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2,672,778

QUICK-RELEASE TOGGLE WRENCH

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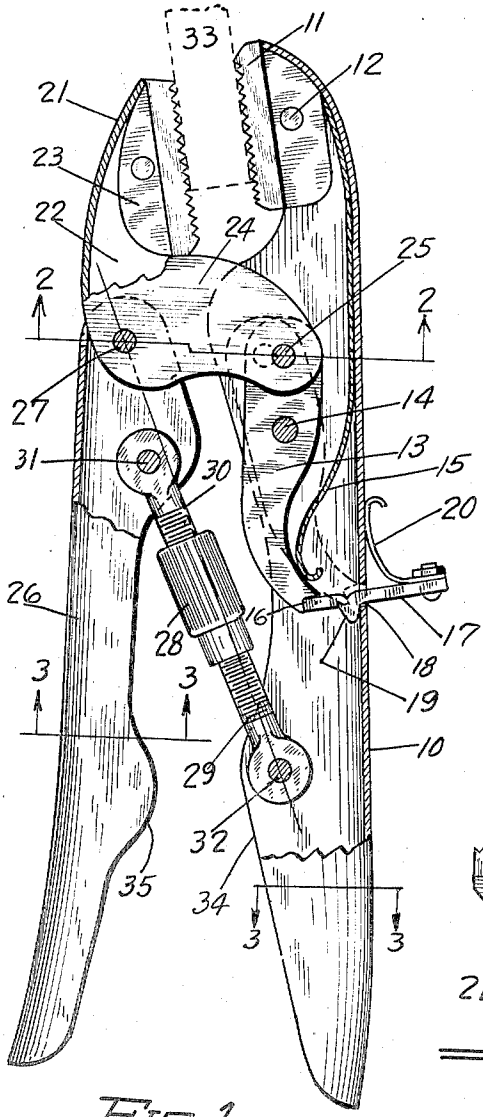


FIG. 1.

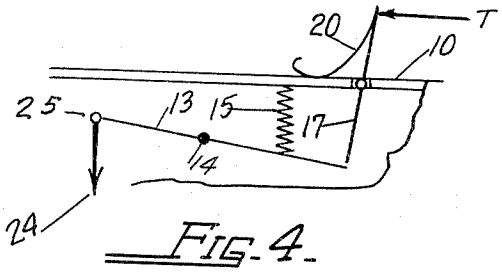


FIG. 4.

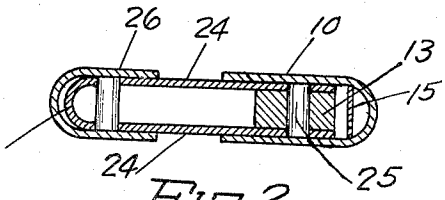


FIG. 2.

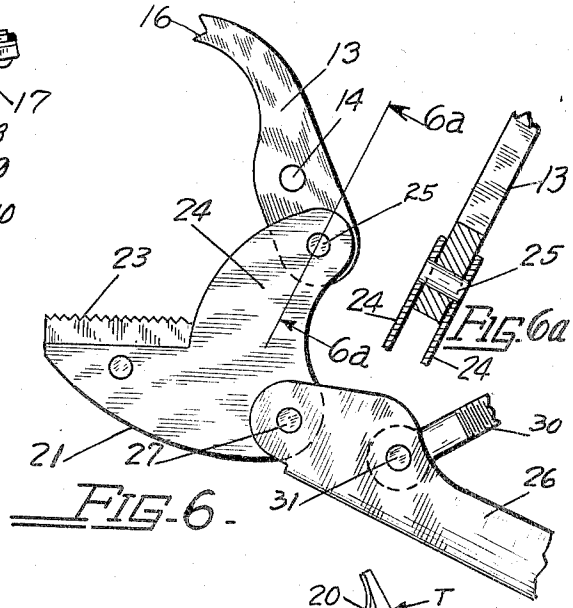


FIG. 6.

FIG. 6a

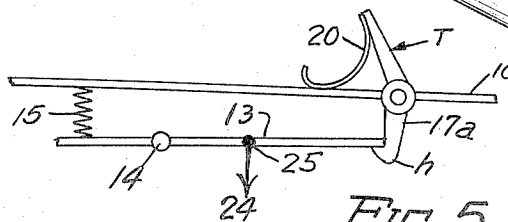


FIG. 5.

