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PLIER-TYPE, TOGGLE ACTUATED WRENCH

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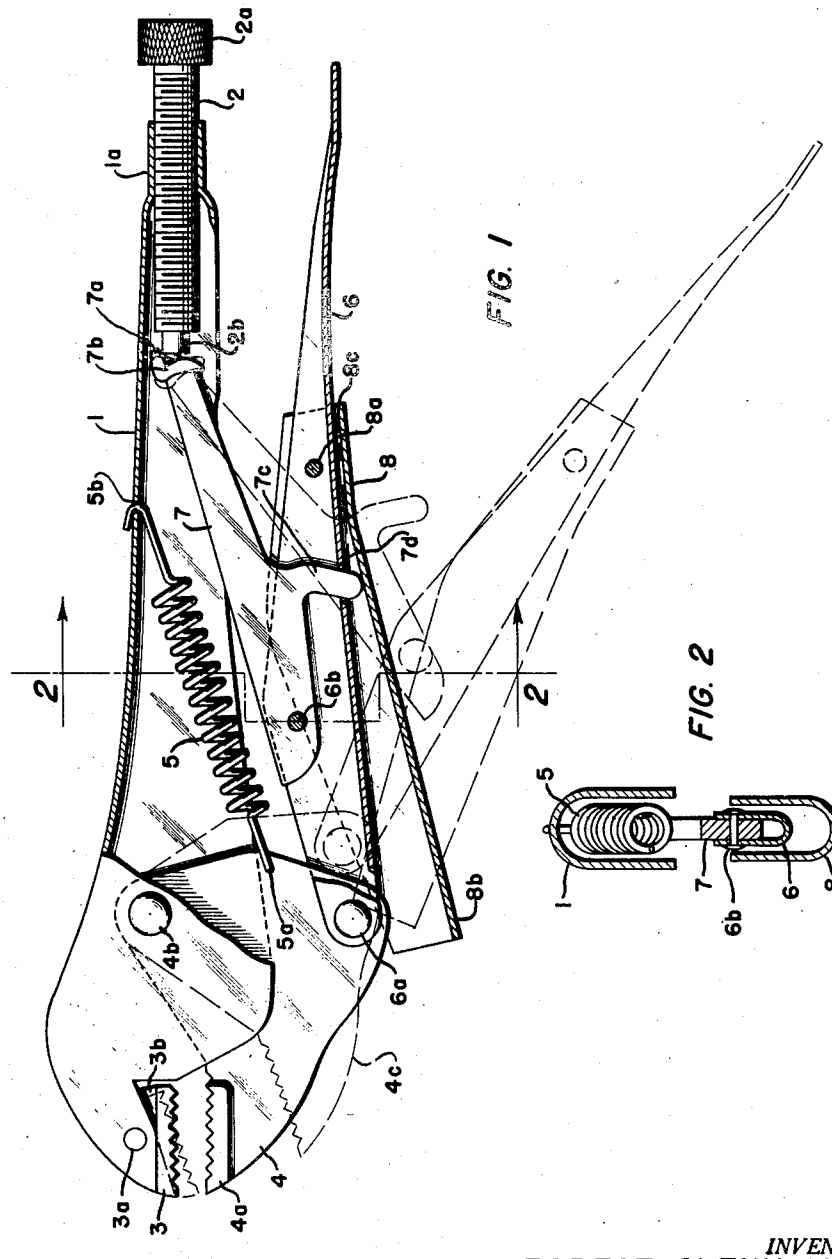


FIG. 1

FIG. 2

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PLIER TYPE, TOGGLE ACTUATED WRENCH

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My invention relates to a plier-type toggle-actuated wrench. When this type of wrench has been applied or clamped to a nut or other object it has, in the past, required both hands of the operator to release the grip of the wrench and the objects of this invention are:

First, to provide a tool of this character with a grip release which can be operated by one hand by merely shifting the hand along the handle and pressing a releasing lever.

Second, to provide a tool of this character with a grip releasing lever having safety guard flanges to protect the hand of the operator from injury.

Third, to provide a tool of this character with a pivoted jaw which co-acts with the other jaw to allow self-alignment of the jaws and the use of the tool as a parallel-jawed clamp.

