F. S. OBER.

Ratchet-Wrench.

No. 168,406. Patented Oct. 5, 1875.

Fig. 1.

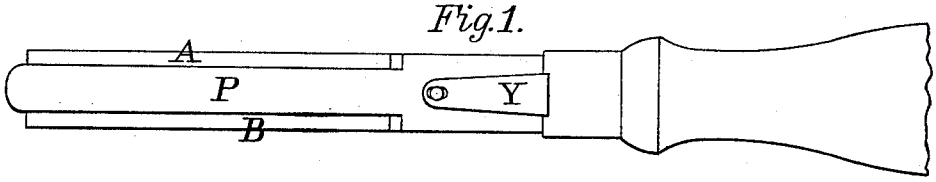


Fig. 2.

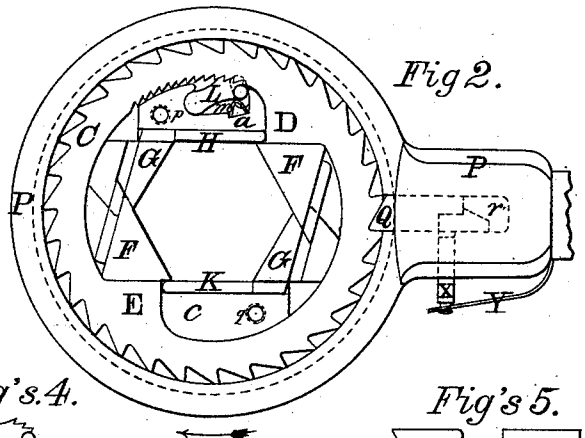
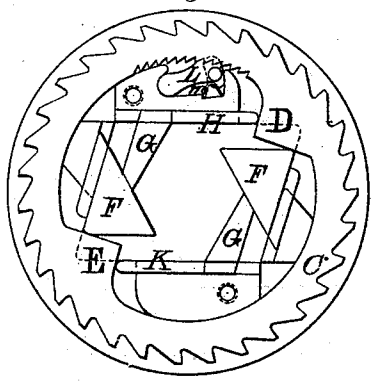
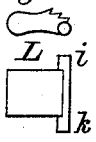


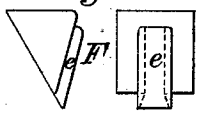
Fig. 3.



Fig's. 4.



Fig's 5.



Fig's 6

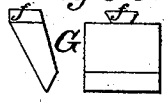


Fig 7.

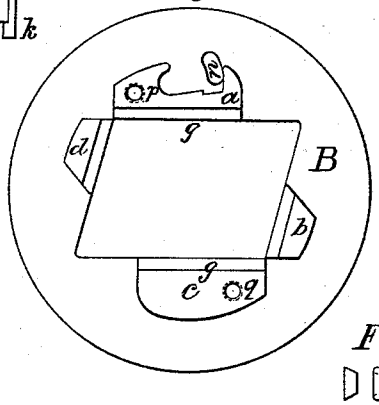
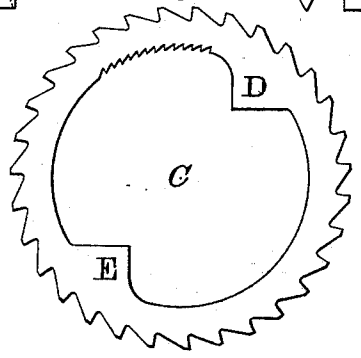


Fig. 9.



Fig's. 11.

Fig. 8.

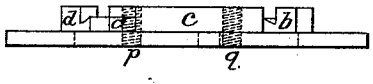


Fig 10.

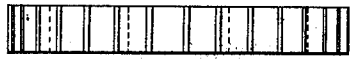
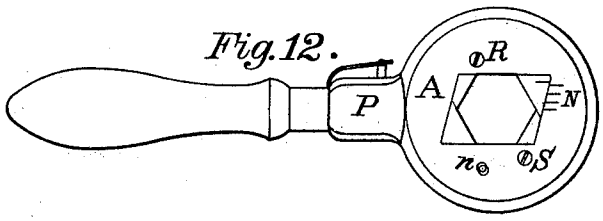


Fig. 12.



Witnesses;
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Inventor; Franklin S. Ober
per- C. H. Watson & Co. Atty's

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UNITED STATES PATENT OFFICE.

FRANKLIN S. OBER, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO HIMSELF AND WALTON BROTHERS, OF NEW YORK CITY.

IMPROVEMENT IN RATCHET-WRENCHES.

Specification forming part of Letters Patent No. **168,406**, dated October 5, 1875; application filed August 4, 1875.

To all whom it may concern:

Be it known that I, FRANKLIN S. OBER, of Washington, in the District of Columbia, have invented certain new and useful Improvements in Ratchet-Wrenches; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings and to the letters of reference marked thereon, which form a part of this specification.