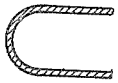


FIG. 3.

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QUICK-RELEASE TOGGLE WRENCH

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3 Claims. (Cl. 81—84)

1

This invention relates to improvements in wrenches of the type usually referred to as "toggle locking pliers" or "locking wrenches and pliers."

Wrenches of this general type above indicated are extensively used and are highly favored by mechanics.

This invention relates more particularly to an improvement of U. S. Patent 2,514,130, granted July 4, 1950.

Wrenches of the general type to which this invention relates were originally so constructed that it required the use of both of the operator's hands to release the wrench.

The patent above identified shows one construction by means of which the wrenches may be locked and released by one hand. It is the object of this invention to produce an improved and simplified construction by means of which the wrench may be released from the work by a simple manipulation by one hand.

The above and other objects that may become apparent as this description proceeds are attained by means of a construction and an arrangement of parts that will now be described in detail for which purpose reference will be had to the accompanying drawing in which:

Figure 1 is a view partly in section and partly in top plan view, certain parts having been removed to better disclose the construction.

Figure 2 is a section taken on line 2—2, Figure 1.

Figure 3 is a section taken on line 3—3, Figure 1.

Figure 4 is a diagram showing in a simple way the relationship of certain parts and forces employed in the construction shown in Figure 1.

Figure 5 is similar to Figure 4 but shows a lever arranged with the fulcrum at one end.

Figure 6 is a fragmentary disassembled view showing the relationship of three important elements, and Figure 6*a* is a section taken on line 6*a*—6*a*, Figure 6.

Referring now to the drawing, reference numeral 10 designates a rigid one piece handle provided at one end with a jaw 11 that is held in place by pin 12. The handle has a channel shaped cross section as shown in Figure 3 and has the shape shown in Figure 1. A lever 13 of the first class is fulcrumed on a pivot 14 whose ends are secured in openings in the sides of handle 10. A spring 15 has one end positioned in the space between jaw 11 and the bottom of the channel and its other end curved towards

2

lever 13, as shown in Figure 1, and is tensioned so that it tends to turn lever 13 in a clockwise direction about its pivot. The lower end of lever 13 is outwardly curved and is provided with a notch 16. A trigger 17 extends through hole 18 and is provided with a projection 19 that serves as a stop that prevents the trigger from moving outwardly in response to an outwardly directed force; projection 19 also serves as a fulcrum or pivot about which the trigger can rock. A spring 20 has one end attached to the outer end of the trigger and the other end resting against the outer surface of the handle and is tensioned to turn the trigger in a clockwise direction about fulcrum 19. Other equivalent construction may, of course, be substituted for the one shown and the same is true with respect to spring 15 which is merely illustrative of means for this purpose.

A movable jaw 21 of the shape shown in Figures 1 and 6 has a channel recess 22 in which the steel jaw facing 23 is positioned and parallel spaced sides 24 that lap the upper end of lever 13 and are attached to the latter by pivot pin 25. Toggle arm 26 is attached to jaw 21 by means of a pivot pin 27. A toggle link comprising an elongated sleeve 28 and threaded members 29 and 30, one of which has a right hand thread and the other a left hand thread, form a turnbuckle, parts 29 and 30 are connected respectively with handle 10 and arm 26 by pivots 31 and 32. That part of handle between pivots 27 and 31 forms one link of the toggle.

We now have an assembly like that illustrated in Figure 1. Let us now assume that the block of metal 33 is positioned between the jaws as shown by dotted lines and that the parts are related as shown. It will be observed from Figure 1 that the three pivots 27, 31 and 32 are not in a straight line, and that pivot 31 is to the left of line 27—32. By adjusting the distance between pivots 31 and 32 the extent of the underset position of toggle pivot 31 can be adjusted. Let us assume that the parts are properly adjusted and that toggle arm 26 is moved towards handle 10 until pivot 31 crosses line 27—32, the toggle will now be overset and will maintain the jaw pressure on block 33 constant until the toggle is released.

