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LEVER-ACTUATED PIVOTED-JAW WRENCH

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This invention relates to wrenches, and more particularly to the type having a movable jaw adjustable with respect to a fixed jaw to enable nuts, bolts, pipes and other elements upon which a wrench is normally used, to be firmly engaged between the jaws and very quickly released or disengaged when desired.

The primary object of the invention is to provide a wrench of this character, wherein a movable jaw is adapted to be adjusted to any position desired in respect to the stationary jaw, and while arranged to be pivotally shifted from its adjusted position to instantly free the object engaged between the jaws, it will also be instantly restored to clamping position, whereby its gripping surface will be parallel to that of the stationary jaw, upon closing movement of an operating handle.

Another object of the invention is to provide a wrench of this character which may be readily adjusted to fit any desired size of nut or other like object, and which, due to the pivotal mounting of one of its jaws and a toggle movement by which the jaw is pivotally moved with a relatively slight movement of an operating handle, may be readily released from gripping engagement with the nut without the necessity for altering the adjustment means.

The invention further contemplates the provision in the wrenches of this kind, means by which the adjustment of the jaws, when once set for a nut of a certain size, will remain constant, despite repeated pivotal opening and closing movements of the movable jaw.

Still another object of the invention is to provide in a wrench of this character, means by which the aforementioned functions are performed and results secured by a minimum of parts, so that the wrench may be sturdy, of long-lasting construction and fully capable of withstanding the hard uses to which tools of this character are generally put.

More particularly, the invention contemplates the provision of a fixed jaw and a movable jaw adjustable to or from the fixed jaw, and an actuated actuating handle engaging with a pair of pivotally connected links to establish a toggle connection by which the movable jaw is pivotally moved by the handle to an angular position to free an object engaged between the jaws.

In the accompanying drawing, wherein an illustrative embodiment of the invention is disclosed, Fig. 1 is a side elevation of the improved wrench in closed position, with certain parts broken away and other parts shown in section, to disclose construction; Fig. 2 is a similar view with the wrench in open or released position, and Fig. 3 is a sectional view on the line 3—3 of Fig. 1, looking in the direction of the arrows.

Referring to the drawing, 1 indicates a frame, which in its wider portion is substantially channel-shaped in cross section, thereby providing a pair of spaced side walls 2 and 3, integrally connected by the back wall 4. Toward one end of the frame, the side walls are curved inwardly toward one another, or otherwise brought together, to form a cylindrical handle portion 5, and at its opposite end the frame is provided with a solid part 6 constituting the stationary jaw portion of the wrench. This jaw portion 6 of the wrench may be reinforced or otherwise strengthened by inserts, and it is provided with a gripping face 7 which may be roughened if desired, to afford a non-slipping grip on a nut or other object to be engaged by the wrench.

Extending between the walls 2 and 3 of the frame 1 is a pivot pin 31 on which is pivoted a lever 32 constituting an adjustment member, said lever having a segmental end portion 33 which is toothed at 34 to mesh with an adjusting worm 36 rotatably mounted on the pin 37 secured in an insert 38 fixedly located between the side walls 2 and 3 of the frame. The frame is apertured as at 39 so that the adjusting worm 36 is exposed through the walls 2 and 3 and is thus accessible to the fingers of the user of the tool for adjusting the movable jaw 40 of the wrench to and from the fixed jaw 5 in a manner to be described.

The opposite end of the lever 32 is pivotally connected at 41 to the movable jaw 40 which is provided with a head portion 52 constituting the movable jaw proper, and having a gripping surface 20. The movable jaw 40 has an extended arm portion 42 in the form of a clevis, pivoted at 43 to one end of an angular link 44, which is in turn pivoted at 45 to one end of a link 46 having its other end pivoted at 47 between the walls 2 and 3 of the frame 1.

At 23 is shown the actuating lever which is pivoted at 48 in the clevis part 43 of the movable jaw 40 and is straddled by the link 46. The actuating lever or handle 23 is provided with an aperture 49 which surrounds the link 44.

From the foregoing, the operation of the improved wrench will be readily understood. By rotation of the worm 36 the lever or adjusting member 32 is swung on its pivot 31 and through its pivotal connection at 41 with the movable jaw 40, it will adjust said jaw to or from the fixed jaw 6 according to the direction of rotation of the worm 36, to space the jaws apart for the
required distance to cause them to fit a nut or other object.

In its open position, the wrench is shown in Fig. 2, wherein it will be noted that the actuating handle has been swung angularly away from the fixed handle part 5 and the gripping surface 20 of the movable jaw 40 is angularly positioned with respect to the gripping face 1 of the stationary jaw.

To bring the movable jaw into gripping position, at a distance from the fixed jaw as determined by the adjustment secured by the toothed engagement of the worm 35 and segment 33, merely requires the actuating handle 23 to be swung toward the handle 5 to the limit of its movement in that direction. As the actuating handle 23 is swung toward the handle part 5, the angular face portion 50 of the aperture 49, engages against a toe 51 provided on the link 44, moving said link inwardly on its pivot 45 and causing it to swing the movable jaw 40 on its pivot 41 to bring its gripping surface 20 into parallelism with the gripping surface 1 of the stationary jaw. This toggle arrangement is such that when the movable jaw has reached a position wherein it has its gripping surface parallel to that of the stationary jaw, a position past dead center has been reached, as seen in Fig. 1, and the parts are locked in clamping position.

