing us that we are indebted to an article on this subject by Hoe & Co., in the second number of our present volume, for many subscribers in his locality, proceeds to give the following practical information:—

"As well as the number of teeth being proportioned to the hardness of the timber to be sawed, their number should also be proportioned to the power used. Each tooth of a saw can only cut advantageously a certain distance forward in passing through the log, which distance depends on the hardness of the wood; but if a saw has a great many teeth, and is driven by a weak power, each tooth will not cut so far forward as it should do, and there is a loss of power. If the power is great, and the number of teeth few, then each tooth will have to cut too far forward."

Sorghum Molasses.

Dr. F. Stewart, of Philadelphia, has sent us a sample of molasses made from the Chinese sugar cane. The yield from which the sample was taken was equal to two hundred and forty gallons to the acre, and is very good, being quite as rich and sirupy as that from the ordinary cane. We are still of the opinion, however, that it is not capable of producing crystallizable sugar; but if any of our readers have succeeded in making it, we should like to see a specimen.

WILLMOTT'S "LITTLE GIANT" BOOT CRIMPING MACHINE.



This machine is intended for crimping or forming the fronts of boots. There are already several machines in the field for this purpose, while, to a great extent, "crimping" is performed by hand—that is, by stretching the leather over a wooden form, and rubbing it into shape, without the intervention of any machine. This process, however, is so tedious, that machines of some kind are fast coming into use, and the inventor of this crimper claims that it will not only accomplish more work, but that it performs the operation with greater perfection; all wrinkles are rubbed out, the corners are stretched, and the crimp is put into the boot with greater solidity and without injury to the leather; while the operation is performed with such rapidity that twenty pairs of boots can be crimped in an hour, and even this number has been exceeded by a skillful workman, hence its name—"The Little Giant."

Fig. 1 represents the whole machine, in which A A are the legs supporting the frame, B. C C are leg screws, by which means the machine is held firmly to the floor. D is the handle (broken in our engraving) attached to the "former," E, on which the leather is stretched. This "former" is shown in Fig. 2. F F are two jaws, made of iron, lined with wood, and faced with brass, fastened by sliding in a groove in the frame, B, and are separated at the bottom by screws (not seen in our engraving; the jaws are kept together, and the pressure upon the leather regulated by the hand wheel, H, which works a screw, G, passing through both jaws. The handle, D, is connected with E, and on the top of this are mounted two standards, I I, carrying on their top the drum, J, which contains a powerful coiled spring, by whose means the ratchet wheel, K, is turned upon the screw, L. M M are pincers, so arranged that when the ratchet wheel is turned in the proper direction, they are lowered, and open to receive the corners of the boot front; while, by the same movement the spring is wound up in the drum, J. This is held wound up by the pawl, *k*, until the leather is adjusted, when the pawl being tripped, the spring is left free to act.

Operation.—The leather being cut to shape, and wet in the usual manner, is laid over the jaws, F F, in a suitable position, the "former" being first thrown back, and the jaws graduated to the thickness of the leather to be crimped; the "former" is then brought down forcing the leather between the jaws for a short distance; the pincers are then lowered, and the corners secured within them. The process is continued by working the handle, D, up and down, which rubs out the wrinkles, while the spring exerting its force upon the ratchet wheel, keeps a constant strain upon the corners drawing them out to the proper shape; when finished, the leather will appear on E, as seen at Fig. 2, E′ being the leather without crease or wrinkle; all that now remains to be done is to loosen the pincers, remove the boot front, and tack it on a form to dry.

This machine is the invention of W. W. Willmott, and was patented Aug. 25, 1857. Further information and particulars may be obtained from the manufacturers and assignees, A. H. and C. H. Brainard, of 90 Utica street, Boston, Mass. A machine may be seen at the machinery warehouse of S. C. Hills, No. 12 Platt street, New York.

Progress of the Age.

The great deeds done by men of old, and the accumulated discoveries of the ancient sages, have all been surpassed in the last half century. Before the year 1800, there was not a single steamboat in existence, and the application of steam to machinery was unknown. Fulton launched the first steamboat in 1807; now there are three thousand steamboats traversing the waters of America, and the time saved in travel is equal to seventy per cent, and every river in the world is a highway for their encroachments. In 1800 the word "railroad" had not been coined, and to travel forty miles an hour was an impossibility. In the United States there are now some twenty-five thousand miles of railroad, costing in the neighborhood of seven hundred and fifty millions of dollars, and about thirty-seven thousand miles of railroad in England and America. The locomotive will now travel in as many hours a distance which in 1800 required as many days to accomplish. In 1800 it took two weeks to convey intelligence between Philadelphia and New Orleans, now it can be accomplished in minutes by the electric telegraph, which only had its beginning in 1843.

Trinidad.

This small island is situated off the coast of South America, not far from the mouth of the river Orinoco. It has long been noted for the production of a superior kind of coffee, but is now about to enter the commercial world in a far more important way. Beds of coal, sulphur and good ochre have recently been found there. Asphaltum, petroleum, gypsum, good lime, a compact sandstone, and clay suitable for bricks have been known for some time, and all that was wanted was the coal, to aid in their productive development. There is also every reason to believe that gold is to be found in some of the northern streams. An American firm has recently established itself at the famous Pitch Lake, and erected works, now nearly completed (they make the crude oil already), for the extraction and refining of oil from the asphalt—the supply of which is, no doubt, practically inexhaustible. With regard to the coal, there are seams of eighteen to forty feet, and one measuring horizontally the enormous width of one hundred and twenty-two feet—a veritable quarry.

The *Mining Chronicle* gives the above information, and, should it be true, this discovery will be a most valuable acquisition to the maritime world. A coaling station has long been wanted in that locality, and it would seem that Trinidad will be able to fill the vacancy.

Issued from the United States Patent Office

FOR THE WEEK ENDING NOVEMBER 3, 1857.

[*Reported officially for the Scientific American.*]

LIME KILNS—A. G. Anderson, of Quincy, Ill.: I claim the combination of the perforated arch, C, and escape passages, f f, with the throats, b b, chambers, D D, dampers, F F, holes, g g, and supporting and removable bars, h h, the same being constructed and arranged for joint operation, substantially as and for the purpose set forth.

[A notice will be found on another page.]

FEED WATER PIPE IN THE BED OF A STEAM ENGINE—Henry W. Bill, of Cuyahoga Falls, Ohio: I am aware that steam and water passages have been made through the frame and bed of a steam engine. This I do not claim.

But I claim making the bed of a steam engine hollow, and so as to form a steam chamber, and arranging the feed water pipes in or through said chamber, so that the exhaust steam in the chamber shall heat the feed water in the pipes, as set forth.

MACHINE FOR MAKING BOLTS—Richard H. Cole, of St. Louis, Mo.: I claim pressing the head on the bolt in a moving die box or die, and against a yielding tool or support, as set forth, by the motion of the bolt instead of the tool, as described.

I also claim the combination of the spring, X, the crotch, a, and the jaws, s, so that the crotch, a, or its substitute in pressing the jaw, s, forward, shall act against a yielding medium, for the purpose specified.

I also claim the internal construction of the gripping tools, x, as shown at Z, whereby each of the said tools, in closing, shall form one-fourth of the point on the bolt, thus making half of the point when closed.

I also claim finishing the point on the bolt, that is, completing it by an off-set made on the side of the knife N, having a form in it to correspond with the form in the end of the tools, x, the said off-set to be below the cutting edge of the knife a distance equal to the diameter of the point of the bolt when finished, so as to make the point of the bolt like the frustum of a cone.

CURTAIN FIXTURES—John W. Currier and James M. Thompson, of Holyoke, Mass.: We claim the combination of mechanism for rotating the curtain roller, for the purpose of either winding up or unwinding the curtain, the same consisting of the slider, F, the cords, H I, and the straight and helical grooves for the slider to work in, one of said grooves being stationary, and the whole being arranged and made to operate as described.

ROSE FOR DOOR KNOBS—Samuel S. Day, of New York City: I make no claim to securing the shank of the rose in the door by means of a screw made upon the outside of it, as this has already been done.

I claim combining the slotted flange, f, the screw threaded flange, e, and the disk flange, d, in the construction of a rose for door knobs, as and for the purpose set forth.

REVERSING THE CHISEL IN MORTISING MACAINES—D. M. Cummings and P. C. Cambridge Jr., of North Enfield, N. H.: We claim rotating the chisel mandrel, D, from the auger mandrel, K, when desired, by means of the lever, l, with pressure roller, m, attached, and spur, n, in connection with the lever, T, operated by the upright, f, as described.

[Full particulars of this invention will be found in another column.]

MIXING AND GRINDING OIL PAINTS—William H. Dolson, of New York City: I claim the combination of the mixer, A, and grinder F, with an intermediate endless belt, C, and scraper, G, the whole arranged as set forth.

UNLOADING VESSELS—Robert Ferguson, of New Orleans, La.: I claim the combination of swinging platform, c, arm, f, lever, l, and spring, m, with the body of the carriage, operating as and for the purposes set forth.

HOISTING BUCKETS—George Focht, of Reading, Pa.: I claim the catch lever, g, in combination with the lip or roller, b, and the staple, d, the whole being arranged as and for the purposes set forth.

CANDY-TWISTING MACHINE—John Gardner, of Philadelphia, Pa.: I claim the working and twisting of candy by means of a machine constructed substantially as set forth.

[By the use of two conical rollers and a taper screw, the candy is rolled and twisted at one operation, and much more expeditiously than by the methods now in use.]

BENDING METAL PLATES—E. L. Gaylord, of Terryville, Conn.: I am aware that metal plates are bent or swaged in various forms, by means of what are known as drop presses, and I therefore do not claim the drop K.

Nor do I claim, broadly, a drop press, nor any of the parts described separately.

But I claim the block, C, provided with the movable arms, a a, and cross piece, b, the block or bed piece, H, and adjustable stop, I, arranged as shown, and used in connection with a drop, K, or its equivalent, for the purpose set forth.

[This machine bends metal plates at right angles, such as for the box of locks; it bends them perfectly, and gives a good sharp angular edge.]

VIOLIN ATTACHMENT—Jackson Gorham, of Bairdstown, Ga.: I claim the lever, B, having its fulcrum, d, in a support, c c, which is movable on a board or piece, A, attached to the head of the violin, and having a screw, C, or its equivalent, applied to it, the whole operating as described.

[This is described on another page.]

PRINTING PRESSES—George P. Gordon, of New York City: I claim, first, the arrangement of a bed, with its form of types, between two distributing tables, so that the impression may be taken while one table is inking the rollers and distributing the ink by passing to and fro upon the distributing table on one side, and at the alternate time, an impression may be taken while the rollers are passing over the opposite distributing table, thus allowing of the reversal of the rollers at the extreme ends of the two tables, meeting and inking the form in its transit from one extreme to the other, and allowing the impression to be taken at each inking of the form without waiting for the return of the rollers.

Second, I claim the arrangement of the variable eccentric, or its equivalent, with the sheet guides or gauges, and friction feed rollers for the purpose of drawing in evenly the sheet or strip any required distance.

And I further claim the arrangement of means described, for feeding, printing, cutting and counting the cards or sheets of paper with the means described, for the inking and alternately distributing the ink, as set forth.

WATER-COOLING PITCHER—Alonzo Hebbard, of New York City: I claim the use of the combination of the woolen cloth or felt covering as an elastic, non-conducting packing for a porcelain or glazed ware pitcher, with the said porcelain or glazed ware interior pitcher, and external metallic shell or pitcher, for the purpose of making a water-cooling pitcher, as set forth.

OPERATING SCROLL SAWS—John L. Lawton, of Baltimore, Md.: I claim the method of operating the saw by means of the belts and back levers, substantially as described.

IRON TRUSS FRAMES FOR BRIDGES, &C.—Francis C. Lowthorp, of Trenton, N. J.: I do not wish to confine myself to the precise form or size of the parts described.

