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OPENING MEANS FOR LOCKING WRENCH TYPE PLIERS

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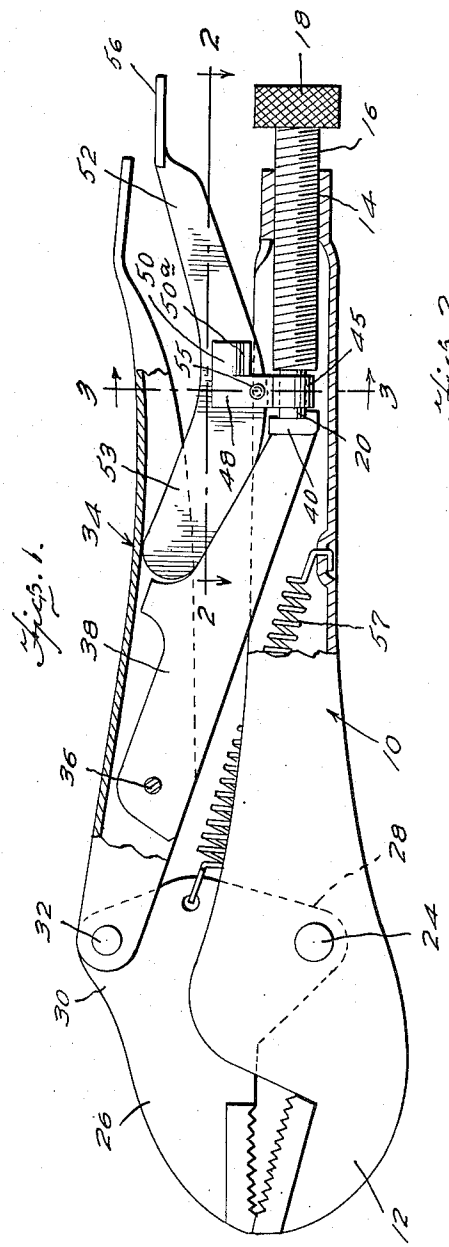


Fig. 1.

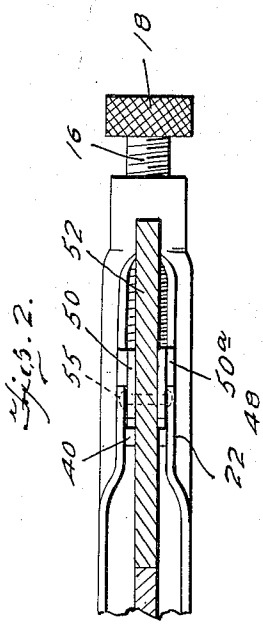


Fig. 2.

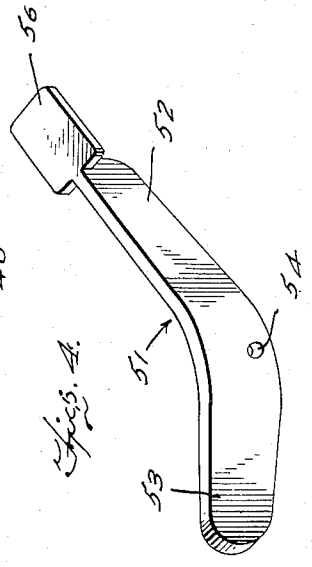


Fig. 4.

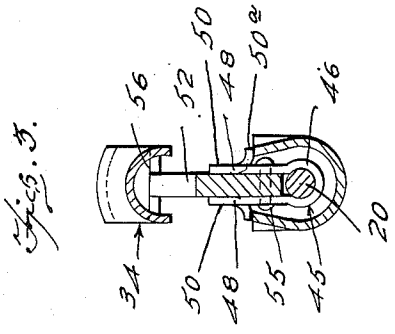


Fig. 3.

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OPENING MEANS FOR LOCKING WRENCH TYPE PLIERS

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1 Claim. (Cl. 81—84)

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This invention relates generally to the class of tools and is directed particularly to improvements in tool of the plier wrench type.

In the plier wrench type of tool such as that sold on the market under the name "Vise-Grip," when proper adjustment has been made whereby the jaws of the tool can be closed under force onto an object, a powerful locking grip is obtained due to the alignment of pivots of a toggle link and handle which holds the tool closed or locked on the work. While this makes the tool very valuable in holding work against movement it also makes it somewhat difficult to open the tool when the work is to be released.

A principal object of the present invention, in the light of the foregoing, is to provide a novel, easily actuated means associated with a tool of the character stated, whereby the locking grip can be broken easily and quickly.

Another object of the invention is to provide, in a tool of the character stated, a releasing means which does not add materially to the weight of the tool; is located on the tool in such a way that it will not interfere in any manner with the free and easy operation of the tool in its customary manner, and is so designed that it can be applied to the tool as it is brought on the market, without requiring any changes or alterations in the tool for such application.

The invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawing forming a part of the specification, with the understanding, however, that the invention is not to be limited to the exact details of construction shown and described since obvious modifications will occur to a person skilled in the art.

In the drawing:

Figure 1 is a view in side elevation, with parts in longitudinal section, of a plier wrench type of tool, showing the present invention applied thereto, the wrench being in closed or locked position.

Figure 2 is a longitudinal section taken substantially on the line 2—2 of Figure 1.

Figure 3 is a transverse section taken substantially on the line 3—3 of Figure 1.

Figure 4 is a view in perspective of the releasing lever without its support mounting.

