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PLIERS OR WRENCH WITH AUTOMATIC
ADJUSTING AND LOCKING MEANS
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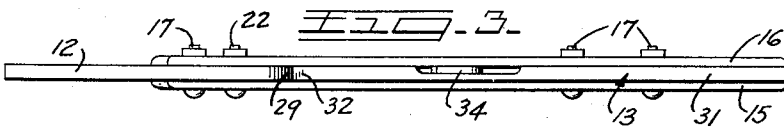
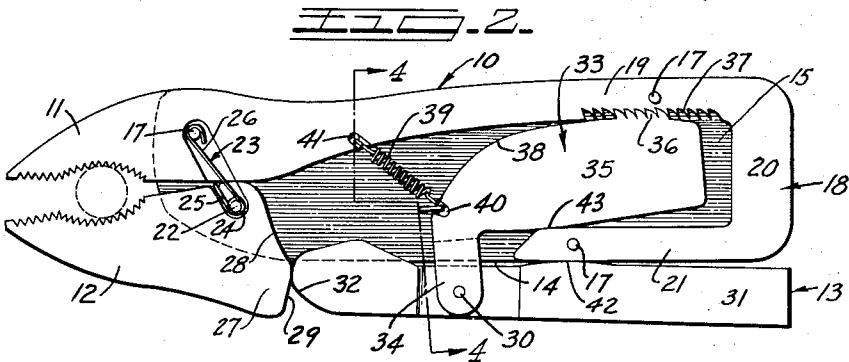
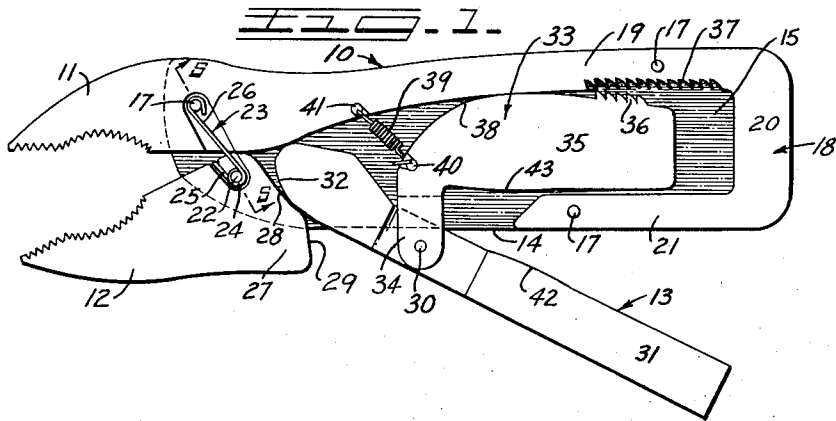


FIG. 4.

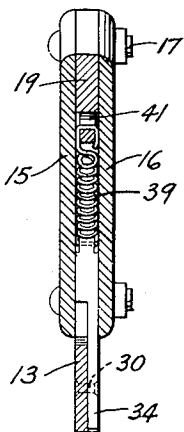
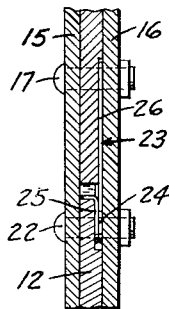


FIG. 5.



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PLIERS OR WRENCH WITH AUTOMATIC
ADJUSTING AND LOCKING MEANS

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8 Claims. (Cl. 81—78)

1

The invention relates to pliers and wrenches of the type having an adjustable jaw with means for locking it. In tools of this character, so far as known, the use of both hands are necessary to adjust the jaws to the size of the pipe, nut or other object and to lock the two jaws in engagement with the object to be turned or manipulated.

The principal object of the invention is to provide a tool of the type indicated which may be operated by one hand and which, when the handle portions are grasped after the object is positioned between the jaws, will be entirely automatic in the operation of closing the jaws upon the object and then locking them.

Another object of the invention is to provide a tool of this character in which the movable jaw is pivoted and spring actuated to its open position and is cam actuated to its closed positions on objects of different sizes by a hand lever pivoted to a floating or shiftable locking member in the handle portion of the tool, so that the locking action will be effective when the tool is applied to objects of various sizes.

A further object is to provide a tool of this character in which the pivoted spring-opened movable jaw has a cam area and a locking area adjacent thereto to be engaged by a coacting cam on the jaw actuating and locking lever.

With the above and other objects in view as will hereinafter appear, the invention resides in the novel construction, combination and arrangement of parts as set forth in the following detailed description and shown in the accompanying drawings in which:

Figure 1 is a side view, with one of the handle cover plates removed, of the present preferred embodiment of the invention, the movable jaw being shown in its open position.

Fig. 2 is a view similar to Fig. 1 but showing the movable jaw in one of its closed and locked positions.

Fig. 3 is an elevation of one edge of the tool.

Fig. 4 is a detail section taken on line 4—4 of Fig. 2.

Fig. 5 is a detail section taken on line 5—5 of Fig. 1.