I claim, first, arranging and constructing the vertical posts of iron truss frame girders for bridges, and other structures, in relation to the upper and lower chord, substantially in the manner set forth, in order that the said posts may be allowed to vibrate on the chords, for the purpose specified.

Second, Allowing the end posts of truss frame bridges to vibrate on the piers or foundation, for the purpose set forth.

CHAMFERING AND CROZING BARRELS—James H. Mattison, of Scriba, N. Y.: I claim the cams, n n, in combination with the spring, p, and the chamfering and crozing tools, so constructed as to traverse them out gradually to cut the score and chamfer a barrel, and draw them in suddenly to remove the barrel, and save the time of the operator attending the machine.

I claim making the edges of the rims D and D′, which hold the end of the barrel by making a rebate, or otherwise, so as to hold the barrel properly in the machine, without removing the truss hoops, substantially as described.

WATER CLOSETS—Francis McGhan, of Washington, D. C.: I claim the adjustable communication, d k, between the supply pipe, D, and the chamber, B, above the valve, b, in combination with the displacing diaphragm, f, or its equivalent, arranged and operating as set forth.

ROTARY EXCAVATOR—Gilbert H. Moore, of Rochester, N. Y.: I claim, first, the construction of the carriers or receivers, as described, viz., the support and hinging of the bodies upon the axle in such a manner that they may be damped by elevating the two extremities.

Second, The construction and mode of attaching the shield, F, by either of the methods substantially as described.

Third, The combination of the digging wheel, the carriers and the shield, for the purposes set forth.

CLEANING AND POLISHING COFFEE—William Newell, of Philadelphia, Pa.: I am aware that a cylinder with a surrounding steam jacket has been used for many purposes. I make no claim to the apparatus described, but merely represent it to better illustrate my process of treating green coffee, and which process constitutes the essence of my invention. Grains, flour and many other articles have been subjected to heat and motion and friction in a cylinder such as I represent. To this I lay no claim; nor to the treatment of anything but coffee; and I am not aware that coffee has ever been cleaned and polished in the way which I have discovered.

But I claim the cleaning and polishing of green coffee by subjecting it to the combined action of heat, friction and motion, as set forth.

EXPANDING TIRES—Samuel Penberthy, of Chicago, Ill.: I do not confine myself to the precise construction of furnace as shown and described, for it is obvious that various modifications of the same may be successfully employed for the purpose, although the described apparatus or contrivance would, probably, be as convenient and as simple as any that could be devised for the purpose.

I claim expanding the tires of locomotive and other heavy wheels while on their axles or shafts, and connected with their vehicles or locomotives, by means of a portable furnace, arranged as shown, or in any proper way, so that the same may be attached to the tire at any desired point, as set forth.

[For more information about the above we refer to a notice on another page.]

IRON SHUTTERS FOR DOORS, WINDOWS, &C.—M. C. Root, of Toledo, Ohio: I do not claim, broadly, the making of metallic shutters in such a manner that the slats shall fold and unfold in a self-acting manner when raised or lowered. Examples of devices of this character may be seen in the rejected case of Richard Murdock, May, 1851, and in King's case, June 10, 1856.

I claim the construction of metallic shutters in the manner described.

[These shutters are much cheaper than the usual iron ones; they fold side by side as they descend, and shut up in a box or recess underneath the window-sill when open.]

CANAL LOCK GATES—Samuel J. Seely, of New York City: I do not wish to be understood as limiting my claim of invention to the special form specified, but claim the privilege of modifying the same so long as I attain the same end by means substantially the same.

I claim the method, substantially as specified, of connecting the upper journals of canal lock gates to the masonry of the lock, by means of adjustable boxes, and for the purpose specified.

I also claim suspending the outer or swing edges of the gate to the upper journal boxes by diagonal suspension braces, in the manner and for the purpose as specified.

I also claim connecting the top flaps of the gate with each other, so that the two shall move together by means of the joint link and arm, or other equivalent means, substantially as described, in combination with the connection with a capstan at the side of the lock by a jointed rack, or other equivalent means as described, and for the purpose set forth.

SMOOTHING IRON—James Goodin Jr., of Cincinnati, Ohio: I am aware of gas having been used for heating purposes before, and that wire gauze has been employed for distributing the heat, all of which I disclaim when taken separately or together.

But I claim the arrangement of the perforated diaphragm, g g, with the air openings, 5 5 and 7 7 7, when said diaphragm and air openings are arranged with the gas pipe, B, and gauze, C, in the bottom of the iron, as specified, for the purpose of detaining and equally distributing the heat over the surface of the bottom of the iron, as, and for the purposes mentioned in the specification.

TIGHTENING TIRES ON CARRIAGE WHEELS—N. J. Skaggs, of Talladega, Ala.: I do not claim separately connecting the ends of the tire together by means of a screw, for this has been previously done.

But I claim forming the ends of the tire with the heads, a a, recess, e, and projecting portion f, as shown, in connection with the screw rod, E, by which the ends are secured together, and the tire contracted as may be desired, and a continuous or perfect joint or connection obtained.

[This invention relates to that class of tires that are not in a continuous band, but are secured by a screw. The inventor causes the ends so to overlap that in any position of the screw they form a good and perfect joint.]

PUMPS—Noah Sutton, of New York City: I am aware that two pistons having a variable movement, and fitted within one cylinder, have been previously used; therefore I do not claim giving a variable movement to the pistons, irrespective of the arrangement shown.

But I claim the peculiar means employed for operating the pistons, or giving them the variable movement as described, viz. the pulleys, Q Q, R R, connected with the bars, I, of the pistons, F G, by means of the chains, S T, the pulleys, Q Q, R R, being placed loosely on their shafts, and connected alternately therewith, by means of the bars, f, connected with the spring, g, the projections, h, on the wheels, P, and the beveled projections, j, j, on the bars, V, the whole being arranged as described.

[By giving the pistons a variable motion—that is, causing them to descend with greater rapidity than they ascend, and connecting the cylinders by water passages, these pumps give a continuous stream of water which is equal in force in any position of the pistons.]

HAND PRINTING PRESS—Samuel J. Smith, of New York City: I do not claim any one of the parts separately.

But I claim the manner described of adjusting the lever, l, and its inking roller, h, by the screw, 8, so that the inking takes correctly on to the edge of the printing surface, 2, as said surface moves in a curved line with, and on the lever, d, as and for the purposes specified.

I also claim arranging the printing surface, 2, and inking table, g, on the lever, d, in such a manner relatively with the inking roller, h, and its lever, l, that said roller shall travel over the printing surface as the lever descends, and then pass up on to the inking table, g, for distributing the ink while the impression is being given, at the same time that the paper or other material being printed is kept from contact with the roller by the foot, 5, substantially as and for the purposes specified.

BAROMETER—T. R. Timby, of Medina, N. Y.; I claim the elastic tube between the stop cock and barometer tube as set forth.

I claim the mechanical arrangement for supporting the barometer tube within the suspension glass case, the same consisting of the bracing rods, t, t, passing through the glass and brass tubes, d and e, and the wooden block w, the inner cap, a 2, the blocks, w w′, the lower cap, a 3, and the screw joint, S, all arranged and co-operating as set forth.

HARVESTERS—Hosea Willard and Robert Ross, of Vergennes, Vt.: We do not claim broadly attaching the finger bar to the machine by a joint, for this has been previously done.

But we claim the combination of the hinged finger bar, L, with the adjustable bar, I, lever, P, regulating set screw, f, and wheel, o; the whole being constructed and arranged in relation to the main frame for joint operation, in the manner and for the purpose set forth.

We also claim lever P, and regulating set screws, f, in combination with bar, I, chain or cord, j′, pulley, i, and clutch, Q, for the purpose of raising the hinged finger bar, L, as described.

[This improvement consists in forming the cutters, so that they can be raised to suit any inequality of the ground, or elevated bodily, when moved from place to place.]

JOINTS OF CARRIAGE TOPS—Reuben W. Stone, of Solsville, N. Y.: I claim the bars, A A′, B B′, connected by the joints, a, and provided with loops or hooks, b b, arranged substantially as and for the purpose set forth.

[This is a cheap and simple carriage top.]

MACHINERY FOR BURRING WOOL ON THE PELT—John Waterhouse, of Little Falls, N. Y.: I claim, first, The combination of the feeding apparatus, which holds and controls the pelt, with a cleaning cylinder arranged, constructed and operating substantially as set forth.

Second, I claim the combination of the rollers, D E, one being elastic, and the other non-elastic, for holding and presenting the pelt in a curved or bent form to the action of the cleaning cylinder as described.

Third, I claim, in combination with the holding and presenting rollers, the feeding rollers, F F, one said rollers, F, being elastic, and the other non-elastic, as described and for the purpose set forth.

Fourth, I claim mounting one of the feed rolls F, and one of the holding and presenting rolls on the main frame, and their fellows upon a traveling carriage, for the purpose of facilitating the introduction, turning and removal of the pelt, as set forth.

FOLDING IRON BEDSTEADS—H. F. Vandenhove, of New York City: I do not claim broadly a bedstead connected by joints, so that when not in use the parts may be folded together, as such bedsteads are well known and in quite common use.

Neither do I claim separately or in themselves considered the guards or fenders independent of the manner in which they are arranged or applied to the bedstead.

But I claim applying or attaching the guides or fenders to the bedstead, as and for the purpose set forth.

I further claim attaching the buttons, f, to the side pieces, b, and also attaching the pins or stops, f 2, to the side pieces, b, in connection with the grooves, f 2, in the inner sides of the posts, D, for the purpose specified.

[This improvement is described on another page.]

SEWING MACHINES—C. H. Andrus, (assignor to Squire Lee) of Goshen, N. Y.: I am aware that in the sewing machine of A. B. Wilson, patented 1854, a tri-pronged spring pressure pad is employed. The central prong of this pad presses or holds the cloth against the periphery of the feed wheel. I disclaim the spring pressure pad, and also the holding of the cloth against the feed wheel by a spring. In the device of said Wilson, the pressure pad is stationary, the feeding of the cloth being accomplished by a serrated wheel.

I am also aware that in the device of E. H. Smith, 1857, the pressure pad is slotted, and has a separate spring within the slot which presses the cloth upon a horizontally moving dog. The cloth is fed by said dog which is below the table.

I do not claim the employment of two foot pieces or feeding plates in any other way than as described.

But I claim the employment of a supplementary serrated feeding plate, B, fitted within a slot in the principal feeding plate, and provided with shoulders, b b, and being controlled entirely by springs, d d′, applied between it and the principal feeding plate, so as to operate as described.

[This is a useful little improvement in the feed motion of sewing machines, and is applicable to any machine.]

PRINTING PRESSES—Merwin Davis, of New York, N. Y., assignor to P. G. Bergen, of Brooklyn, N. Y.: I do not claim separately or in itself considered the reciprocating carriage, O, provided with fingers or nippers for feeding the blank sheets to the form, nor do I claim the "fly" separately or independent of its arrangement and connection with the parts as shown.

But I claim, first, The reciprocating rolling pressure segment, J, provided with a weight box, h, or any suitable or equivalent device by which the counterpoise of the segment may be varied or graduated to be commensurate with the speed of the segment. I also claim the reciprocating rolling pressure segment, when arranged to operate as shown, irrespective of the variable counterpoise.

Second, I claim the reciprocating carriage, O, provided with the fingers or nippers, w, in combination with the segment, J, for feeding the sheets to the form. I also claim, in combination with said segment, J, the "fly" or device formed of the rods or shafts, S T, e, arms d, d, j, j, and the hinged ledge or plate, d 4, the above feeding and flying devices being arranged and operating conjointly with the segment, J, as described.

Third, I claim the rails, m m, applied to the machine, and operated substantially as shown, or in any equivalent way so as to raise or elevate the face, k, of the segment above the form during one movement, and allowing it to descend and rest upon the bed during the other movement in order to give the impression to the sheets. And I also claim the bar, Z, when used in connection with the rails, m, and having the bar, j″, connected with it as shown, whereby the segment may be raised at any time, and the sheets also prevented from being fed to the form.

