

## New Inventions.

## Improvement in Reversible Wrenches.

The accompanying engravings represent the adjustable reversible ratchet wrench for which a patent was granted to John D. Dale, of the city of Philadelphia, on the 21st of August last.

Fig. 1 is a top view of the under part of the wrench, arranged to turn a bolt or a nut, and fig. 2 is a vertical longitudinal section of the wrench, adjusted to turn a bolt or nut. The same letters refer to like parts on both the figures.

The nature of the invention consists in combining in the wrench adjustable jaws, capable of grasping square, round, or other formed nuts, bolts, &c., with ratchet wheels notched in a reverse direction, and a series of parts for giving motion to the ratchet wheels and jaws, either to the right or left at the will of the operator, from the end of the handle of the main body of the wrench, and with an increased leverage without moving the main body of the wrench, and in such a manner as to cause the nut, bolt, or drill, or other object to be turned without disengaging the jaws from their grasp of a object, simply by the vibratory motion of the lever or handle arranged above the wrench handle, and capable of being worked (when the nut, bolt, or other object is difficult of access) where the ordinary wrench could not be operated.

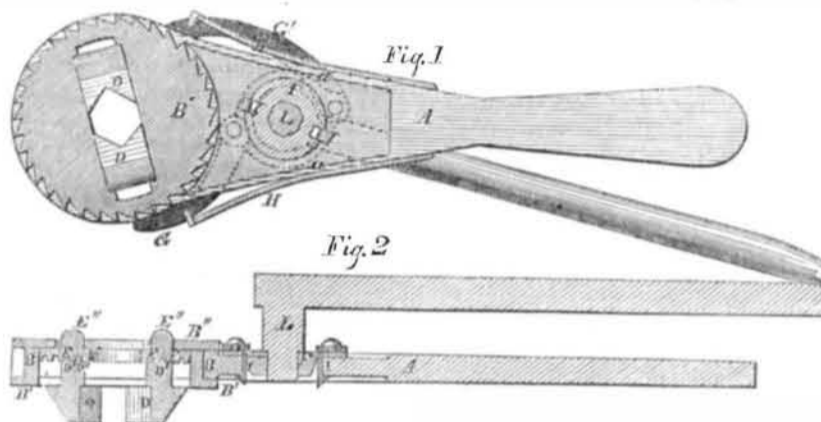
The main body, A, of the wrench is cast in one piece with a handle at one end for holding it while working. B is a circular rim in the enlarged, or box end of the wrench. B' is a ratchet wheel, snugly fitting in this rim. The upper surface of this wheel—outside the rim—rests against the lower surface of the enlarged part of the wrench. The upper edge of the rim is on line with its upper surface, so as to cause the lower surface of an upper ratchet wheel, B', outside of the rim, to rest on the upper surface of the enlarged part of the wrench. The rim and the ratchet wheels, B1 B2, are confined and turned within the circular box of the wrench. C is a slot in the lower ratchet wheel, B1; it extends across it from one side of the inner periphery of the rim, B, to the opposite side, and the edges enter grooves in the sides of the two adjustable jaws, D D, which extend above and below the slot. These jaws are formed strong, and move parallel. Their office is to grasp the article—bolt, nut, &c.—to be turned. On their upper part they are made convex; their outer and inner sides are concave. They have curved cogs or lips, D1, projecting from their upper surfaces—two cogs being near the outer and inner sides of the other. These cogs enter helical grooves formed by a thread, E, on the lower surface of a circular plate, E1, which is confined between the upper surfaces of the jaws, D, and the lower surface of the upper ratchet wheel, B2, inside of rim B. Its periphery fits exactly within the rim, and it has finger holds, E2, for turning it, which thus expand or contract the jaws, D D, to grasp and set free articles of various sizes. The worm, E, acts upon the cogs, D1, of the jaws to operate them. F is a hub fitting in a circular opening. It has a flange at its upper part, and has ears projecting therefrom. G G' are pawls secured to these ears by pins. The pawl, G, is attached to the ear nearest wheel B2, and is curved round its periphery and made like a bill hook tooth to engage in the notches of the wheel against which it is pressed by a curved spring, H. Another pawl, G', is attached in a similar manner at the other end, and engages with the notches of wheel B1, on the opposite side to that on which the pawl G is situated; it is also constantly pressed by a spring, H2, secured to the side of the wrench, and is like the opposite spring in form and office. The flanged hub, F, to which the pawls are attached, is held in place by springs, I, while at work. L is a lever, with its axis secured in the hub, F; its office is to operate the pawls, G G', to turn the ratchet wheels by successive vibrations.