In order that pivot 31 shall not pass too far to the right of line 27—32 when pressure is applied to handle 10 and toggle arm 26 to move the toggle to overset position. Handle 10 has been provided with a straight portion 34 that is positioned to be engaged by the curved portion 35 of toggle arm 26 which serve as stops that determined the

overset position of toggle pivot **31**, portions **34** and **35** may also serve as fulcrums about which the toggle lever can rock to open the jaws after lever **13** has been released.

With parts **24**, **13** and **17** positioned as shown in Figure 1, but with the toggle in the overset position, the clamping force exerted by the jaws is resisted by pivot **25** of lever **13** that is held from turning by trigger **17**. The wrench is now in the locked position. If an operator desires to remove the wrench from object **33** he may do so by one of the following methods. He may urge trigger toward jaw **11** and then squeeze on the grip ends of members **10** and **26**. Or he may elect to release the wrench from object **33** by urging trigger **17** toward jaw **11** and then separating members **10** and **26**. In releasing the wrench by either method mentioned above, pivot **25** will move from the solid toward the dotted line position, the final setting being a balance between load tension on the wrench and tension of spring **15**. In the event that trigger **17** be accidentally bumped, the tension of spring **15** against lever **13** is sufficient to cause the jaws to maintain their grip on object **33** and prevent the wrench from being separated from the work.

In Figure 5 lever **13** has been shown as fulcrumed near one end and the load **24** positioned between the fulcrum and the right hand end. With this construction link **17***a* will be under tension and must have a hook *h* to resist the movement of lever **13**. Spring **15** may be positioned as shown.

If lever **13** and associated parts are removed and pivot **25** is attached to handle **10** the locking operation will be identical with that shown in the patent above identified only the method of releasing the wrench being simplified.

It is therefore evident that the invention in this case resides in the addition of the means for normally holding pivot **25** in the position nearest the bottom of the channel and providing means for releasing it while the jaws are in locking position and to return the pivot to locking position by means of a spring.

What I claim as new is:

1. A wrench of the toggle actuated type having an elongated substantially straight handle of channel cross section provided at one end with a jaw, a lever positioned in the channel and pivotally connected with the handle, a movable jaw having an integral arm extending laterally from one end thereof towards the handle, the end of said arm being pivotally connected to the lever at a point spaced from the pivotal connection of the lever with the handle so that the pivotal connection of the lateral arm and lever will move towards and away from the handle when the lever turns about its pivotal connection with the handle, means comprising a spring in operative engagement with the handle and the lever for exerting a force on the lever tending to move its pivotal connection with the lateral arm of the movable jaw towards the handle, a toggle arm having one end pivotally attached to the movable jaw at its juncture with the lateral arm, a toggle link having one end pivotally attached to the handle at a point spaced rearwardly from the lever between the lever and the end of the handle, the other end of the link being pivotally connected with the toggle arm near the pivotal connection of the toggle arm with the movable jaw, and a trigger device operatively interconnecting the handle and the free end of the lever forming means resisting a force acting on it by the movable jaw, tending to move the point of jaw pivotation away from the handle when the jaws are urged into operative engagement with an article to be gripped, said trigger device being accessible from the outside of the handle to effect a release of the jaws.

2. A toggle operated wrench, comprising in combination, an elongated handle of channel shaped cross section having a jaw at one end, a lever positioned in the channel and pivotally connected with the sides of the handle, a spring in operative engagement with the lever and the handle forming means tending to turn the lever about its pivot, a movable jaw having a laterally extending arm pivoted to the lever at a point spaced from its fulcrum pivot, means comprising a toggle arm and a toggle link operatively interconnecting the movable jaw and the handle to rock said jaw about its pivotal connection with the lever, moving the movable jaw into gripping engagement with an article positioned between the jaws, whereby a force is exerted on the lever tending to move the movable jaw pivot away from the handle and against the force exerted on it by the spring, and a trigger mechanism carried by the handle and operatively engaging the free end of the lever to hold the same in its spring biased position in opposition to the force exerted thereon by the movable jaw when gripping an article, the trigger element being accessible from the outside for releasing the lever.

3. A device in accordance with claim 2 in which the toggle arm has a projection facing the handle and positioned to engage the opposing surface of the handle at a point adjacent the point where the toggle link is pivoted thereto, forming a fulcrum about which the toggle arm can pivot to spread the jaws after they have been released by the trigger.

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