Fourth, I claim operating the lateral vibrating ink rollers, W X, by means of the T-shaped lever, Y, as described.

[For information about this invention we refer to page 75.]

MACHINES FOR FOLDING PAPER—Cyrus Chambers, Jr., of Philadelphia, Pa.: I do not desire to confine myself to the precise form or method of operating the various moving parts of the machine, as they may be considerably modified without altering the result.

I claim, first, Forcing the edges of the sheet between the folding rollers, in advance of the middle of the said sheet for the purpose specified.

Second, Temporarily arresting the motion of the first pair of folding rollers, in the manner described, or any equivalent to the same.

Third, The register pins, q, in combination with the tubes, p, when the same are arranged for joint operation, substantially in the manner and for the purpose set forth.

Fourth, The combination of the first pair of folding rollers, N and N′, with the register pins, q, when the latter operate between the former, in the manner described, or any equivalent to the same.

Fifth, Preventing the rebounding of the folded sheet during its passage through the machine, previous to the descent of any of the folding blades, by means of the arresting rollers described, the same operating in combination with the tapes, in the manner set forth.

Sixth, Dividing the printed sheet into two halves by means of shears, arranged, actuated and constructed as set forth.

Seventh, Discharging free from the machine the strip cut from the folded edge of the sheet by means of a revolving disk, arranged and operating in the manner set forth.

Eighth, So constructing and arranging machines for folding sheets of paper, that the two halves of one sheet (said sheets having been printed on both sides from the same form) may be separated from each other, and folded in succession.

Ninth, Packing the folded sheets by means of a reciprocating plunger against a frictional plate in a trough, so that the backs and heads of the folded sheet coincide with each other.

Tenth, The employment of the devices described, or any equivalent to the same, whereby the operator can separate the imperfect from the perfect sheets.

Eleventh, Preventing the return of the packed sheets of paper, by means of the catches situated above, and in the corner of the trough.

Twelfth, The combination and arrangement by which the operations described are performed simultaneously or in succession to each other in the same machine.

ROCK DRILLS—G. H. Wood, of Green Bay, Wis.; I claim the employment, in combination with a drill raised, turned, and operated as above described, of the supplementary spring, R, for the purpose of controlling the re-bounding of the drill, G, in the manner as set forth.

[See notice of this improvement on another page.]

VANE GOVERNOR FOR STEAM ENGINES—C. Whittier, of Roxbury, Mass.: I claim suspending the fans or vanes D, on the crank (or its equivalent) attached to the spindle of the regulator valve, whereby the resistance of the atmosphere causes them to operate the valve in the manner as set forth.

RE-ISSUES.

CORDAGE MACHINERY—Henry Pearce, of Cincinnati, O. Patented May 22, 1855: I claim, first, The method described of equalizing the paying out of the strands from the bobbins for the purposes set forth.

Second, The arrangement of a friction or rubbing collar, m, operated by a plunger, o, passing upward within the supporting stem, b, and the weighted lever, p, as described, or equivalent devices for regulating the degree of facility of the rotation of the bobbin spindles.

MANUFACTURE OF IRON—Wm. Kelly, of Eddyville, Ky. Patented June 23, 1857: I do not wish to be understood as claiming broadly the act of blowing blasts of air into molten iron, as that has been done in processes dissimilar to mine.

But I claim blowing blasts of air, either hot or cold, up and through a mass of liquid iron (the oxygen in the air combining with the carbon in the iron, causing a greatly increased heat and ebullition in the fluid mass, and decarbonizing and refining said iron without the use of fuel.

ADDITIONAL IMPROVEMENT.

INKSTANDS—Kingston Goddard, of Philadelphia, Pa. Patented April 28, 1857: I claim as new and useful, the straight tube, d, in combination with a simple cup or receptacle, E, substantially as and for the purposes described.

DESIGNS.

STOVES—Wm. T, Coggeshall, of Fall River, Mass.

NOTE.—In the above list of claims we recognize FIFTEEN cases which were prepared at this office. Under the present efficient and liberal management of the Patent Office, there has never been in our opinion so good a time to present applications for patents as now. Cases are early taken up for examination, and a liberality is shown by the Examiners which is truly commendable. Mechanics who are out of employment cannot devote their time more profitably than to an effort to invent something new, or make some improvement on machinery used in their respective trades.

Charcoal.

As the result of experiments with charcoal, an English chemist avers that for the reduction of metallic oxyds, the charcoal of the heavier woods (as that of oak and the beech) is preferable; and that, for common fuel, such charcoal gives the greatest heat, and requires the most plentiful supply of air to keep it burning, while those of the lighter woods preserve a glowing heat with much less draft of air; and that for purposes where it is desirable to have a steady and a still fire, charcoal should be employed which has been made from wood previously divested of its bark, since it is the cortical part which flies off in sparks during the combustion, while the coal of the wood itself seldom does.

Statistics of Consumption.

Medical statistics appear to prove that consumption, where prevalent, originates as often in summer as in winter, and the best authorities declare that it is more common in hot than in cold climates. There is more consumption in the Tropical Indies, both East and West, than in the almost arctic Canadas. The number of the British troops attacked with this disease in Jamaica is annually twelve in one thousand, while in Canada it is only about six. The British government have accordingly resolved upon sending their consumptive soldiers to a cold climate in preference to a warm one.

CHEAP CORN.—South of Springfield, Ill., on the railroads, some of the farmers are offering corn at 15 cents per bushel in the field; others at $5 per acre.

Process of Making Ice in the East Indies.

Natural ice is never seen in the warmest parts of that country. To procure ice by artificial means, they dig, on a large open plain, not far from Calcutta, three or four pits about thirty feet square, and two feet deep each, the bottom of which they cover about each inches or a foot thick with sugar cane or the stems of the large indian corn, dried. On this bed are placed, in rows, a number of small, shallow, unglazed earthen pans, formed of a very porous earth, a quarter of an inch thick, and about an inch and a quarter deep, which, at the dusk of evening, they fill with soft water that has been boiled. In the morning, before sunrise, the ice-makers attend the pits, and collect what is frozen in baskets, which they convey to the place of preservation. This is generally prepared on some high, dry situation by sinking a pit fourteen or fifteen feet deep, lining it first with straw, and then with a coarse kind of blanketing. The ice is deposited in this pit, and beat down with rammers, till at length its own accumulated cold again freezes it, and forms one solid mass. The mouth of the pit is well secured from the exterior air with straw and blankets, and a thatched roof is thrown over the whole. The quantity of ice formed by the method above described depends on a light atmosphere, and clear, serene weather. Three hundred persons are employed in this operation in one place.

At first sight, this curious process may appear to be an effect of evaporation; but this is not the case; for it is remarkable that it is essential to its success that the straw in which the vessels are placed should be dry, whereas, if evaporation were concerned in the congelation, wetting the straw would promote it. When the straw becomes wet by accident, it is obliged to be replaced by dry straw.

The earth is continually losing heat by radiation, and it loses most on clear, starlight nights, when there are no clouds to intercept and send back the rays of heat. The straw, like all filamentous substances, is a good radiator of caloric, and it is in consequence of the heat that is thus given out by it into space on clear nights that the ice is formed. When the weather is windy and cloudy the effect does not take place.—*American Druggists' Circular.*

Is Gaslight Injurious?

There is a prejudice against gaslight as being the most injurious form of artificial illumination. As against the proper and well regulated use of gas, this prejudice is entirely groundless, but there can be little doubt that from its abuse and bad management it is really doing more mischief than any other kind of light; its very excellencies are turned to bad account; its extreme cheapness, compared with other sources of illumination, naturally leads to its use in excessive quantities; floods of light are poured forth, so that persons may read and sew for hours together in the remotest corners of the room. The air is heated by the excessive combustion, and poisoned by large quantities of carbonic acid, which there are no means of removing. The eye is unprotected from the glare by screen or shade; extraneous light is freely admitted, which obscures the impression, and strains the nerve of vision, and in proportion as the sensibility of the eye is impaired, stronger light is used, which gives temporary relief, but with danger of ultimate and permanent injury to the sight. On the other hand, good, well purified gas, judiciously controlled in accordance with the hints we have given, is perfectly harmless.

Chilled Iron.

If iron, when cast into a mold, is allowed to cool slowly, it is very liable to crystallize, and the crystals will so arrange themselves that the article which is manufactured will be likely to break off short when put to bear any great pressure. The remedy for this is "chilling," which is done by suddenly cooling the outer edge of the piece, or the part on which the strain will come, and letting the rest cool gradually. If, however, the casting is large, this chilling, by the sudden contraction of such a mass often cracks the piece and renders it useless. Many proposals have been made to obviate this difficulty, but none are thoroughly successful. It is possible to make such castings as railroad car wheels and axle boxes with chilled surfaces, and wherever they have been used, they have answered so well that they are now in almost general use.

Mammoth Forest.

From the *California Farmer* we learn that a grove of mammoth trees has been discovered in Yosemite valley. The first tree that was measured was eighty feet in circumference three and a half feet from the ground; another tree was ninety feet in circumference at the same distance from the ground, while close to the roots it was one hundred and two feet round it, and it was three hundred feet high. The number of trees measured was one hundred and fifty-five, and they are about half the group; none were less than forty feet in circumference, and there were one hundred over fifty feet. The largest tree now lies upon the ground; it is charred, and its heavy bark is gone, and yet it measures thirty-three feet in diameter, or one hundred feet in circumference, and must have been four hundred feet high. The *Farmer* concludes by saying:—"This we believe to be the largest tree yet discovered; and this forest we claim as the Parent Forest of the world."

The Iron Trade.

As to the growth of American iron manufactures, the *Pennsylvanian* says:—

"Since 1848, the consumption of that article in the United States has augmented in an unprecedented manner. The consumption of foreign iron, and manufactures of iron, which previous to 1848 never reached, in any one year, the value of $9,000,000, amounted in 1850 to $15,600,000; in 1856 to nearly $20,000,000. On the other hand, the domestic production of pig iron made very considerable progress. From 1852, when it amounted to 500,000 tuns, it rose to 1,000,000 tuns in 1856. The domestic manufacture of railroad iron has as yet only reached about one-half of our annual requirements. But, considering that eleven years ago we made no rails at all, this result must be regarded as exceedingly encouraging. The value of domestic manufactures of wrought iron of every description amounted in 1840 to $12,800,000; in 1850 to $22,600,000; in 1855 to $28,300,000."

Cadmium.

This was a term formerly applied to calamine and to the substance which sublimes from the furnace during the manufacture of brass. Cadmium is a simple metal, and was discovered in 1817 by Stromeyer, while he was seeking to ascertain the cause of the yellow color of certain oxyds of zinc. It has since been found in several varieties of zinc ore. It resembles tin in its physical properties, but is rather harder and more tenacious; its specific gravity is 8·60, and somewhat exceeds 8·69 after hammering. It fuses at a temperature a little above that required by tin. Air scarcely acts upon it except when heated, and then it forms an orange-colored oxyd. This metal has not been used in the arts, except in some cases for stopping teeth.

Uranus.

This planet is one of the most distant of our system, being about 1,800,000,000 of miles, or if a person were to count 200 every minute for ten hours a day, he would be about 42 years in counting the distance of this planet from the sun. It performs its journey round the sun in about 84 years, or its year is equal to 84 of ours. It is 86 times as large as our planet, and its diameter is 35,000 miles. Six satellites attend it, and revolve round it from east to west. It was discovered by Sir Wm. Herschel in 1781; and he christened it *Georgium Sidus*, in honor of the reigning king; other astronomers called it after its discoverer, *Herschel*, and *Uranus* is the name by which it is now generally known.

The Pressure of Water.