**OPERATION**—To turn the nut, bolt, &c. to the right, the flange hub, F, is inserted in its opening from the upper side, as represented in the figures. The jaws, D, are then made to grasp

the nut or bolt by turning the circular plate, E', to the left. A vibratory motion is then given to the end of the lever, L, by one hand, while the handle of the wrench, A, is held in the other, by the operator, which causes the flanged hub, F, to move in a corresponding manner, and to alternately move the ends of the pawls, G G', against the teeth of the ratchet wheel, B2, and over their inclined portions in their backward and forward motions, and thus give the ratchet wheel, B2, a rotary motion, and with it the jaws, D, and nut or other object grasped. In case it is desired to turn the jaws, D, with the nut or bolt embraced by them in a reversed direction (to the

left) the pawls, G G', are discharged from the springs, H, and the projections on the flexible ends of springs, I, are pressed in the countersinks in the periphery of the hub, F, so as to disengage them from contact with the under surface of the wrench. The hub, with its pawls attached, is now withdrawn, and again inserted in its opening from the opposite side, in an inverted position, and held therein by the notches of springs I. The pawls are then pressed against the teeth in the periphery of the lower ratchet wheel, B', which teeth, being in a reverse position to those on the wheel, B2, and thus made to conform with the reversed position of the pawls, G G', &c., will be opera-

## DALE'S PATENT REVERSIBLE WRENCH.



ted upon alternately by the pawls, as their ends are pushed forward and back by the vibratory movement of the hub and lever, and a continuous motion to the left will be given to the jaws, D, and the nut or bolt.

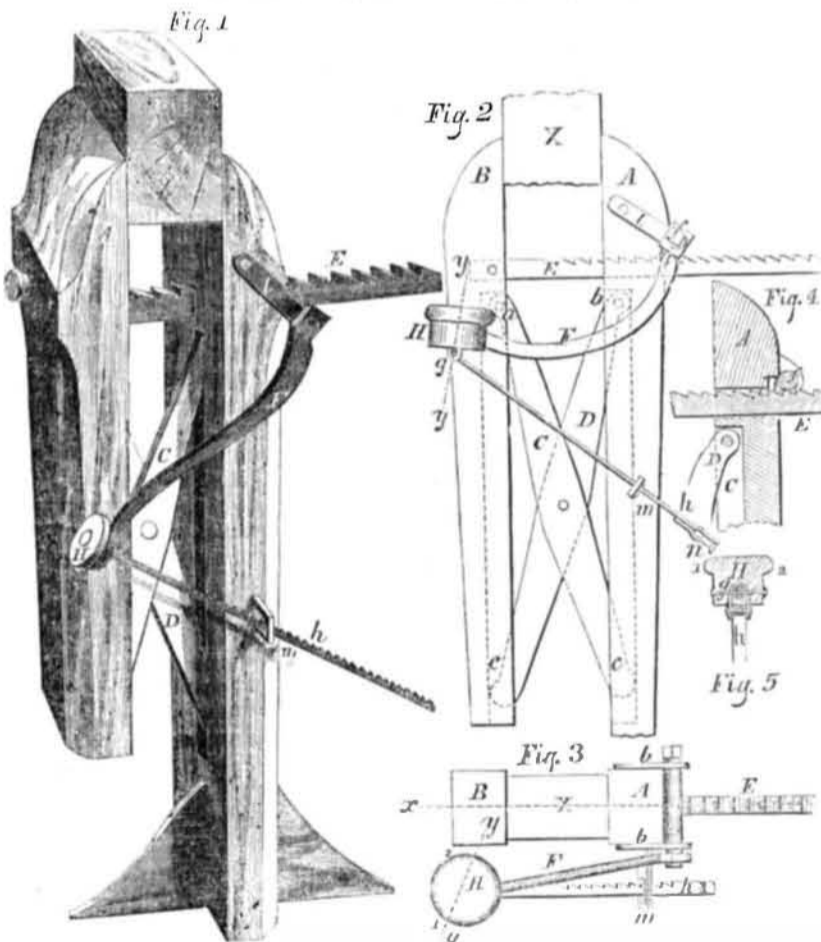
Instead of operating the ratchet wheels, B' B'', by the lever, it may be detached from the hub, F, and the wings of it may be allowed to turn against the projecting edges, a, on the side of the main body of the wrench, between which they are situated, and by vibrating the handle of the wrench, the pawls, G G', will be caused to act alternately against the teeth of

the ratchet wheels, in such a manner as to give a continuous movement to the wheels and jaws, and the nut or bolt—the direction in which the ratchet wheels and jaws move, and the object grasped being reversed in this case.

This wrench may be used for turning drills or other tools, the spindle passing through the openings in the center of the ratchet wheels, B1 B2, and circular plate, E, and being grasped firmly by the jaws, D, in the manner described for operating nuts and bolts.