The object of my invention is to construct a ratchet-wrench with adjustable jaws, whereby it can be adjusted or fitted to suit nuts, bolts, &c., of various sizes and shapes; and it consists, first, in the peculiar construction of the outer plates of the wrench, whereby they form guiding-plates for the sliding jaws; second, in the peculiar construction of the sliding jaws and their arrangement in connection with the guiding-plates; third, in constructing the ratchet-wheel with forcing-lugs on the inner edge thereof, by which the sliding jaws are operated; fourth, in also constructing the ratchet-wheel with teeth on a portion of its inner edge, and providing a check-pawl for engagement therewith, whereby the wheel is permitted to move in one direction, and prevented from moving in the opposite direction until the pawl is withdrawn from the teeth; fifth, in the construction and arrangement of readjusting-bars, whereby the action of the forcing-lugs is transmitted to the sliding jaws in readjusting the latter; sixth, in an operating-pawl, having a jog therein at its rear end for the reception of a spring-stop; and, seventh, in the combination of the holder, guiding-plates, ratchet-wheels, having the forcing-lugs, sliding jaws, readjusting-bars, check-pawl and the operating-pawl, and spring-stop, as will be hereinafter more fully set forth.

In the drawing, Figure 1 is an edge view of the wrench. Fig. 2 is a plan view with the top plate A, Fig. 1, omitted, all the parts shown occupying their normal positions. Fig. 3 is a plan view with the top plate A and the pawl-holder P omitted, showing the sliding jaws as moved to a smaller adjustment than in Fig. 2. Figs. 4 are plan and rear views of the check-pawl. Figs. 5 are plan and edge views of the larger sliding jaws. Figs. 6 are plan and edge views of the smaller sliding jaws. Fig. 7 is a plan view of the bottom guiding-plate B. Fig. 8 is an edge view of the same. Fig. 9 is a plan view of the ratchet-wheel. Fig. 10 is an edge view of the same. Figs. 11 are plan, end, and edge views of the readjusting-bars. Fig. 12 is a plan view, on a reduced scale, of the wrench in its normal condition.

The guiding-plate B, Figs. 7 and 8, is of a circular form, and is provided with a parallelogrammic opening through it, the opposite sides of said opening at corresponding points being exactly the same distance from the center of the plate. This plate is flat on the outside, but the inner face or surface is provided with four projecting parts, *a*, *b*, *c*, and *d*, the curved outer edges of which, except at the wider ends of *a* and *c*, are concentric with the periphery of the plate. The inner edges of these projections are grooved to receive one-half of the dovetailed portion *e* and *f* of the sliding jaws F and G, Figs. 5 and 6. In the projecting part *a* there is a recess formed to receive the check-pawl L and the rubber spring *m*. The guiding-plate is also provided with an opening, *n*, Figs. 7 and 12, into which one of the lugs of the check-pawl L extends when the parts are all put together. The tapped holes *p q* are to receive the threaded portion of the countersunk head-screws R and S, Fig. 12, by which the two guiding plates A and B are screwed together. The guiding-plate A, Figs. 1 and 12, is similar in size and shape with plate B, excepting that one is right and the other left, and excepting, also, that the holes in plate A for the screws R and S are drilled for the body of the screws, and countersunk for their heads.

The projections on the two plates are made to aggregate a little more in thickness or depth than the thickness of the ratchet-wheel, the ring portion of the pawl-holder, or the body of the check-pawl, so that each of them will play freely between the two plates after they are screwed together. The ratchet-wheel C is of uniform thickness, and its teeth are of

a suitable size to engage with the operating-pawl Q. On its inner edge it is also provided with a number of ratchet-teeth of suitable size to engage with the check-pawl L. It is also provided with two forcing-lugs, D and E, exactly opposite each other. The curved portions of the inner edge of this wheel fit nicely around the outer edges of the projections *a*, *b*, *c*, and *d* of the guiding-plates, so that it will work freely without shake, its extent of motion back and forth being limited by the wider ends of those projections. When this wheel is in its normal position the forcing-lug D abuts the wider end of the projection *a*, and the lug E that of the projection *c*, Fig. 2. The dovetailed portion of the sliding jaws F F and G G are made to work snugly in the grooves formed in the projections of the guiding-plates when screwed together. Their fit should give sufficient friction to require a slight force to move them back and forth in their respective grooves. The edges of these sliding jaws are so arranged as that, when in their normal positions within the guiding-plates, they fit closely and nicely in their respective corners of the opening through the plates, and at the same time their inner surfaces form four sides of a perfectly hexagonal space, as shown in the drawing; or a set of jaws can be made and used which will form nearly four sides of a square space when it is desired to use the wrench upon square nuts, bolts, &c.