Water exerts the pressure caused by its own weight and that of the air above it, equally in all directions; and on this principle depends the hydraulic press—one of the most useful applications of a philosophical principle known in modern times. The direction of the pressure is not equal in all directions, but is controlled, in a great measure, by the shape of the containing vessel, as, for example, in a round cup having a flat bottom, the pressure is equal and greatest over the whole base, and gradually diminishes as it ascends the sides, and so in all regular figures. In a bottle having a long narrow neck, the pressure is greatest on the base, and then on the semi-circular portion where the bottle bulges out.

When constructing a canal, or water course, the sides should incline from the base outward, because then, the pressure will be at right angles with the sides, and so exert its force on the earth; whereas, should the sides be perpendicular, the pressure would be a direct thrust against it, and it would require a much stronger embankment to prevent the water forcing its way through. It is advisable also, to form the bottom inclined towards the center, or in a semicircular form.

In the case of a dam to stay the course of a long current of water, or to form the head of a mill pool, the form to be preferred is a segment of a circle from side to side, and widening from the top downwards; but should the river or stream be too wide for this method to be adopted, then a straight one can be built, placed at an angle with the course of the stream—like the one on the Schuylkill, at the Fairmount Waterworks—that it may serve to break the force of the stream. If a V-shaped one be thought the best, the apex of the V must be placed against the course of the stream, and not with it; or, in other words, the outside of the letter must form the dam, and not the inside.

Progress of the Telegraph.

A calculation has been made by which it appears that, of overland and submarine telegraphs, there are completed and in progress of construction at the present time, the following lengths: United States 33,000 miles overland; South America, 1,500 miles, overland; Europe, 37,900 miles, overland; India, 5,000 miles, overland. Submarine, Europe and America, 900 miles. Total, 78,350 miles. This aggregate will be increased 1,700 miles by the completion of the Atlantic Telegraph. Of the European and Indian telegraphs, not more than from six to seven thousand miles of the lines commenced are finished, yet the next six months will probably see them all in operation.

Rice Grass.

This plant, also called "cut grass" and false rice, is a native of the Levant, and its classical name was given to it by Leers, a German botanist. It grows very commonly in wet, swampy places, and has stems from two to three feet high, spreading with rough, slender branches, and narrow or long leaves. The florets are oval and white, and they are seen in the month of August.

It is a beautiful grass, and is cultivated to some extent in the South, where they cut it several times in a season, and make from it a valuable hay. In the northeast it is regarded as a weed, and is destroyed by thorough draining, moisture being a necessary of its existence.

The Greatest Steam Invention yet.

The Baton Rouge *Gazette*, under the above heading, has the following:—

"William St. Martin, of this city, has invented an engine, which can be constructed, boiler and all, for about $50. The machine is so simple that we might with propriety say it is merely an escape-pipe, taking up no more room. The steam is admitted into the center of a drum or cylinder, in which the shaft works; from this the power is applied directly, without further friction. The other day we saw the perfected model of the engine pumping water about twenty feet, and throwing it into the reservoir at the brewery. This is the apparatus wanted, for getting, in a cheap manner, one or more horse power to drive small machinery. Mr. St. Martin has made application for Letters Patent, and when he gets them, we think he has a fair prospect to realize something from the result of his genius."

[The above paragraph has been "going the rounds" of the papers for some time past. The readers of the SCIENTIFIC AMERICAN will recognize in this "greatest steam invention yet," simply a rotary engine.—EDS.

Boring and Mortising Machine.

D. W. Cummings and P. C. Cambridge, Jr., of North Enfield, N. H., have invented a new machine for this purpose. A varying and progressive length of stroke is given to the chisel mandrel or arbor, so that the length of stroke may be gradually increased, as the depth of the mortise increases, and the chisel is thus regularly fed to its work. There are also means employed for rotating the chisel mandrel automatically from the auger arbor. It is a valuable machine.

Attachment to Violins.

The violin, it is well known, is one of the most difficult instruments to finger. A patent has been granted to Jackson Gorham, of Bairdstown, Ga., for a device consisting of four fingers, which press the string on to the finger-board in any desired place; so that ordinary performers will be able to execute music in any key, fingering only in those keys on which the great mass of performers play, viz., the keys of one, two and three sharps.

Expanding Tires on Wheels.

S. Penberthy, of Chicago, Ill., has patented a device for this purpose, by which tires may be expanded on iron wheels without removing the wheel or axle from the carriage. It is essentially a portable furnace, by which any portion of the tire can be expanded until it has become sufficiently enlarged.

Lime Kiln.

A new form of lime kiln has been patented by A. G. Anderson, of Quincy, Ill., whereby its operation is continuous for any length of time, and the lime is exposed to the more direct action of the fire. Greater convenience is afforded for withdrawing the charges than in any other so-called "continuous" or "perpetual draw" lime kilns.

Printing Press.

Mervin Davis, of New York City, has invented an improved printing press, in which a small expenditure of power will give a good impression; he also combines with it an improved feeding device and ink-distributing apparatus—the whole forming a complete and efficient press, which will do its work well and neatly.

Rock Drill.

This improved rock drill has a kind of jumping motion combined with the rotatory one, and the machinery by which it is operated is compact and simple. It is the invention of George H. Wood, of Green Bay, Wis., and the patented features will be found in our List of Claims this week.

Folding Iron Bedstead.

This bedstead is provided with sides, which open out when the bed is set up, and which occupy no more room when folded than an ordinary folding bedstead. It is the invention of F. Vandenhove, of New York City, and was patented this week.

The city of Columbia, Cal., whose total destruction by fire we announced a short time ago, has been rapidly rebuilt. The new buildings are many and testify to the prosperity of the neighborhood.

The first pile has been driven for a bridge across the Sacramento river, California.

New Inventions.

New Alloy.

The French chemists have discovered a new alloy which will answer well as a substitute for pure silver. It is composed of silver, nickel and copper; these metals may be combined in any suitable proportions—as silver twenty parts, nickel from twenty-five to thirty-one parts, and the rest up to one hundred parts in copper. By these proportions an alloy is formed that contains twenty per cent silver, and equaling the third degree of fine silver. The copper employed must be pure, and the nickel should be entirely free from cobalt.

Incrustations in Boilers.

Messrs. Editors:—The inside of my boiler is as bright as when new; and for the last three years I have done nothing but put into it a stick of oak timber as long as the boiler, or several of them if I had not one long enough; said sticks being large enough not to fall through between the flues. I throw the old ones out, and put in new ones as often as I clean out the boiler, which is, perhaps, after every thirty or forty days running. The water I use is, probably, not the worst to be found, but it is bad enough to form a considerable crust; the first six days I used it without doing anything for the prevention of crust.

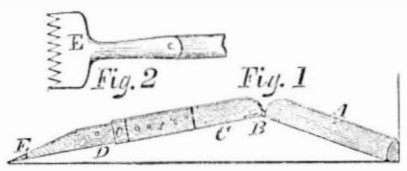
H. Goepper.

[This arrangement is very simple, and may be of use to some of our boiler-owning subscribers, who will, no doubt, try it, and let us know the result. For any information on super-heated steam we must refer our contributor to the correspondence column, where, in an answer to S. W. R., of Vt., he will find our opinion on the subject.—Eds.

Carpet Stretcher.

A correspondent (Mr. P. H. Tyler, of Richmond, Va.) has sent us a drawing of an improved carpet stretcher, which we engrave for the benefit of our readers.

Fig. 1 is an end view of it, and Fig. 2 an end view of the toothed end. A is a piece of wood having a cushion at one end, and a hinge, B, at the other, by which means it is connected to another piece, C, having a number of holes and a strap, *c*, through which slides the piece, D, having the toothed iron, E, at its extremity. The operation is very simple. All that is required is to place the cushion on A against the wall, and the teeth



on E in the carpet, having the whole in the position shown in our engraving, and then by pressing on the hinged part, the carpet will be stretched. The pieces, D and C, can be connected, and the whole lengthened or shortened to suit any carpet, by sliding them against each other through the strap, *c*, and fastening them by passing a pin through corresponding holes in each, It has been successfully used for two years, and can be made by any carpenter for two dollars.

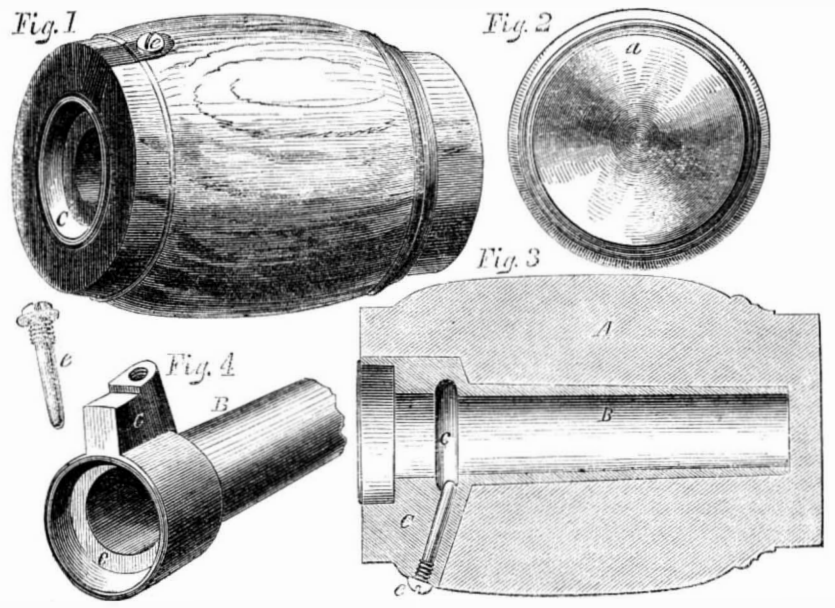
Improved Box for Carriage Hubs.

The great inconvenience attending carriage hubs is that there is always a difficulty in keeping them well greased; and the boxes are, when arranged so as to be easily accessible, very liable to become filled with dirt.

Our engravings represent a device which, it is said, overcomes these evils, and is particularly adapted for the English mail axle, although it is applicable to light or heavy wheels. Fig. 1 is a view of the hub with the invention applied; Fig. 2 shows the outside end of the hub, *a*; and Fig. 3 a section through it.

A is the hub, B the axle box, *c* the lubricating groove, and C a piece cast into it, which is let into a corresponding slot in the hub; through a hole in this passes a semi-cylindrical tube having at the end a screw, (seen at *e*,) and separated at Fig. 4, which also represents the box. The advantage of this is that the screw can be easily removed, and oil supplied, and in the removal it brings with it a small quantity of dirt, and by its

GARRATT'S BOX FOR CARRIAGE HUBS.



shape it always tends to keep the channel in which it lies clean.

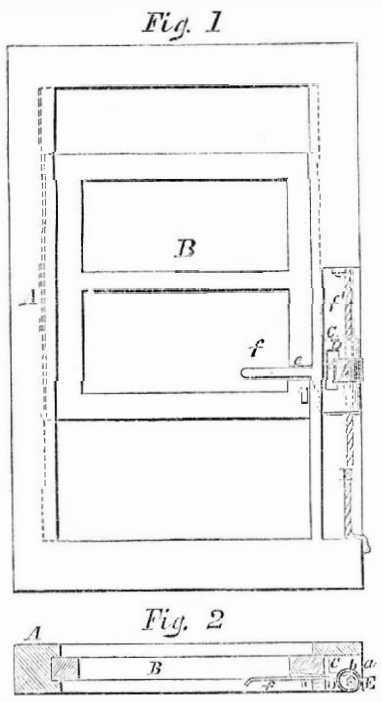
The firm who have purchased the English patent have called it the "United States Axle Box," and by this name it will become generally known, thus taking the place of the English axle box, which is at present considered the best.

It is the invention of Dr. A. C. Garratt, No. 83 Eustis street, Roxbury, Mass., from whom all further particulars can be obtained. Patented February 26, 1857.

Baker's Sash Supporter.

