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TOGGLE ACTUATED AND ADJUSTABLY MOUNTED PIVOTED JAW WRENCH

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Fig. 1.

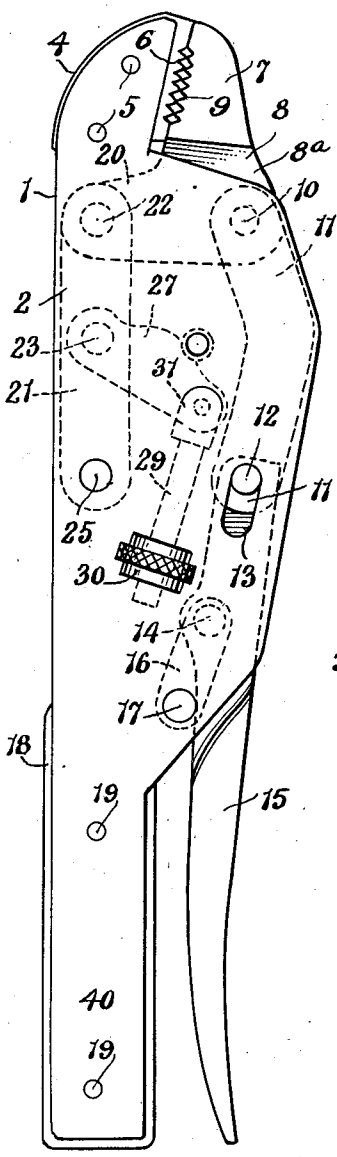


Fig. 2.

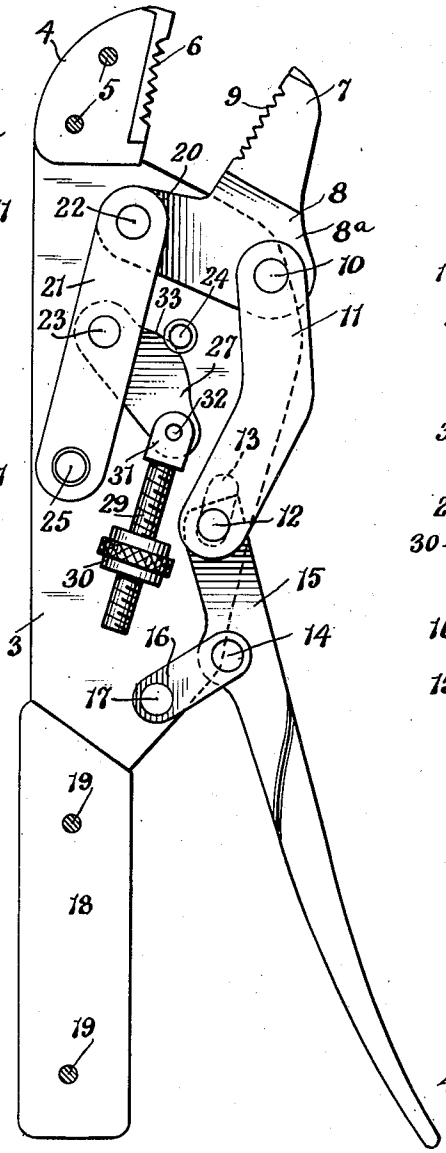
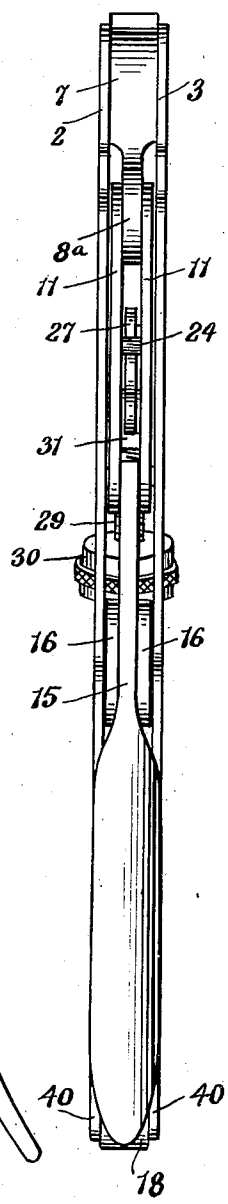


Fig. 3.