More information may be obtained by letter addressed to the patentee, at Philadelphia.

## JOHNSON'S PARALLEL VISE.



The accompanying engravings represent the improvement in Parallel Vises, for which a patent was granted to Jasper Johnson, of Geneseo, N. Y., on the 16th of October last.

Fig. 1 is a perspective view of the vise. Fig. 2 is a side elevation; fig. 3 is a top view; fig. 4 is a vertical section on the line, x x, fig. 3; and fig. 5 is a section on y y, figs. 2 and 3.—Similar letters refer to like parts on all the figures—excepting A B on fig. 1, which are misplaced.

The nature of the invention consists in so constructing parallel vises that their jaws

shall be tightened by pressure upon a simple lever, without the agency of screw power in any form; a gathering pawl which constitutes one arm of said lever, acting upon a rack bar attached to the movable jaw, to tighten the vise, the lever being held in any given position, by means of a sliding rack, so connected with a rocking head at the extremity of said lever, as to be susceptible of a lateral motion of sufficient degree to engage or disengage the securing stud at the will of the operator.

A is the stationary jaw of vise, B the movable jaw. These jaws are connected by the

cross levers, C and D, secured by bolts, a b, so that jaw B, always moves parallel to the jaw, A, by reason of the lower extremities of said cross levers rising in grooves, c c. E is a rack bar, secured to jaw, B, and passing through the stationary jaw, A. The opening through A, may be such as to permit in the rack bar a lateral motion, sufficient to allow the holding between the jaws of an article whose opposite faces incline towards each other. F is a lever, secured to the extremity of the shaft, f, which is held by the lugs, l, connected with jaw, A, by bolts. Upon the shaft, f, is a pawl, i, capable of engaging rack bar E, under certain circumstances, said pawl constituting the short arm of the operating lever. H is a rocking head resting upon the lever, F, having the sliding rack, h, in a direction from the side of the head pressed. This rack, h, passes through a slot in stud m, of the stationary jaw, and engages the inner edge of the slot when forced towards it. The lower extremity of the rack, h, has a spring, n, which, when drawn into the slot of stud m, will preserve the lever, F, in an elevated position, and lift the pawl, i, clear of rack bar, E.

**OPERATION**—Before inserting the article, X, between the jaws, the lever, F, is sufficiently elevated to cause the spring, n, to enter the slot of stud m, the effect of this being, as before stated, to lift pawl i into recess r, and leave the rack bar, E, free to move. The jaw, B, is then drawn out, and X inserted in the opening between the jaws; the jaw, B, at the same time, closing by its weight, the cross levers maintaining it in a position parallel with A throughout its length. The hand of the operator is then placed upon the head, H, causing it to drop, and the pawl, i, to engage the rack bar, E. A slight pressure on the said head causes the pawl, i, to draw powerfully on the rack bar, and compress X between the jaws. The side, 1, of fig. 3, of the head H is then pressed with greater force than is bestowed on side 2, which forcing rack h against the edge of its slot, causes one of its teeth to engage the stud, and the operation is complete, the several parts of the vise then having the positions shown in figs. 2, 3, and 4. To release X, the reverse action takes place. Side 2 of H is pressed upon moving the rack, h, outward, and disengaging its tooth from the standard. The lever, F, is then raised until spring n engages the slot of stud m, when the jaw, B, is free to move outward as described.

The lever, F, may be carried to the lower portion of the vise, so as to be operated by the foot, a spring being employed to carry it up when the vise is to be opened. The lugs, l, are movable about their bolts, the weight of the shaft and lever always keeping them in position. This construction of vise, by rendering the fulcrum movable, gives the system of levers, when in operation, the effect of the toggle joint, and also insures the taking of the pawl into some tooth of the rack for holding an article of any desired size.

It will be observed that the construction and action of this parallel vise, differ essentially from that of the vise of Messrs. Davis, in the last number of the SCIENTIFIC AMERICAN; the feet of the levers, C D, in this one rise up; in the other the top ends of the levers were unbolted and slid down. The other devices and combinations are also quite different. This vise has been recommended for the convenience it affords to the operator, and the rapidity with which he can work it, to open and close the jaws, and to adjust the distance between them, for the reception of articles of different sizes.

More information may be obtained respecting this invention by letter addressed to the patentee, at Geneseo.

## Breech-Loading Rifle.

We have lately examined a new breech-loading rifle, the invention of Mr. John Swyne, of Boston, Mass., patented in August, 1855. It belongs to the class known as magazine fire arms. The cartridges are all contained in a round longitudinal magazine, which extends the whole length of the implement below the barrel. Percussion caps are used, and they are stowed in the gun stock. The loading and capping is done with great rapidity, safety, and certainty, by means of simple, easily operated mechanism.