Fourth, to provide a tool which has all the functions of a vise grip wrench, pliers, clamp and ratchet wrench, unimpaired by the addition of the grip releasing mechanism.

Fifth, to provide an improved plier-type toggle-actuated wrench which is practicable to manufacture, simple and convenient to use, and which will give efficient and durable service.

With these and other objects in view as will appear hereinafter, my invention consists of certain novel features of construction, combination and arrangement of parts and portions, and a certain modification, as will be hereinafter described in detail and particularly set forth in the appended claims, reference being had to the accompanying drawings and to the characters of reference thereon which form a part of this application, in which:

Figure 1 is an elevational view of my invention with parts broken away and in section to facilitate the illustration and with the positions occupied by the various levers of the mechanism when the jaws are apart or open shown in dash lines; and Fig. 2 is a sectional view of my invention taken on the line 2—2 in Fig. 1.

Similar characters of reference refer to similar or identical parts in the different views.

The handle 1, adjustable fulcrum bolt 2, self-adjusting jaw 3, lever actuated jaw 4, spring 5, lever handle 6, toggle bar 7, and grip releasing lever 8 constitute the principal parts and portions of my invention.

The handle 1 is an irregular shaped slotted member, as indicated in Fig. 2 and extends nearly the full length of the tool. At one end the slot is closed to provide an internally threaded support 1a for the adjustable fulcrum bolt 2 which

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is threaded throughout the major portion of the length thereof and terminates in a knurled thumb nut 2a at the outer end and this bolt has a knob hereinafter referred to as the fulcrum 2b at the inner end within the slot of the handle 1.

The self-adjusting corrugated jaw 3 is pivotally secured to the slotted handle 1 as at 3a by a medial flange 3b, this construction allowing the jaw 3 to align with the surface of the object clamped and in most instances the self-adjusting jaw 3 will move into parallel relationship with the corrugated portion 4a of the lever-actuated jaw 4.

This jaw 4 is generally triangular in shape and is pivotally secured within the slotted handle 1 by the pivot pin 4b. The helical spring 5 is secured under tension between the lever-actuated jaw 4 and the handle 1. One end 5a of the spring is secured to the jaw 4 at a point spaced a considerable distance from the pivot pin 4b and the other end of the spring is secured as at 5b so that the jaw 4 is constantly urged away from the jaw 3 into the position shown in dash line at 4c in Fig. 1.

The lever handle 6 is shorter than the handle 1 and is likewise a channel member throughout the greater part of the length thereof. One end of the lever handle 6 is pivotally secured as at 6a to the jaw 4 and at a point 6b spaced a considerable distance from the pivot 6a the toggle bar 7 is pivotally secured to this lever handle 6, the other end of the toggle bar having a lip 7a adapted to hook onto the adjustable fulcrum 2b to maintain the toggle bar in place. The action of the spring 5 constantly urges the toggle bar towards the fulcrum 2b so that the rounded end 7b of the toggle bar remains in frictional contact with the fulcrum 2b.

Intermediate the length of the toggle bar I provide an extended lug 7c disposed towards the lever handle 6 and adapted to pass through a hole 7d in said lever handle a short distance when the lever handle is made to approach the handle 1.

The grip releasing lever 8 is a channel member pivotally secured at 8a to the lever handle 6 and saddles this lever handle from the point of pivotal connection at 8a to a point just beyond the pivot 6a and the end 8c extending beyond the pivot 8a limits the outward movement of the end 8b of the lever 8. When the lever handle is made to approach the handle 1 the end of the lug 7c passing through the hole 7d will contact the inner surface of the grip releasing lever at a point spaced somewhat from the pivot 8a, forc-

ing the end 8b of the grip releasing lever outwardly away from the lever handle 6.

Now the clamping or self-holding action of this vice grip wrench results from the over-center movement of the toggle pivot 6b causing pressure exerted on the jaws towards opening the jaws to tend to push this pivot 6b closer to the handle 1 thus holding the lever handle 6 in locked position. It will be evident that the end of the lug 7c forms a fulcrum for the grip releasing lever 8 so that if the end 8b of this lever 8 is pressed towards the lever handle 6 the pivot 8a is forced outwardly carrying the pivot 6b back over center and releasing the lever handle 6 so that the jaws 3 and 4 can separate. The various parts and portions will then assume the positions indicated in dash lines in Fig. 1.