This supporter for sashes acts by friction, although not in the ordinary way, which is to let the friction of the sash against the jamb hold up the window. This invention is particularly adapted to the windows of railroads, omnibuses, and to other small sashes. In the arrangement shown in our engravings, Fig. 1 is front view, with part of the jamb removed, to show the supporter, and Fig. 2 a section through the invention. The same letters refer to similar parts in each.

A is the window frame or jamb posts, and B a sash, having a vertical movement. In a

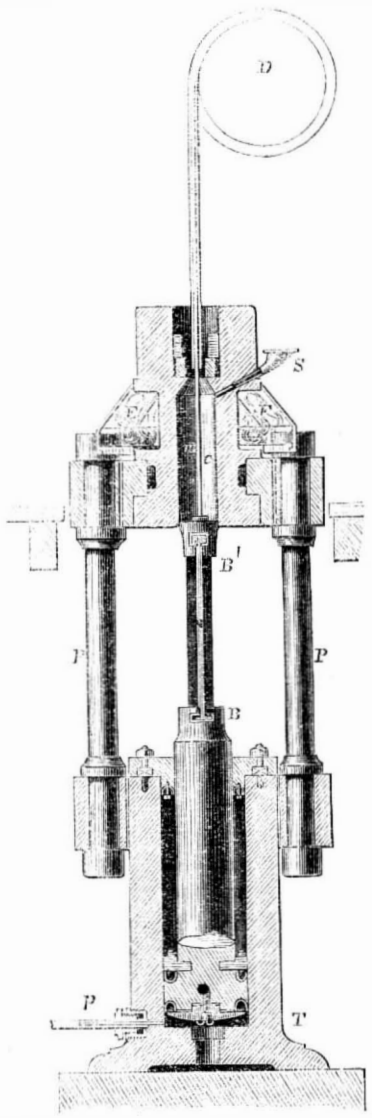


recess, *f'*, in the frame, is placed the cord, E, and to the side of B is attached the metal plate, C, whose outer edge is seen at *a*; another plate, D, is attached to it by an india rubber band, *b*, which passes through openings, *c*, in the plate. The outer edge of D is rounded, and the other has a shank, *f*, attached, which passes through a groove, *e*, in the stile of the sash.

The operation is very simple: In raising the window, the thumb or finger is pressed upon the shank, which loosens C and D, from the cord, E; when raised high enough, the shank is released, and the india rubber band draws the plates, C and D, close against E thus holding the window firm in its place.

This sash supporter is the invention of Mr. Nathaniel E. Baker, of Holyoke, Mass., and from him all further particulars may be obtained. Patented October 13, 1857.

Lead Piping.



The manufacture of lead pipe by the ordinary method combines, like that of sheet lead, the double process of casting and elongation. Whatever may be the dimensions of the pipe required, it is first cast in the form of a short and extremely thick cylinder, which is afterwards reduced to the proper size by being forcibly drawn, when placed in a mandrel of the exact size of its internal diameter, through a succession of progressively decreasing steel dies. By this process, however, although affording pipes of good quality, with regard to soundness and finish, lengths of from twenty to thirty feet only can be obtained; and, consequently, when very long pieces without a joint are required, recourse must be had to the hydraulic pipe-press shown in our engraving.

This machine consists of a common hydraulic press, T, connected with a double force pump, by which water is pumped beneath the piston, B, through the small metallic pipe, *p*; above the top of the press, and on a level with the floor of the workshop, is supported by the stout iron pillars, P, a heavy casting, containing the cylindrical reservoir, *c*, for the reception of the metallic lead, and an annular fire-place, F, charged with pit coal, and communicating with a chimney for the escape of the smoke. At the upper extremity of the cavity, *c*, is secured a steel die, of the diameter of the outside of the pipe to be made, whilst a mandrel, *m*, which passes directly through its center, has the same dimensions as the inside of the pipe which is to be produced.

To use this apparatus, the piston, B, is brought into the position shown in the cut, and the space, *c*, filled with molten lead, through the spout, S, which is immediately removed, and the aperture firmly stopped by a stout iron plug, kept in its place by a strong key. The pressure is now established by admitting the water through a valve, beneath the piston, which forces the other extremity, B', accurately fitting the cylindrical cavity, C, gradually upwards, and causes the lead to escape in the form of a perfectly finished tube through the annular space existing between the mandrel and the fixed collar. The pipe, in proportion as it escapes from the press, is coiled around the drum, D, from which it is afterwards removed, and cut into convenient lengths. The pipe made by this machine is of good quality, and may be made of almost any required length.

On admitting the pressure above the piston by means of a valve, the plunger again descends to the bottom of the cavity.—*J. A. Phillips' Treatise on Metallurgy.*

Manufacturing Bullets from Lead Wire.

A machine has been invented for manufacturing bullets from lead wire. The wire is coiled upon rests at the top of the machine, and suspended by means of arches, from which the lead is fed downwards into the machine, where it is measured, and cut off as required for each bullet, after which it is forced forward into dies, and formed into the desired shape by compression. It makes musket, rifle and pistol elongated, hollow, and conical expansion bullets; also round or shell balls, at the same time. At one corner it makes round balls, at another musket, at another rifle, at the other rifle and pistol elongated bullets; each corner being double, with two sets of dies and punches, which gives eight bullets to one revolution of the machine.

Inventors's Congress.

The editor of a Southern paper writes to us proposing the above, and with the glowing language of the sunny South depicts its seeming advantages. It has been proposed before, and we have always opposed it heartily, as being against the true interest of the inventor; a few greedy capitalists and speculators in patents would soon creep in and turn an intended good into a positive evil, and so blast the end of such a meeting. We give it as our opinion founded on the experience of twelve years, that inventive genius, to be successful must be single and alone, self-dependent, self-reliant, heroic in its labor and its aim.

Postage.—Correspondents who write to us for information, expecting a reply by mail, will oblige us much by enclosing a stamp to prepay return postage. Our daily correspondence is large, and the postage tax is an item

Scientific American.

NEW YORK, NOVEMBER 14, 1857.

Geography and Geology.

The first of our subjects, geography, is the science of describing the surface of the globe, while geology has for its object the description of the interior of the earth, and tracing the history of the rocks of which it is composed. Any one looking at a map will at once perceive the amount of talent, observation and calculation necessary to perfect such a drawing, and the same is equally true of a geological chart or section. We wish, in this article, to show the necessity of a perfect description of our earth, and also indicate the means at command for performing the labor, and, so to speak, for jotting down the items in the great encyclopædia of facts.

It is of the utmost importance to the mariner, and all who trust themselves upon the ocean, that there should be perfect and reliable charts and instructions, deduced from practical observations, of the route they are about to travel. It is equally necessary that every current should be indicated and soundings taken, and the depth of water, at various points, marked on the charts, so that every ocean and sea may become as well known as the Atlantic, from New York to Liverpool. Commerce demands geographers to work in this field, and the saving of human life is their reward. Again, it is necessary that the land should be equally well mapped out, in order that boundaries may be accurately determined, and the divisions of States and countries may be truly known. It may seem surprising to some of our readers, that the destiny of a nation often depends on a geographical question. The late war between Great Britain and Russia was one of boundary, and the Paris Conference was called to settle the question; and there are many parallel cases in history where one geographer would have settled a question which took many battles and victories to determine.

Geology is important, as developing the resources of a country—its explorations are requisite to make out where the coal, iron and mineral veins are concealed—to discover the locality of building stones, and marbles, and of clays for bricks, and also to determine their extent, and the best places to commence their working.

Now, let us inquire the means at command for attaining these objects. The governments of nearly every country having any pretensions to civilization have now an organized body of scientific men to make these geographical and geological charts, sections and maps. We have a Coast Survey, and we are occasionally sending out exploring expeditions whose aim is to do the work we have mentioned. Each State has its geologist and scientific corps for exploring and giving to the world an account of its resources and capabilities. Great Britain has her Ordnance Survey, and her ships of war are always carrying on this work of mapping the globe. Germany has her great band of scientific amateurs, and the learned of each nation are voluntarily doing their utmost for the good of the world.

A vast amount of labor has been done in this field by the means we have specified, but there yet remains much to be done, and we would point this out as a sphere of enterprise in which many can engage, and by first making a chart of their own district they may extend their labors to wider and unexplored fields.

Winter Evenings.

The season when King Frost enchains our country in his icy grasp, and throws his white mantle over the earth, will soon be upon us, and we must begin to think what we shall do with ourselves in those long winter evenings, when there is no comfort but at the fireside, or in sitting close around the stove. Those evenings contain many precious hours that ought not to be, as they too often are, wasted and lost. Reader, we will propose a scheme to you whereby you will find them pass pleasantly and profitably; and when spring again comes, with its gladsome sounds and beauteous vegetation, you will be happier and better for the winter that has passed. Our advice, then, is, learn to do something. No matter what—to draw, to paint, to put together machinery, to read or speak a language that at present you do not know; invent something in your own line of business that is wanted, and determine to make it by the spring. Learn something, read a useful book every evening, if only for an hour; but do whatever you determine regularly and punctually, and you will be surprised how much knowledge you will have acquired in a short time. Do not idle away the precious moments in foolish conversation and story paper nonsense, although they are both very good in their place; but try and master a branch of science—each one of you knows which you like the best, and which is best suited to your habits and capabilities—and should you meet with difficulties in the way, as no doubt many will, write to us, and we will give you the best aid and advice that it is in our power to dispense.

At any rate, set earnestly to work, and learn to do something, and who knows but that there may be among the subscribers to the Scientific American an embryo Newton, Herschel, Morse or Watt. If such there should be, this advice may tend to develop his genius, and the world will eventually thank us for having advised our readers not to neglect their winter evenings.

Manufacture of Starch.

Starch is an important element of food with animals as with vegetables, and its ready convertibility, without change of composition, into suitable forms, such as dextrine and sugar, fits it exactly for carrying on those changes which occur in the juices of vegetables. It is stored up in the seeds, roots and pith of plants, and by its decomposition affords the materials for the most essential vegetable products. Starch, from whatever source, always presents the same chemical characters; its physical peculiarities may, however, vary slightly. In its pure state, it is a fine, white powder, without taste or smell, and has a peculiar crispness when rubbed between the fingers. It is not soluble in cold water, and on this fact the manufacture, or rather, the extraction, of starch depends. The simplest method of preparing starch, and separating it from the gluten, and other constituents of wheat, is by washing dough in a linen bag, in a gentle stream of water. The usual process, however, whether potatoes, wheat, rice or maize is treated, is as follows:—

The substance is crushed, left to steep in cold water, and occasionally agitated; or a quantity of the grain is conveyed, by appropriate machinery, under small jets of water, until all the starch grains are washed out; the water having the fine starch suspended (not dissolved) in it, they are left to settle, and then dried, when they crack into the little prismatic shapes so well known to all consumers of the article.

The crushing is a very inconvenient operation, especially with indian corn; and Mr. Watt, of Belfast, Ireland, has taken out a patent in this country for the manufacture of starch from indian corn whole. His process is as follows, and in our opinion will be found to answer perfectly:—He first takes the ear of corn, and steeps it in water for a week, keeping the water at any temperature between 70° and 140° Fah., and changing the water several times. In this there will be a slight fermentation, and as soon as it has ceased, the corn is taken out and ground to a kind of powdery pulp, as it is quite soft from the steeping. Warm water of the above temperatures must be kept running through the millstones, and this will carry away the starch; the water is passed through the seives, or other arrangement for catching the starch, and the whole is allowed to settle—the clear water being run off, and the starch dried and packed as in older processes. It was patented June 30, 1857.

Human Strength.

When we say that any one is strong, we mean that he is capable of enduring physical exertion and fatigue longer than the average run of men. Many experimenters have endeavored to find an average on which to base observations as to the strength of men; but many allowances have to be made for climate, temperature, food, age, and other accidental interferences. It has, however, been determined that the best method of arriving at a true idea of the strength of men, is to observe the average effect produced by a laborer who continues his exertions several successive days. What is called a "dynamic unit" is then fixed upon as a standard by which to compare results, and this is 1,000 lbs. avoirdupois carried one foot in one minute.