The check-pawl L is made so that the butt-end will work nicely in the circular part of the recess in the guiding-plates, while the front end (where the lugs *i* and *k* are) just clears the front end of the recess. This prevents any riding of the check-pawl, and consequent lost motion of the ratchet-wheel. The teeth in this pawl will be as fine as it is practicable to make them, (as also the teeth of the ratchet-wheel into which they match,) and the number of teeth in it will be determined by the estimated force they are to resist. The lugs *i* and *k* will extend through and be flush with the outer faces of the guiding-plates. This pawl is kept in engagement with the teeth of the ratchet-wheel by the rubber spring *m*, which has just a little more force than is required for such purpose. The readjusting-bars H and K, Figs. 2, 3, and 13, are made to fit snugly within the grooves *g*, formed by the projections *a c* of the guiding-plates, when they are screwed together. Their fit should give sufficient friction to require a slight force to move them back and forth in their respective grooves. The ends of the bars pressed by the forcing-lugs of the ratchet-wheel are made semicircular in form, and the opposite ends are made square to fit against the dovetailed portions *f* of the sliding jaws G. The ring portion of the pawl-holder P fits nicely around the teeth of the ratchet-wheel and between the guiding-plates, and is made so as to work freely without shake. The handle portion is made with a square recess of sufficient depth to receive the operating-pawl Q and the rubber spring *r*, which keeps the pawl in play. This pawl-holder may terminate with a shank for insertion into a wooden handle, or with a stub or a socket to receive a piece of pipe or a solid bar for a longer handle when required.

It will be seen, by reference to Figs. 1, 2, and 3, that when the guiding-plates are held stationary, and the ratchet-wheel C is revolved by means of the operating-pawl Q in the pawl-holder P, the forcing-lugs D and E will press against the larger sliding jaws F and F, and cause them to move along the opening in the guiding-plates, and they, wedging in between the guiding-plates and the smaller sliding jaws G and G, will cause them to move along the opening in the plates also, the inner faces of these four sliding jaws preserving a continually-diminishing, but always perfectly hexagonal space, between them.

The wrench will be graduated with marks, as shown at N on Fig. 12; and to set the wrench for a certain-sized nut it will only require that the guiding-plates be held stationary with one hand, while with the other the handle is moved until the mark on the sliding jaw F comes opposite to the mark on the guiding-plate which represents the sized nut required to be screwed or unscrewed, as the operation of the wrench is reversed by simply turning it over.

To "set" the wrench from a smaller to a larger adjustment the lugs *i* and *k* of the check-pawl L must be pressed inward at the same time in which the handle is moved slightly in the direction indicated by the arrow beneath, Fig. 2. This, while the plates are held stationary, relieves the ratchet-wheel, and then, with the thumb pressing upon the spring Y, turn the handle quickly in the opposite direction, and the ratchet-wheel will be carried in that direction also. The lugs D and E, pressing against the rounded ends of the readjusting-bars H and K, will transmit the motion to the sliding jaws, and thus they will be forced back to their normal positions, from which they can be set in the manner before described.

As it is sometimes desirable to "coax" a nut—that is, to work it back and forth several times for a portion of a turn only—and then proceed for several whole turns before more coaxing, this operation can be accomplished by pressing upon the spring Y while the wrench is being worked back and forth. Such pressure keeps the operating-pawl Q inserted in the teeth of the ratchet-wheel, and causes motion to the nut either way the handle is moved. As soon as the pressure ceases the spring Y withdraws the stop X, and the motion from the handle will be transmitted in one direction only.

It will be observed that all the parts that would be most liable to injury by exposure to rough usage are almost completely concealed and protected, while at the same time all that is required to enable the wrench to be taken to pieces for cleaning or other purposes is to take out the two screws R and S, Fig. 12.

I claim as my invention—

1. The guiding-plates A and B, constructed with the projections *a b c d*, the parallelogrammic opening, and the holes *n*, substantially as and for the purpose described.

2. The sliding jaws F and G, constructed substantially as described, and having dovetailed projections thereon, which engage with the dovetailed grooves formed in the projections of the guiding-plates, substantially as and for the purpose set forth.

3. The check-pawl L, constructed and arranged as described, in combination with the ratchet-wheel C, provided with teeth on a portion of its inner edge, substantially as and for the purpose described.

4. The readjusting-bars H and K, in combination with the forcing-lugs D and E, and sliding jaws G G and F F, whereby the sliding jaws are returned to their normal positions when the movement of the ratchet-wheel is reversed, substantially as described.

5. In combination with the ratchet-wheel C, the pawl Q, having a jog at its rear end, and the spring-stop X, substantially in the manner and for the purpose set forth.

6. The combination of the holder P, guiding-plates A and B, having the projections *a b c d*, ratchet-wheel C, having the forcing-lugs D and E, and interior teeth, sliding jaws F F and G G, readjusting-bars H K, check-pawl L, operating-pawl Q, and spring-stop X, the several parts being constructed and arranged substantially as described, and for the purpose set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

FRANKLIN S. OBER.

Witnesses:
C. H. WATSON,
H. A. HALL.