In using my invention, the jaws 3 and 4 are brought into juxtaposition with the nut or other object to be held or turned and the lever handle 6 pressed towards the handle 1 till the pivot 6b passes over center and the jaws are tightly clamping the object. Unless the tool is being used on repetitive work clamping a succession of objects of uniform size adjustment of the fulcrum bolt 2 will usually have to be made, the bolt being turned in when a small object is to be clamped and turned outwardly when clamping a larger object. To release the clamping action of the tool the hand is slid along the lever handle 6 and the releasing lever 8 is pressed. This forces the end 8a of the releasing lever inwardly pivoting on the end of the lug 7c and forcing the pivot 8a outwardly, carrying the pivot 6b over center and releasing the jaws 3 and 4 from the object. The action of the spring also urges the jaws apart and tends to hold the lever handle 6 away from the handle 1. Use of the tool is therefore considerably simplified by the improvements described herein since only one hand is required to clamp and unclamp an object.

Though I have shown and described a particular construction, combination and arrangement of parts and portions, and a certain modification, I do not wish to be limited to this particular construction, combination and arrangement, nor to the modification, but wish to include in the scope of my invention the construction, combination and arrangement substantially as set forth in the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A plier-type toggle-actuated wrench comprising a handle, a jaw on said handle, a lever handle, a jaw pivoted to said handle and to said lever handle, a spring adapted to urge said jaws apart, an adjustable fulcrum member on said handle, a toggle bar having one end thereof abutting said fulcrum member and the other end thereof pivotally secured to said lever handle so that this toggle pivot has an over-center handle locking action when the jaws are closed, a U-shaped in cross section grip releasing lever pivotally secured to said lever handle, said lever handle having an opening therein and a lug on said toggle bar extendable through said opening adapted to function as a fulcrum for said releasing lever.

2. A plier-type toggle-actuated wrench comprising a handle, a jaw on said handle, a lever handle, a jaw pivoted to said handle and to said lever handle, a spring adapted to urge said jaws apart, an adjustable fulcrum member on said handle, a toggle bar having one end thereof abutting said fulcrum member and the other end thereof pivotally secured to said lever handle so that this toggle pivot has an over-center handle locking action when the jaws are closed, a U-shaped in cross section grip releasing lever pivotally secured to said lever handle, said lever handle having an opening therein and a lug on said toggle bar extendable through said opening adapted to function as a fulcrum for said releasing lever, said lug being adapted to project through the hole in said lever handle and to force the free end of said releasing lever away from said lever handle when said toggle pivot passes over center into locking position.

3. A wrench comprising a handle, a jaw on said handle, a lever handle having an opening therein, a jaw pivoted to said handle and to said lever handle, a spring adapted to urge said jaws apart, an adjustable fulcrum member on said handle, a toggle bar provided with a lug projectable through said opening in said lever handle and having one of its ends abutting said fulcrum member and the other end thereof pivotally secured to said lever handle so that this toggle bar has an over center handle locking action when the jaws are closed, a U-shaped in cross section grip releasing lever pivotally secured at its one end to said lever handle on the outside thereof, and engageable with the lug on said toggle bar when it is shifted towards said first mentioned handle to release the jaws of said wrench.

4. A vise grip wrench comprising a handle, a jaw on said handle, a lever handle having an opening therein, a jaw pivoted to said handle and to said lever handle, a spring adapted to urge said jaws apart, an adjustable fulcrum member on said handle, a toggle bar provided with a lug projectable through said opening in said lever handle and having one of its ends abutting said fulcrum member and the other end thereof pivotally secured to said lever handle so that this toggle bar has an over center handle locking action when the jaws are closed, a U-shaped in cross section grip releasing lever pivotally secured at its one end to said lever handle rearwardly of the pivotal connection of said toggle bar with said lever handle, said grip releasing lever being disposed externally of said lever handle and engageable with said lug on said toggle bar and arranged when shifted to force said handle and said lever handle away from each other and release the over center handle locking action.

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