To free an object clamped between the jaws of the wrench merely requires that the actuating handle 23 be swung away from the handle part 5, or outward for a relatively short distance as shown in Fig. 2. At the beginning of this movement, the links 44 and 46 will “break” at the pivot pin 45, or assume an angular position with respect to one another, as shown in Fig. 2, causing a pull to be exerted on the pivot 42 and causing the movable jaw to be swung on the pivot 41 to move it to an angular or open position, thus freeing the clamped object.

It is to be noted that the movable jaw can be repeatedly swung to open position by movement of the actuating lever and each time that it is returned to closed position it will not only be halted at the point where its gripping face is in parallelism with the gripping face of the stationary jaw, but it will be halted at the position determined by the adjustment that is controlled by the meshed engagement of the adjusting means 34 and 35. Thus, the wrench can be opened and closed repeatedly on the same object or on another object of similar size merely by operation of the actuating handle 23 and without requiring any change of its adjusted setting.

The toggle connection between the actuating handle 23 and the two jaws is such that the angular movement required of the handle to swing the movable jaw away from the stationary jaw is considerably reduced as compared to other wrenches of this general character, thus enabling the wrench to be very conveniently operated with a minimum of exertion on the part of the user.

What I claim is:

1. A tool of the character described comprising, a frame having a stationary jaw, a pivoted adjustment member mounted in the frame, a movable jaw pivotally connected to one end of the adjustment member, means for threadably engaging the other end of the adjustment member to cause it to move the movable jaw to or from the stationary jaw, an actuating handle pivotally attached to the movable jaw, a link having one end pivoted to the movable jaw and its second end pivotally attached to a second link, the other end of the second link being pivotally attached to the frame, the actuating handle having an aperture within which the first link is disposed and which has a surface operative upon said link to cause pivotal movement of the movable jaw when the actuating handle is swung to or from the frame.

2. A tool of the character described comprising, a frame having spaced walls, an adjusting lever pivoted between the walls, the frame having a stationary jaw portion, a movable jaw pivotally connected to the adjusting lever and being pivotally connected by a pair of pivotally-joined links to the frame, an actuating lever pivotally attached to the movable jaw and apertured to embrace one of the links and operative on said link to cause pivotal movement of the movable jaw when the actuating handle is swung to or from the frame.

3. A tool of the character described comprising, a frame having a stationary jaw, a link pivotally secured at one end to the frame, a second link pivotally connected to the other end of the first link, a movable jaw mounted in the frame and pivotally attached to the second link, and an actuating handle pivotally secured at one of its ends to the movable jaw and provided with an aperture embracing the second link, said aperture having surfaces operative with respect to the linkage to cause pivotal movement of the movable jaw when the actuating handle is swung to or from the frame, and means for adjusting the position of the movable jaw relative to the fixed jaw.

4. A tool as called for in claim 3, wherein the means for adjusting the position of the movable jaw consists in a lever pivotally mounted in the frame and having one end pivotally secured to the movable jaw and its other end toothed, and a spirally threaded member for manual rotation mounted in the frame and in engagement with the toothed end portion of the lever.

5. A tool of the character described comprising, a frame having a stationary jaw provided with a gripping face, a pivotally movable jaw mounted in the frame and movable into or out of parallelism with respect to the stationary jaw and also provided with a gripping face, an actuating handle pivotally attached to the movable jaw, a plurality of joined and pivotally linked connected end-to-end and extending between the movable jaw and the frame, at least one of said links being located in the aperture in the handle means by which movement of the actuating handle toward the frame will operate the linkage connection between the movable jaw and the frame to cause the jaw to be swung to bring its gripping face into parallelism with the gripping face of the stationary jaw.

6. In a tool of the character described, a frame having spaced walls and a stationary jaw, a movable jaw disposed between the walls, an adjustment member pivotally between the walls, said member being in toothed engagement with a manually rotative worm, a pair of links joined end-to-end, one end of the joined linkage being pivotally connected between the walls and the other end being pivotally secured to the movable jaw, an actuating handle pivotally mounted on one end to the movable jaw and having an aperture embracing one of the links in the linkage, the connection between the parts being such that swinging movement of the actuating handle in a direction away from the frame will pivot the movable jaw and direction away from the fixed jaw and movement of said handle toward the frame will, when said linkage is moved past a dead center position, halt the
movable jaw at a position parallel to the stationary jaw.

7. A tool of the character described comprising, a frame having a stationary jaw, said frame having a portion of channel shape, a lever pivoted at its substantially central point in the channel-shape portion of the frame, one end of said lever being segmentally toothed, a rotatable, spirally-threaded element mounted in the frame and in adjustable engagement with the toothed end of the lever, a movable jaw having an end portion pivotally attached to the second end of the lever, said movable jaw having a second end portion pivotally attached to one end of a link of substantially bell-crank shape, said bell-crank link being pivotally secured at its substantially central point at one end of a second link, the second link having its other end pivotally secured in the channel portion of the frame, an actuating handle pivotally connected to one end of a link in the aperture in the actuating handle is of bell-crank shape and has an arm portion operative against a wall of the actuating handle defining said aperture, to cause pivotal movement of the movable jaw when the actuating handle is swung to or from the frame.

8. A tool of the character described comprising, a frame having a stationary jaw portion, an adjusting lever pivotally attached to the frame, a movable jaw pivoted to the adjusting lever and being connected by a pair of pivotally-joined links to the frame, an actuating handle pivotally attached at one of its ends to the movable jaw and having an aperture through it near said pivotal connection, said aperture confining one of the links within it and being operative on said link to cause pivotal movement of the movable jaw when the actuating handle is swung to or from the frame.

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REFERENCES CITED

The following references are of record in the file of this patent:

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