According to M. Coulomb, a man traveling on a level road may walk 30 miles per day, or 264 feet per minute, and continue his exertion for ten hours a day. Taking the man's weight at 150 lbs., he has expended 23,760 dynamic units, or, in other words, has used the amount of strength that would have been required to transport 23,760,000 pounds one foot in one minute.

If instead of walking on a level road he ascends a staircase, the velocity is reduced to 26·4 feet per minute, and he can only work eight hours per day. In this case he has only expended 1,901 dynamic units.

A person carrying a weight of 90 lbs. along a level road, travels at the rate of a mile and a half an hour, or 132 feet per minute, and continues his exertion seven hours per day. The useful effect is, consequently, 4,989 dynamic units.

The force which a man exerts in dragging a load has been variously estimated. Schulze says that a man can exert a pressure of 107 lbs. for a short time, and that a man may walk at the rate of from $4\frac{3}{4}$ to $6\frac{1}{2}$ miles per hour.

The most advantageous method of employing human strength is in rowing a boat. Of course there are numerous exceptions to these rules of strength we have given, as they can but be an approximation to the average; but in investigations of this kind we must be content with such results.

Another Important Decision by the New Commissioner of Patents.

We have the pleasure to present, in this number of our journal, the report of a late decision by the new Commissioner of Patents, which not only confirms our previous high estimate of his administrative qualifications, but foreshadows the inauguration of a line of future official action that cannot fail to be productive of the most important results.

The decision in question was given in the case of D. D. Badger's appeal, on an application for a patent for an improvement in iron beams, and claimed as a "new article of manufacture." The application was twice rejected, and then carried up on appeal to the Commissioner, who referred it to a Board composed of Chief Examiners Baldwin and Dodge, with instructions to report back to him in the usual manner. Counsel for applicant (Munn & Co.) filed with the appeal a special request that, in rendering its decision, the Office would define its views in regard to the consideration of claims of a character like that presented. The Board was unable to agree, and the members reported their respective opinions to the Commissioner, who thereupon gave the case a personal hearing. We annex his decision. He confirms the report of Examiner Dodge, and sets aside that of Examiner Baldwin. We should be glad to publish both the reports of the Board, but our limits, at present, forbid. The report of Examiner Dodge is very interesting. He takes the most broad and liberal grounds, and fortifies every position by quotations from the highest authorities. His arguments are unanswerable.

We would here remark that much contrariety of opinion has, for a long time, existed among the examining officers at the Patent Office, not only as regards the proper wording of claims and titles, but also in regard to the degree of novelty that an invention must contain in order to render it patentable. Each Examiner has been permitted to follow his own notions in rendering decisions, and to constitute himself judge, jury and prosecuting attorney, in disposing of the petitions of applicants. The result is that the decisions and practice of the Office have often been of a contradictory, and sometimes of a ludicrous character.

We rejoice to believe that this mixed-up method of practice is about to be drawn to a close. In the accompanying decision, Commissioner Holt declares, in effect, that under his administration, the Patent Laws *shall be liberally construed;* that every new and useful improvement shall be entitled to a patent; that *simplicity* shall not be a bar to the patent; that names are not things; that the applicant may patent his improvement as a "New Article of Manufacture," or give it any other term that he chooses; that it is sufficient if the specification describes an invention uniting the indispensible requisites of novelty and utility; that the applicant shall not be embarrassed or impeded by the demands of Examiners in reference to terms and words.

We regard this decision of Commissioner Holt as one of the ablest documents that has ever emanated from the Patent Office. It is strong, dignified, liberal and bold. The constitutional aspect of the whole subject is examined and discussed with judicial clearness. The concluding portion contains an eloquent tribute to inventors, which will be read by them, in all parts of the country, with thrilling interest, and with immense satisfaction. He addresses them as *the benefactors of their race;* and says that it is the duty of the Patent Office, instead of perplexing and discouraging, to take them kindly by the hand, and, if possible, strew their pathway *with sunshine and with flowers!*

Most cordially do we respond to these sentiments. Most heartily do we applaud the Commissioner for the noble stand he has taken in behalf of inventors. In their name, and in the name of the whole country, we thank him for what he has already done, and we urge him to *go on*, fearlessly, with the good work.

COMMISSIONER HOLT'S DECISION.

U. S. Patent Office,
Oct. 23, 1857.

In the matter of Daniel B. Badger's application for a patent for an iron beam, to be used in the construction of buildings, and which, as made in pursuance of the specification, is claimed to be "a new article of manufacture."

This case having been twice rejected, and brought before me on appeal, was referred to a Board of Examiners, who differ widely in regard to the principal question involved, but conclude their report by deciding that in view of the reference given—the application of Adrian James, rejected on the 28th day of May, 1850,—a patent should not be allowed. Under these circumstances, concurring as I do in the determination arrived at, it is somewhat irregular on my part to discuss the principles commented upon in the Examiners' report. I am urged, however, to do so, both by the Board and by the applicant's counsel, *with the hope of establishing a more uniform rule of action than has heretofore prevailed in the Office in regard to this class of inventions.* I have looked, accordingly, into the authorities bearing upon the subject, and submit briefly the conclusions to which they have led me.

It is objected that this beam could not be patented, because, as is insisted, it is not "a new article of manufacture," It is admitted that it is not an "art," nor a "machine," nor yet "a composition of matter," as that term is universally interpreted. If, then, it is not "a new manufacture," nor a new and useful improvement upon such, it is a nondescript, so far as patent law is concerned, and whatever may be its merits on the score of novelty, utility and invention, it cannot be patented, because it finds no place in the Statutory Catalogue. This renders it necessary

to define, if practicable, with some degree of precision, the import of this term. The familiar etymology of the word "manufacture" indicates that it originally implied something made by the hand of man; but it has long since outgrown this primitive and narrow signification, and keeping pace with human progress, it has come at last to include alike the process of fabrication and every object upon which art or skill has been exercised, whereby a product has been fabricated, either by the hand of man or by the labor he directs. (Webster on Patents.) This broad, though sufficiently accurate definition would embrace "machines," which certainly, strictly speaking, are "manufactures,"—the latter constituting a genus of which the former are but a species; so far as relates to "machines," the statute, therefore, must be regarded as presenting, in fact, a *double enumeration*, which is interesting to note, because manifesting the extreme solicitude of the Legislature to cover, with its protection, the whole field of useful invention.

It is often an embarrassing question whether a particular invention is "a new manufacture," or only an improvement upon a manufacture already subsisting and known, and it is not easy to lay down a rule which would, at all times, solve this perplexing problem. It may be safely held, however, that if the invention only modifies a pre-existing manufacture, and by that modification merely improves, without so essentially changing its character and functions as to destroy its identity, it will be but an improvement, and should be so claimed. This question should be treated as of really but little practical importance. By our laws the specification is made part and parcel of the patent; and if the invention be therein correctly set forth, no misapplication of terms in the designation of the claim will vitiate the patent *a fortiori*; it should not be allowed to prejudice the application. It should, at most, furnish grounds for a suggestion on the part of the Office, whereby the error might be corrected. It is not assumed in this particular case, that more appropriate designation than that employed, could, within the range of the patent law, have been given to the invention. The position maintained is that the "beam" is not, in point of fact, "a new manufacture." There are on file the affidavits of three practical mechanics, who represent themselves as well acquainted with the various kinds of iron beams used in the construction of buildings, and who, therefore, sustain to this issue the relation of experts. After comparing the beam of Badger with those which have preceded it, they declare that they regard it as "a new article of manufacture." Their judgment, uncontradicted, is entitled to the greatest weight. Coryton (on Patents) holds this language: "The amount of difference from existing things requisite to constitute the result of the improvement or discovery 'a new manufacture,' is, in every case, *a question of fact to be referred to the particular branch of industry to which it is applied*, and requiring an accurate acquaintance with the state of manufactures, rather than a knowledge of general jurisprudence for its determination."

The objecting Examiner is understood to assert, in effect, that this beam is in no sense a manufacture, because not an article of merchandise; and that it is not patentable, for the reason that it is wanting in invention. In regard to the first feature of the objection—admitting, for the sake of the argument, that a manufacture is necessarily vendible and merchantable—I think the beam comes fully up to the requirements of the Examiner's definition. Like door and window frames, and other heavy articles of iron which now enter extensively into buildings, it is made for sale, and is, in fact, bought and sold, and forms as much an article of merchandise, as legitimate an object of commerce as a paper of pins. I confess myself unable to perceive the strength of the position taken, that it is, at best, but "an improvement in architectural materials," and cannot be ranked as a manufacture, because its utility can only be tested or realized when it is "used in some other and further connection" than that which it occupies in the workshop, or in other words, only when it has been placed in position in the building. The same thing, it seems to me, might be said of the plow, whose merits are only demonstrated after it has buried its share in the field which it is destined to furrow—and so of a countless multitude of similar inventions. The reference given being out of view, and the novelty and utility of this beam being conceded, I should, therefore, not have hesitated to grant a patent for it as a new article of manufacture, or as a new and useful improvement thereon, as the facts might have warranted. Nor should I have delayed my judgment in the matter until I could have instituted an elaborate and critical analysis of the process of labor, mental and physical, through which the inventor had probably passed, with a view of ascertaining the amount of invention which has been called into exercise. I regard such a method of investigation as delusive and unsatisfactory in its results. We know that some of the most important and valuable discoveries which have marked the progress of the arts and sciences have been the effect of accident, or the suggestion of some stray but happy thought, which came, as it were, unbidded; while, on the other hand, men have exhausted their intellects and their lives in fashioning, combining and maturing the most abstruse processes and machinery, without having contributed one dollar to the world's wealth, or one throb of enjoyment to its happiness. The law, essentially practical in its judgments, looks only to the *fruit* of the invention, and if it finds there the indispensable features of novelty and utility, it will presume a sufficient amount of invention to support a patent; nor is there any other lens through which the invention can be safely examined. All others, however specious, do but obscure and darken the inquiry.

Until within a few years the English Courts, regarding patents as establishing monopolies in derogation of common right, have shown them little favor, yet if any case has been reported in that country, combining novelty and utility, but in which the patent has been declared invalid for want of invention, it has escaped my researches. Such a case would be an extreme one, and should be most cautiously pronounced upon. (Webster's Reports of Letters Patent, 409, note E.)

The Constitution declares that Congress shall have power to promote the progress of science and useful arts by securing for limited time to authors and inventors, the exclusive right to their respective writings and discoveries. This embraces *all inventors*, and imposes no limitation save that the invention protected shall be useful. It is a fair if not a necessary inference that Congress has sought to carry out this provision of the fundamental law, by extending as ample and complete protection as was contemplated by the founders of the government. Indeed, in the comprehensive words employed in the statute, we have a sufficient evidence that the National Legislature has met this obligation in good faith, and if it has not been fulfilled it has not been from lack of zeal, but from lack of the knowledge of languages. If, however, the stringent construction not favored in certain quarters be adopted in practice, it is to be feared that many inventors who have been summoned to this Office by the Constitution, would find its door shut in their face. It must be assumed as the only safe and tenable ground which can be occupied in the administration of this Office, that *every new and useful invention* is patentable, and may be appropriately ranked under one or other of the clauses designated in the statute. Names happily are not things; and if the specification describes an invention uniting the indispensable requisites of novelty and utility, it will not be considered as of the essence of the claim, that it should be referred *eo nomine*, to any one of the heads of the statutory enumeration. A failure to adopt some one of the designations presented in that enumeration, or the adoption of what the office might regard as an inappropriate designation, should not be allowed to embarrass the application, if the specification itself combines the characteristics mentioned.