The improved tool comprises a handle 10, a fixed jaw 11, a movable jaw 12 and an actuating member 13 preferably in the form of a hand lever extending along the handle and movable toward and from the same so that both may be grasped by one hand. The coacting jaws may have work engaging faces as shown or of other shapes according to the intended use of the tool. The fixed jaw is preferably integral with one end of the

2

handle. The latter is hollow with a side or edge opening 14 and may be of any shape. The handle or body 10 may be cast in one piece or composed of two side plates 15 and 16 secured by bolts, rivets or similar fastenings 17 on opposite sides of a flat body portion 18 which may have the jaw 11 integral with it as shown in Figs. 1 and 2. The body portion or plate 18 is substantially U-shaped, one of its arms 19 extending from jaw 11 to the rear or cross portion 20 and its other arm 21 being shorter to provide the side opening 14.

The movable jaw 12 is in the form of a lever fulcrumed between its ends on a bolt or the like 22 passing through it and the front portions of the handle plates or covers 15, 16. A portion of the jaw lever is disposed between these plates which guide the jaw in its pivotal movement. The movable jaw is preferably spring actuated to its open position. That may be accomplished in various ways but as shown recesses are formed in adjacent portions of the two jaws to receive portions of a wire spring 23 as shown in Figs. 1 and 5. The spring 23 has a coil 24 surrounding the pivot 22 and two arms 25 and 26 extended from the coil. One arm 25 is hooked around the inner edge of the jaw lever 12 to urge the jaw to open position and the other arm 26 is bent around and anchored to one of the fastenings 17. The longer front end of the jaw lever carries the working face of the jaw and its shorter rear end 27 is formed with a cam area 28 and an adjoining locking area 29. The cam edge 28 is slightly curved while the locking edge or area 29 is preferably straight for the purpose hereinafter stated.

The movable jaw actuator or hand lever 13 is mounted on a floating or shiftable fulcrum. It is preferably a straight lever pivoted at 30 between its ends, its longer rear portion 31 forming a hand grip and its shorter front or outer end being shaped to provide a cam 32 which coacts with the areas 28 and 29 on the rear of the movable jaw. The rivet or other form of pivot 30 is carried by a locking member 33 positioned in the cavity or chamber of the hollow handle and mounted for both a tilting or rocking movement and a sliding movement longitudinally of the handle between the long and short edge walls 19 and 21 of the hollow portion of the body. This tiltable and shiftable member 33 is preferably in the form of a flat metal plate of substantially L-shape and has a thickness which will fill the space between the plates or sides 15 and 16 of the handle. Its short arm 34 is reduced in thickness and projects later-

3

ally through the side or edge opening 14 of the handle where it contacts with a reduced intermediate portion of the hand lever and carries the fulcrum pin 30. The long arm 35 of the L-shaped member or plate 33 extends rearwardly and has a width slightly less than the space between the inner edges or walls of the parts 19 and 21 of the handle so that it may tilt or rock on and also slide on the inner edge of the wall 19 of the hollow handle. The purpose of these movements of the locking member 33 is to permit the engagement and disengagement of coacting locking elements on the member and handle at different points longitudinally of the handle according to the size of the object between the jaws and the relative positions of these parts. These elements are preferably one or more V-shaped teeth 36 formed on the outer or side edge of the arm 35 adjacent to its rear and one or more similar teeth 37 formed on the inner edge of the confronting wall 19. Preferably one or more of the teeth 36 are provided to engage any of a long row of the teeth 37, as will be seen on reference to Figs. 1 and 2. The edge of 35 carrying the tooth or teeth 36 has a curved portion 38 which rocks or rolls on 19.

The shiftable locking member 33 is urged in a forward or outer direction by suitable spring means preferably a coil spring 39 having one end hooked in an eye or opening 40 in member 33 and its other end similarly attached at 41 to part 19 of the handle. This spring will, therefore, urge the parts to their normal positions shown in Fig. 1, that is, the spring will not only rock the member 33 on its curved edge 38 to disengage teeth 36 from teeth 37 but will shift said member and hence fulcrum 30 in a forward direction to pull the cam end 32 of the hand lever up the curved or cam edge 28 of the movable jaw, thus moving the hand grip end 31 away from the handle. The spring 23, which is of greater strength than spring 39, will also tend to throw the hand lever to its open position. When the parts 10, 13 are grasped in one hand to move 31 toward the handle, cam 32 will move along 28 to close the jaws on the work or object between them. When that is accomplished further movement of 31 toward the handle will cause the fulcrum carrying and locking member to shift automatically rearwardly in the handle and also rock or tilt at the point of contact of the coacting surfaces 38, 19, so that when cam 32 rides onto the flat locking edge 29 of the movable jaw the tooth or teeth 36 will engage teeth 37 to lock the jaws upon the object between them, as will be seen on reference to Fig. 2. When the parts are so disposed one edge 43 of the member will thrust against the inner edge or wall of 21. These teeth are preferably so constructed as to move the member slightly forward as the teeth are engaged, the object being to exert force against the movable jaw of the pliers or wrench. As shown in Figs. 1 and 2, both faces of the teeth 36 and 37 are inclined in a forward direction to cause the member 33 to be shifted or cammed in a forward direction when the teeth engage each other. This action takes place before the hand lever is up against the handle and hence when that lever is completely closed it is effectively locked in position. To release the parts a finger is pressed against the forward end of the hand lever adjacent to its cam 32. When that is done the parts spring to the open position shown in Fig. 1. The inner edge of the hand grip 31 of

4

the lever may be formed with a curved portion 42 which strikes the handle and limits the inward movement of the lever.