As previously set forth the plier wrench tool of the present invention is of the type sold on the market under the name "Vise-Grip" and such wrench comprises the elongate fixed handle 10 which at its forward end is formed integrally with the fixed jaw 12. The rear end portion of the handle 10 is in the form of a sleeve 14 which is

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internally screw threaded to receive a fulcrum screw 16. The rear end of the screw customarily carries a knurled head 18 while the forward end of the screw is of reduced diameter for a short part of its length and is unthreaded, forming the longitudinally directed pin 20.

The fixed handle is made of channel form and accordingly, a head of the sleeve 14, has the spaced side walls 22 as shown in Figure 2, such side walls being brought into relatively close spaced parallel relation at the rear end of the handle as shown in the figure mentioned.

At the forward end of the handle is a pivot 24 on which is mounted a movable or pivoted jaw 26. The pivotal mounting is made by means of a short shank extension 28 which projects down into the handle 10 as shown and extending oppositely from the shank 28 is the ear 30 which carries a pivot pin 32.

The numeral 34 designates the pivoted handle which has its forward end mounted upon the pivot pin 32 for movement relative to the fixed handle 10 and this handle 34 is also of U-shape cross section as shown in Figure 3, the channel side being directed toward or opposed to the channel of the fixed jaw 10 as is shown in Figures 1 and 3.

Rearwardly of the pivot 32 there extends across the movable or actuating handle 34 a pin 36 upon which is pivotally mounted, at one end, the toggle link 38 which projects rearwardly and downwardly into the handle 10 and has a foot piece 40 on its opposite end which presses against the forwardly directed end of the pin 20 of the screw 16. Thus, as is well known, when the screw 16 has been adjusted to the proper position either for the closing of the jaws one against the other as shown in Figure 1 or against an interposed object, when the actuating handle 34 is forced inwardly the toggle pivot 36 will be forced across the line between the pivot 32 and the fulcrum provided by the foot bearing upon the pin 20, thereby locking the jaws against opening movement.

In accordance with the present invention there is provided a substantially U-shaped mounting yoke 45 which is formed so as to have the circular or sleeve-like bight portion 46 which is designed to snugly receive the pin 20 and from this bight portion extend the two relatively long straight parallel side arms 48 each of which, adjacent to its free end has extending therefrom the rearwardly directed wings 50. Each of the wings 50 has a downwardly and outwardly curving foot 50a which is adapted to position, when the bight portion 46 is mounted on the pin 20,

upon the top edge of the adjacent handle wall 22.

The numeral 51 generally designates the release lever which, as shown in Figure 4, comprises an elongate flat plate which is longitudinally bowed so as to provide the two arms 52 and 53 which form an obtuse angle.

At the joining ends of these arms the plate has formed therethrough the aperture 54 which, when this central part of the lever is positioned between the arms 48 of the mounting member, receives the transverse pivot pin 55 which passes through the arms 48 of the mounting member as shown in Figure 3. The lever is supported so that the forwardly extending arm 53 is directed upwardly into the actuating handle 34 and lies above and in the plane of the rear end of the toggle link 32, while the opposite arm 52 extends upwardly and rearwardly above the pivot screw 16, lying between the rear ends of the handles 10 and 34.

At the rear end of the arm 52 is a thumb plate 56 which projects slightly beyond the rear end of the actuating handle 34 so that releasing pressure may be conveniently applied to the lever 51 whereby to oscillate the lever and elevate the forward end of the arm 53 to apply an upward or outward thrust against the actuating handle 34. Such a thrust, as will be readily obvious, will result in the outward swinging of the toggle pivot 36, thereby breaking the locking coupling so that the wrench will open easily. This opening action is also assisted, after the lock is broken, by the pull spring 57 which forms a standard part of wrenches of this character and is coupled between the fixed handle 10 and the rear part of the pivoted jaw member 26 between the pivots 24 and 32 as shown.

As will be readily apparent the device of the present invention is supported in such a manner that the screw 16 can be freely turned and at the same time, the device can be easily put in place or removed if desired by opening the handles to the necessary extent to disengage the toggle foot 40 from the pin 20 whereby the mounting device 45 can be slipped off of or applied to the pin 20.

By the provision of the laterally directed wings 50 which rest upon the top edges of the side wall 22 of the fixed handle a stable mounting is provided for the lever and also the application of strain to the screw 16 is prevented.

It will also be seen that due to the nature of the lever and the manner in which it is mounted, the lever can readily fit into the space between the handles where it will not be in the way of the normal use of the tool but at the same time the rear end plate 56 of the lever can be conveniently depressed so as to open the tool easily and quickly.

I claim:

In a wrench type locking pliers having a fixed handle and jaw, a pivoted jaw, an actuating handle pivoted to the pivoted jaw, a toggle link between the handles and pivoted at one end to the actuating handle and having a fulcrum bearing at its other end against an unthreaded end portion of an adjustment screw threadedly connected with the fixed handle for adjustment longitudinally thereof; means for effecting separation of the handles from closed relation, comprising an elongate lever located between said screw and the actuating handle, a substantially U-shaped yoke member having a circular closed end in which the said unthreaded end portion of the screw is positioned and is free to rotate without turning the yoke member, the yoke member including two spaced arms extending toward the actuating handle, said lever being positioned between said arms, a pivot coupling between the arms and lever whereby the lever may turn on an axis extending transversely of itself and the handles, said lever having one end directed toward and obliquely of the handles toward the underside of the actuating handle and adapted to have engagement along one side with and limited in its movement by the toggle link, the lever having its other end extended rearwardly beyond the rear end of the actuating handle, and laterally projecting wings carried by said arms and having sliding bearing along adjacent side edge portions of the fixed handle.

WALTER E. HARVIE.

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