It is due to the dignity of the subject and to the generous spirit of the Constitution, that the patent laws should be liberally construed, having ever in view the great end they were designed to subserve. They were enacted for the government of an office whose range of action is altogether above the barren field of mere technicalities. That office, in my judgment, would be forgetful of its mission, and disloyal to one of the highest interests of humanity, were it to permit itself to be entangled in a mesh of mere words, or palsied by doubts, born of intricate metaphysical disquisitions. It has to do with the substance of things, and to deal with the earnest, ingenuous, practical intellect of the age, and it should be dealt with frankly, not perplexing and discouraging inventors, by subtle distinctions, but kindly taking them by the hand, as the benefactors of their race, and strewing, if possible, their pathway with sunshine and with flowers.

As the reference given is regarded as an anticipation of this invention, the application must be rejected. J. Holt,
Commissioner.

The Acacias.

These are among the most useful of trees, and besides, they form graceful ornaments in streets and fields. They have small flowers collected in balls or spikes of a white, red or yellow color. They inhabit all the warm countries of the world; some of them yield gum arabic, others gum senegal. The bark of one variety gives us the astringent substance called catechu, or *terra japonica*. The flowers of some are extremely fragrant, and are much used in Italy as a perfume. Many species have a bark possessed of valuable tanning properties. The timber is very durable, and it requires little or no cultivation. The Chinese use the yellow flowers to dye silks with, and it gives a color which is, as yet, unrivaled. One genus is known here as the Locust tree, and it is worthy of more general attention.

The Indian Mutiny.

The mutiny in India is likely to affect disastrously a vast amount of progressive industry. Within the last twenty years, the amount of the products of other countries consumed in India has increased from $20,000,000 to $85,000,000. and her native productions have more than kept pace with it. Every nation that trades with her becomes her debtor. In 1835, the surplus produce of India was $40,000,000; in 1856 it exceeded $125,000,000. Last year the balance due India for the excess of the exports over the imports was $41,000,000. The specie importations have increased from $14,000,000 in 1846 to $62,000,000 in 1856. The present war puts a stop to all this trade.

Dishonesty.

A California correspondent writing to us says, in connection with other remarks, "we are now shipping from one to two millions of dollars monthly to the Atlantic States, for which we get paid in merchandise of the following kinds:—Boots and shoes made up of paper, leather and shavings, so that persons often wear out four pairs a month, unfinished pants and shirts, axes with bad handles, colliers' picks without steel." It is really dishonest to send such goods in exchange for hard cash, and we hope that such a suicidal system will soon be stopped.

Wm. D. Wilson, Editor of the *Iowa Farmer*, at Mount Pleasant, Iowa, writes to us that he intends to travel extensively through that State during the coming winter, and will undertake to sell patent rights on good agricultural machines adapted to that region. Mr. Wilson is a stranger to us, but we presume he can furnish satisfactory references if called upon to do so.

The Aquarium.

Messrs. Editors:—There is one feature which no writer on the aquarium has yet noticed: when a tank is properly stocked, the water soon gets crowded with animalculæ, which swarm among the plants, and occupy the sides of the glass in countless numbers, made visible only by the aid of the microscope. These facts are in accordance with certain laws of nature, and the presence of vegetable and animal life always develops them. But observe the utility of these animalculæ; they contribute to the sustenance of the other living creatures by supplying them with food. The researches of chemistry have proved that these minute organizations respire in much the same way as plants, while animals generally absorb oxygen, and perish if the introduction of that gas is suspended. These minute organisms absorb carbonic acid gas, and give out oxygen in abundance. My experience convinces me that a tank which has been fitted up for some months, will sustain a much greater amount of animal life than one of the same dimensions but recently stocked. Beginners should distinctly remember the leading principles of the aquarium, and then success in maintaining one may, without much difficulty, be achieved. If the tank have not a distinctly self-supporting character, such as will preserve its strength without alteration of any kind, it may be concluded that there has been unskillful management in its stock. H. D. Butler.

[The above communication will, no doubt, be interesting to those of our readers who have begun to stock aquaria; but we think the writer's remarks apply more especially to salt water tanks.—Eds.

Heat and Cold.

A lady correspondent writes to us, giving her idea of the philosophy of the facts recorded in our recent article on this subject. We will give a condensation of her letter, which is to the effect "that heat is never strictly speaking evolved by the agitation of water; but, the cause of elevation of temperature, when water flows along shutes, tubes, or is shaken in a patent churn, is due to the friction of the globules of water against the solid material with which they are in contact." She finds fault with us for saying anything against poetical expressions, and, as a lady only can, defends the poets from the charge of writing false science, in such a manner that we must refrain from argument, hoping, however, to hear from her again.

A Steamboat Newspaper.

Among other innovations which the mammoth steamship *Great Eastern* is about to inaugurate, will be the publication of a daily paper on board for the benefit of the traveling public—the regular "public" of travelers—whom she may be bearing across the ocean. But this startling feature is anticipated on the western waters of the New World, for the New Orleans and St. Louis packet steamer *James E. Woodruff* now sails equiped with the force and material for the publication of a regular *daily paper on board* during her trips up and down the river, with a job office attached for the printing of bills of fare and other work.

Longevity.—The *Pacific Sentinel* says that an Indian named Pedro died at Santa Cruz on the 7th September, aged 130 years. In 1784, when the Mission there was founded, Pedro was an old man, as is known to many people residing at Santa Cruz.

Traveling Americans.—The amount expended by American travelers in Europe is estimated at $10,000,000 annually. This is no small amount to be emptied into the pockets of European hotel keepers and railway companies.

Chloroform Liniment for Burns—M. Bargiacchi states that he has found the extreme suffering produced by bad burns completely relieved by means of a liniment composed of chloroform and cod-liver oil.

Correspondents

R. H., of Me.—It is not new to insert the plumb and level in a try-square. It has been done before.

W. R. H., of Texas.—We are not acquainted with Professor Forshey's paper on Texan northers, but if you can give us any particulars of it, with your own remarks, we shall be happy to receive them, as we should like some information on the subject.

F. G. L., of Ala.—It is a well-known fact that a line disposed in the form of a circle will enclose more space than any other form.

B. F. W., of Ga.—Writing machines have long been talked and thought of, and a patent was taken out a few weeks ago for a key printing machine, which would nearly answer your description and ideas.

J. T., of Texas.—The idea you suggest of throwing a jet of steam direct from the boiler into a casing around the barrel of the locomotive pump, so as to prevent freezing, is not new. The same thing has been proposed to us before.

S. W. R., of Vt.—The advantage of what is termed "superheating" steam, that is to say, heating it after it has left the boiler, when only carried out to such a degree as to vaporize all the globules of water which it has carried with it from the boiler, and thus render it anhydrous is universally conceded. Many arrangements of superheating pipes have been employed for this purpose, sometimes in the main fire-box and sometimes in the flues or chimney; but there has been a great difficulty in controlling the temperature of the superheating pipes, so that they should neither burn out or cause the steam to be superheated to excess, both of which results are very likely to occur if the pipes are placed in the main fire-box. If you can arrange your pipes in such a manner as to guard against their being overheated, you will obtain a considerable advantage by "superheating."

J. M. T., of Ind.—We are obliged to inform you that there is nothing new or patentable in your alleged improvement in water wheels.

F. O. B., of Wis.—If you could refer to any engravings which have appeared in our columns for the last six years which are as poorly executed as yours, you might have reason to complain at our rejecting your cuts; but we wish you, and all others who desire us to illustrate their inventions in our columns, to understand that we keep designers and engravers for the express purpose of getting up the engravings for our paper, and so long as we charge no more than other engravers for doing the work, we prefer to have it done under our supervision. No one has cause to demur at what you term "fastidiousness."

H. R., of N. Y.—A cable like the Atlantic one would never float in any depth of water. The idea is a very popular fallacy.

M. A. J., of Pa.—We do not know of any book in which you will find the information you wish, but we can tell you that transparent colors are usually made of what are called silica colors ground with a transparent varnish in the ordinary way.

J. P., of Wis.—Your invention is almost similar to one which we have described in a previous number of the Scientific American, and in our opinion is not patentable, there being no novelty in floating buoys attached to ships.

C. A. H., of Mich.—It is impossible to execute mechanical engravings correctly from a daguerreotype. A model is preferable to drawings to get up engravings from. It enables us, in describing the invention, to better understand the advantages and operation of the machine.

David Sexton, of Wytheville, Va., wishes to purchase one of Norton & Owen's double-cylindered bark mills.

T. W. B., of Ohio.—Your communication has been received, and we are sorry to say it is too abstract for the generality of our readers.

M. A., of Ind.—The simplest way to increase your draft would be to add a few feet to the hight of the chimney. We cannot tell you whether a saving of fuel would be effected by such increase. Too strong a draft is not economical, as it causes too much heat to escape up the chimney, and too weak a one, by not effecting perfect combustion results, also in loss.

D. A. B., of Ala.—We think a gun constructed as you propose would be very liable to burst unless you used an exceedingly short barrel. A sudden or percussive force is not the most effective in throwing projectiles. It is by reason of its very sudden combustion that gun cotton is not so effective as gunpowder in throwing a ball, while it is much more likely to burst the gun. We cannot see that you would gain any advantage over Barker's mill by your spiral tube. The reaction would be in proportion to the fall only.

E. W. P., of Mass.—Your communication on the manufacture of oil of vitriol very correctly details the method practised twenty years ago; but our article is a description of the method pursued *to-day*, and was written by an analytical chemist who is practically acquainted with the present method.

J. R., of N. O.—Your remittance to pay for repairs on model was duly received.

W. A. McC., of Pa.—The best method of freeing coal from sulphur in the coking process is to coke in close ovens, and if the whole of the sulphur is not then freed, have a small hole and sliding shutter in the door to admit a small quantity of air and occasionally let some in. Coke slow, and we think you will get rid of it. Send us a description of your process, and also that of making crude oil, and we will further advise you.

L. S., of N. O.—There have been a great many patents issued for machines capable of sawing two sides of tapering slabs for monuments.

T. C., of N. Y.—Your idea of the gyroscope is truer than many we have seen, but we have given up calling the attention of our readers to it, as its novelty is gone.

E. F., of Ct.—There is no truly valuable work on pumps, valves, hydrostatic presses, &c. Ewbank's Hydraulics is a good general history on the subject of hydraulics, and such subjects as are collateral to it.

W. F. M., of Md.—We think you can procure Professor Mahan's works from Wiley & Halstead, of this city. You can pursue a course of study on civil engineering at the Polytechnic College, Philadelphia,

J. J., of N. Y.—The putty used by gilders is composed of whiting and size. You must find the proportions to suit yourself, as each frame maker uses it differently.

F. W., of Mass.—It is a burning shame that the Commissioner of Patents should have the disposal of so small a portion of the Patent Office Reports which are printed. The Patent Office should have the distribution of three-fourths of the number issued, for it has a complete register of the names of all parties entitled to them; but, under the present system of distribution, the members of Congress have a large proportion of the Patent Reports, and, of course, they distribute them among a class of their constituents who have the most influence at the polls. The mechanic and the inventor are not usually of that class. We would recommend you and others to ask the member of Congress from your respective district to send you the Commissioner of Patent's Report, and if those members are fit representatives of their districts, they will not refuse to respond to the request. The Commissioner has more orders for them than he can fill.

W. C. J., of Kenwood.—Smith Beers, of Nangatuck, Ct., has a patent for an odometer which we believe to be a good one.

H. H., of Pa.—The best wood is mahogany, next to that, soft pine. Shellac varnish will answer your purpose. To apply emery to a rifle, you had better use a weak solution of glue, and dust the emery on.