From the foregoing it is believed that the operation and advantages of the invention will be apparent. It is to be noted that the tool may have its jaws adjusted to and locked on objects of various sizes by simply placing the jaws upon the object and tightening the grip on the handle and lever, the operations being entirely automatic.

It is to be understood that while the present preferred embodiment of the invention has been disclosed, numerous changes may be made within the spirit and scope of the following claims.

What is claimed is:

1. A tool of the character described comprising a handle, a fixed jaw at one end of said handle, a coacting movable jaw pivoted to said handle and having a cam area and an adjacent locking area, spring means for actuating said movable jaw to an open position, a hand lever extending along said handle and having at one end a cam to coact with said areas of the movable jaw, a tiltable locking member shiftable lengthwise of said handle and to which said hand lever is fulcrumed between the ends of the latter, spring means for urging said member forwardly on said handle to maintain the cam end of said hand lever in contact with said areas on the movable jaw, and interengaging locking elements on said member and handle.

2. A tool of the character described comprising a hollow handle having a fixed jaw at one end and an opening in one side; a coacting movable jaw pivoted between its ends to said handle and spring actuated to open position, the rear end portion of said movable jaw being disposed in the open side of said handle and having a cam area and a locking area, a tiltable locking member in said hollow handle and shiftable forwardly and rearwardly therein, said member having a laterally projecting portion extending through the open side of said handle, a hand lever extending along the open side of said handle and fulcrumed between its ends to said extended portion of said member, said hand lever having a cam on its front end to coact with said areas of the movable jaw, spring means for urging said locking member forwardly in the handle and interengaging locking elements on the rear part of said locking member and the confronting interior wall of the handle.

3. In a device of the character set forth, a relatively flat and elongated body having a fixed jaw at its front end, and a hollow portion in rear of said jaw and opening through one edge of said body, a movable jaw lever fulcrumed between its ends in said body and having at its front a jaw to coact with said fixed jaw, an elongated locking plate in said hollow portion of the body and arranged for longitudinal sliding and rocking movements between confronting interior walls of said hollow portion, said plate having at its front end a laterally projecting arm extending through said edge opening in the body, a hand lever extending along the open edge of said body and fulcrumed between its ends on said arm, said hand lever having at its front end a cam to engage the rear edge of said movable jaw lever to actuate the same, and interengaging locking elements on the rear part of said plate and the confronting interior wall of said hollow portion of the body.

4. The structure of claim 3 together with spring

5

means for normally urging said locking plate and said hand lever in a forward direction and holding said locking elements disengaged.

5. The structure of claim 4 together with spring means for actuating said movable jaw to open position, said last mentioned spring means being of greater strength than said first mentioned spring means.

6. The structure of claim 5 in which said inter-engaging locking elements comprises at least one tooth on an edge of said locking plate and a longitudinal series of coacting teeth on said confronting interior wall.

7. In an automatic locking means for a wrench or similar tool in which a pair of work-engaging jaws are first closed upon an object and then locked in such closed position when a pair of handle members are grasped in one hand; a handle having a fixed jaw at one end a hollow portion in rear of said fixed jaw, a movable jaw lever fulcrumed between its ends to said handle and having at its front a movable jaw to coact with said fixed jaw, a locking member in said hollow handle and carrying a fulcrum disposed at one side of said handle, said member being mounted for both longitudinal sliding and tilting movements, a hand lever extending along said handle and pivotally mounted between its ends on said fulcrum, the front end of said hand lever having a cam to engage the rear of said movable jaw lever to actuate the same, spring means for urging said member and hand lever in a forward direction, and coacting interengaging locking elements on said member and said handle.

8. In an automatic locking means for a tool having opposed work gripping jaws, the combination of an elongated hollow body having opposed long and short edge walls between opposed side walls, a row of locking teeth on the inner side

6

of said long wall adjacent one end of the latter and arranged opposite said short wall, a fixed jaw projecting from the opposite end of said long wall, a coacting movable jaw pivoted in said hollow body in opposed relation to said fixed jaw and having an edge spaced from an end of said short wall, a locking plate in said hollow body between its side walls and mounted for sliding and rocking movement between the inner sides of said long and short edge walls, said plate having at one end a tooth to coact with said locking teeth and at its other end an angularly extending arm projecting out of said body between said edge of the movable jaw and said short wall, a jaw-actuating lever pivoted between its ends to said arm and having a handle portion at one end to extend along said body and a cam portion at its other end to coact with said edge of the movable jaw and enter said hollow body, and spring means for urging said locking plate in the direction of said jaws to hold said cam portion engaged with said edge of the movable jaw.

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