Money received at the Scientific American Office on account of Patent Office business, for the week ending Saturday, November 7, 1857:—

M. T., of N. Y., $30; J. H., of Ind., $30; J. D. S., of Vt., $25; R. L., of Wis., $30; H. A. S., of Vt., $30; J. L., of Mass., $10; G. & S., of Vt., $30; J. M. S., of Conn., $30; A. A. N., of Ill., $22; E. A. C., of Conn., $55; J. H. H., of Pa., $30; W. McK., of Cal., $45; T. V., of Cal., $10; G. H. W., of Wis., $695; E. E., of Ill., $30; L. & M., of Mass., $25; C. W., of Pa., $10; J. V. J., of Mich., $10; W. B., of N. Y., $575; W. A. Y., of N. C., $55; N. R. A., of N. Y., $30; H. H., of N. Y., $30; W. C. W., of N. Y., $119; J. C. S., of Mass., $155.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, November 7, 1857:—

J. D. S., of Vt.; J. H., of Ind.; A. A. N., of Ill.; L. K., of Ohio; L. & M., of Mass.; E. A. C., of Conn.; W. C. W., of N. Y., (2 cases); J. C. S., of Mass., (3 cases).

Literary Notices.

Illustrated Annual Register of Rural Affairs for 1855-6-7.—Luther Tucker & Son, Albany. This is a re-issue of a work called the "Annual Register," and it pleasantly treats of all things connected with rural life—houses, gardens, animals, fruits and flowers are all herewell and ably described, and they are illustrated with 440 engravings. Most of the new and useful implements used in cultivation or gathering the fruits of the earth find a place, and it is a nice and valuable book for the farmer or any one living in the country.

Hunt's Merchant Magazine—Freeman Hunt, New York. The November number is full of useful intelligence and matters of interest to the commercial man, while one of its most valuable features is its nautical intelligence, which is an item not found in any other periodical.

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Science and Art.

Spectacles.

These aids to failing sight were first used about the latter end of the thirteenth century, and their invention is ascribed to Roger Bacon. Sir David Brewster says:—"Persons who have enjoyed distinct and comfortable vision in early life, it is remarked, are the most likely to appreciate the benefit to be derived from glasses. Between the ages of thirty and forty, they begin to experience a change in sight. During the progress of this alteration, much inconvenience is experienced, as no spectacles seem to be serviceable in giving correct vision. Happily, however, two or three months ends this difficulty, and as soon as the alteration is complete, distinct and comfortable vision is at once obtained by the use of well selected glasses of a convex figure. During this transition state it is important that the eyes should be subjected to no severe strain, and great regard should be paid to the general health.

The material of spectacle lenses should be glass, of a very low dispersive power or better still, of rock crystal. They should be as thin as practicable. To correct a common error in the manufacture of lenses, by which the distance between the centres of the lenses is equal to the distance between the pupils of the eyes, the following is given: 'Draw on paper an isosceles triangle, the two sides of which are equal to the distance of each pupil from the point to be seen distinctly; while the third side or base is equal to the distance between the pupils when the eyes view that point. Then set off on each side of the triangle, from each end of the base, the distance of the center of lenses or their frames from the pupil, and the distance of these points will be the distance of the centers of the lenses required.'

The long-sighted persons will generally, for ten or twelve years, require glasses only for reading or work done by hands; but as life advances other spectacles will be needed for objects at greater distances, and it will be of great advantage to have two or three pairs of different local distances. It is a very incorrect notion that it is prudent to avoid the use of artificial helps to the eyes as long as possible.

The human eye is too delicate a structure to bear continued strain without injury, and the true rule is to commence the use of glasses as soon as we can see better with than without them."

Fire Protector for Buildings.

When conflagrations occur in old, dilapidated, and, for the most part, frame buildings, it is generally not so much an object to save them as to prevent injury to the surrounding property; and in case the supply of water should fall short, we have, at present, no adequate method of staying the progress of the flames. The invention we are about to describe is intended for this purpose. Fig. 1 is a perspective view of the whole, while Fig. 2 is a longitudinal section of the vertical sliding rods detached.

A truck is first constructed, consisting of an iron frame, A, from thirty-five to forty feet long, and of convenient width, and this is mounted on four wheels, B, on the axles, *c*, attached to the truck by ring bolts to enable it to turn a sharp curve in a small space. On each end of A are erected four iron uprights or iron tubes, D, which are connected at the top by frames, E, on which are journals for the axles of the chain wheels, F. Other chain wheels, G, are mounted on the lower part of the frame, A, and these carry the endless chain, H. On the axles of the lower chain wheels, G, are mounted two ratchet wheels, X, one on each, with pawls *y*, hinged to the frame, and locking into their teeth.

In the center of the truck, nearly filling the space between the chain wheels, is arranged longitudinally with the frame, A, a roller supported at each end on journals in bearings, I, erected on the frame. This roller is constructed with two flanges, J, keyed on a shaft, with a series of wrought iron rods or tubes connecting them, around and near their peripheries. The flanges, J, may either, one or both, form tiller or sprocket wheels, so as to be turned by hand to rotate the roller. This roller forms a foundation on which to wind the necessary quantity of sheet iron, in sheets of about thirty feet wide, (just the length of the roller,) and about twelve feet deep, and are so made at the top and bottom as to form one continuous sheet.

On the inner end of the frame, E, are erected standards, K, with capping pieces, L, to support their upper ends. To these uprights are jointed clamps, M M′, at their top and bottom, through which rods, N, are free to play vertically. A bar or tube, O, having an eye at each end, spans and connects the two rods, N, horizontally above the sheet roller. These rods, N, are also provided with a socket, P, which may be secured to them at any point by a set screw. To these collars are jointed hooks, Q, of a suitable form to hook into the links of the endless chain, H.

To the upper edge of the sheet, W, are attached a number of hooks, *p*, by which it is connected with the bar, O. When it is intended to raise the sheet, pins, S, are passed through the rods, N. The hooks, Q, are connected with the endless chains, H, and their

ODION'S FIRE PROTECTOR FOR BUILDINGS.

Fig. 1

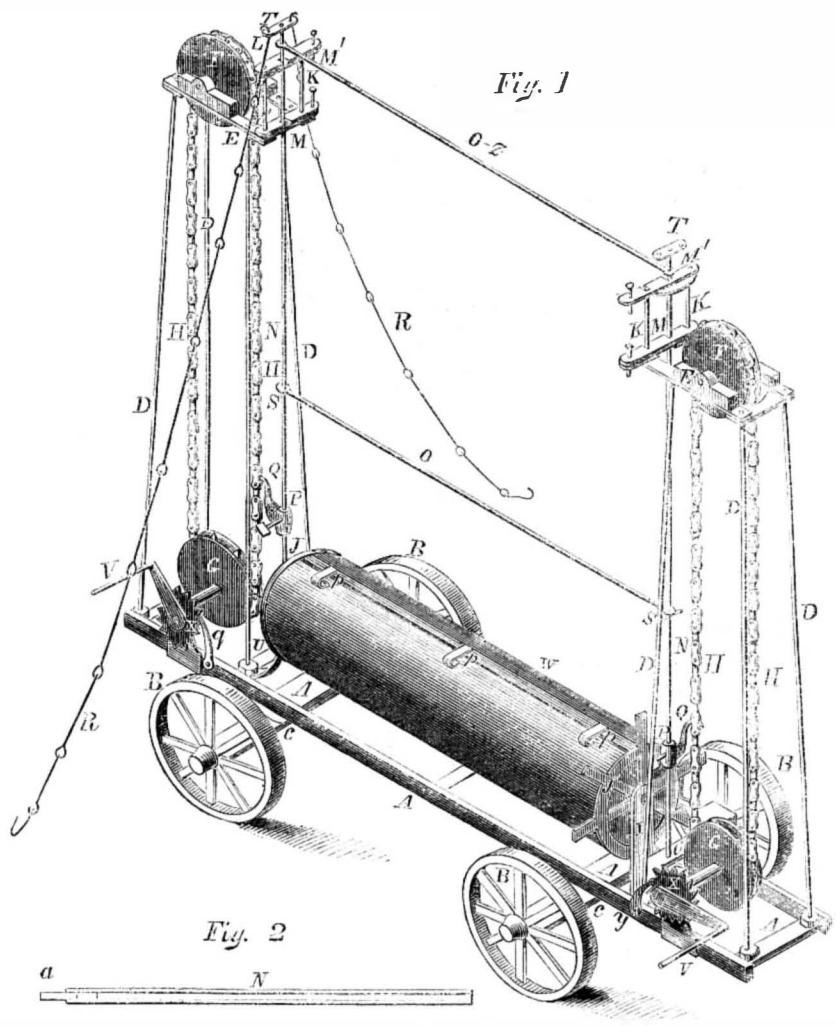
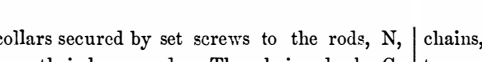


Fig. 2



collars secured by set screws to the rods, N, near their lower ends. The chain wheels, G, are then rotated by cranks, V, on their axles, which raise the rods, N, and with them the bar, O, and sheet, W, by unwinding it from the roller until the ends of the bars come in contact with the lower clamps, M, which are then opened, to allow it to pass up, and closed again, and the upper ones are opened, the rods, bar and sheet pass through, and they are again closed. The screen is then supported by the ends of the bar, O, resting on the clamps, M′, in the position represented at O Z, whilst the rods, N, are released from the chains and allowed to slide down to their original position. A man then ascends by the rattlings, or in any other way, to the head of the endless chains, and secures the cross bar, O, to the rods, N, by inserting a pin, or tightening a collar by a set screw underneath them, and at the same time attaches guy chains, R, to the cops, T, on the tops of N. The hooks, Q, being again connected with the endless chains and rods as low down as possible, they may be raised as before, until a section of rod (made of wrought iron tube, with socket joints, by riveting a shank, *a*, seen in Fig. 2,) can be connected at their lower ends, which are then let to rest on the feet, U, whilst the collar and hook can be again lowered, and connected as before, near the bottom, with the chains and rods, when the sheet is raised by turning the chain wheels. This may be repeated by adding sections of rod, until the screen is raised to the necessary hight to protect the neighboring property, when the guy chains, R, are to be anchored to steady the top. A number of these screens may be arranged in a line, or around a burning building, so as to protect, in a great measure, the surrounding property.

Further information and particulars may be obtained from the inventor, Thomas Odion, of Portsmouth, N. H. It was patented September 29, 1857.

Difference between a Watch and a Clock.

A watch differs from a clock in its having a vibrating wheel instead of a vibrating pendulum; and, as in a clock, gravity is always pulling the pendulum down to the bottom of its arc, which is its natural place of rest, but does not fix it there, because the momentum acquired during its approach to the middle position from either side carries it just as far past on the other side, and the spring has to begin its work again. The balance wheel at each vibration allows one tooth of the adjoining wheel to pass, as the pendulum does in a clock; and the record of the beats is preserved by the wheel which follows. A main spring is used to keep up the motion of the watch, instead of the weight used in a clock; and as the spring acts equally well whatever be its position, a watch keeps time although carried in the pocket, or in a moving ship. In winding up a watch, one turn of the axle on which the key is fixed is rendered equivalent, by the train of wheels, to about four hundred turns or beats of the balance wheel; and thus the exertion, during a few seconds, of the hand which winds up, gives motion for twenty-four or thirty hours.—*Dr. Arnott.*

Observation.

The habit of observation is one of the most valuable in life, its worth can never be too highly estimated, and it is one that can easily be cultivated. Never do anything without observing that all you do is correct. Do not ever take a walk without having your eyes and ears open, and always try and remember what you see and hear. By this means you will acquire more knowledge than can ever be learned from books, as you will find the information in exactly the form you are capable of receiving it. Read books and newspapers, but above all acquire observing habits, for they will be always with you, and ever ready to store your mind with the truths of nature.

The Ague.

Ague is now far less common in London than formerly. The disease was very common some two or three hundred years ago, James I. and Cromwell having died from it. When the population of London was not one-fourth its present amount, the deaths from ague were very much more numerous than now. The average number of deaths in London from real ague do not exceed twenty-four or twenty-five per annum. This decrease is entirely due to the many local improvements, in the way of drains, cleansing the streets, and compelling the inhabitants to obey strict sanitary laws. Ague is not the only disease which can be driven away by drains and cold water—in fact, there are few ailments or epidemics that their combined efforts will not eradicate.