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TOGGLE ACTUATED AND ADJUSTABLY MOUNTED PIVOTED JAW WRENCH

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4 Claims. (Cl. 81—84)

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This invention relates to wrenches, and more particularly to those of the type disclosed in Patent No. 2,388,580, dated November 6, 1945, and issued to F. A. Snell, and in our co-pending application, Serial No. 650,242 filed February 26, 1946.

In that patent and application is shown a wrench in which a movable jaw is brought to a parallel relation with a fixed jaw, regardless of the spacing of the jaws, by movement of an actuating handle, and the present invention contemplates a structure by means of which similar results are obtained. The present invention relates to improvements in the type of wrench referred to and by means of which an accurate and selective setting of the spacing of the co-operating jaws is secured.

The present invention contemplates the provision of a simple, sturdy mechanism by means of which a movable jaw may be set at a selected distance from a fixed jaw in order to grip an object of a given size, said mechanism contemplating the employment of a cam means which is readily adjustable to attain the desired setting, such means being entirely reliable and unlikely to get out of order despite the hard use which a tool of this character is generally given.

These and other objects are attained by the invention, a more particular description of which will be hereinafter set forth and more particularly pointed out in the claims appended hereto.

In the accompanying drawing, wherein an illustrative embodiment of the invention is disclosed, Fig. 1 is a side elevation of a wrench constructed according to the invention, the jaws being shown in closed position. Fig. 2 is a side elevation of the wrench in open position, with one of the face plates of the frame removed to show the operating parts, and Fig. 3 is an edge view of the wrench, as seen from the right side of Fig. 1.

In the drawing, the frame of the wrench is generally indicated at 1, the same including a pair of similarly shaped, spaced-apart side members or face plates designated at 2 and 3. The fixed handle portion of the wrench is composed of the narrowed end parts 40 of the face plates 2 and 3, between which is sandwiched an insert 18 which may be composed of plastic, wood or other suitable lightweight, strong material. Rivets 19 extending through the parts 40 and through the insert 18 hold the parts together, with the face plates 2 and 3 thus maintained in suitably spaced relation.

At 4 is shown the fixed jaw which is mounted between the face plates 2 and 3 at one end of the

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wrench frame, and is held in place between the plates 2 and 3 by means of the rivets 5 or other equivalent fastening elements. The fixed jaw 4 may be provided with a serrated gripping face 6, as shown.

The movable jaw is shown at 8, the same being of substantially bell-crank form, and having the head portion 7, formed with the gripping face 9, and provided with an arm 8a located between the ends of companion links 11 and pivotally attached thereto by the pivot pin 10. The second arm 20 of the movable jaw is pivotally attached by a pin 22 to the companion adjusting links 21 to be shortly described.

At 15 is shown the actuating handle by means of which the movable jaw is moved to or from the fixed jaw 4. Said handle 15 has one end located between the ends of the companion links 11 and is pivotally secured thereto by means of the pivot pin 12 which has its ends disposed in angular slots 13 formed in the sides or face plates 2 and 3 of the frame of the wrench. By movement of the handle 15 in a direction to or from the fixed handle, pin 12 will be caused to ride up and down in the slots 13 in a manner to be described.

At 16 is shown a pair of short companion links which are pivoted at 14 to the actuating handle 15, at a point between the pivot 12 and the free end of said handle, the opposite ends of the links 16 being pivoted on the pin 17, said pin being secured between the sides or face plates 2 and 3 of the frame 1.

The construction of the means for adjusting the movable jaw 8 will be noted in Fig. 2. There it will be seen that the two companion links 21 have an arm 20 of the jaw 8 sandwiched between them at one end and pivoted to them by means of the pivot pin 22. The opposite ends of the links 21 are pivoted on the pin 25 secured between the face plates 2 and 3 of the frame.

At 29 is shown a threaded adjusting screw on which a knurled adjusting nut 30 is threadably mounted, said adjusting nut projecting through openings provided in the face plates 2 and 3 to thereby render said nut accessible for manual adjustment. At one end, the adjusting screw 29 is provided with a clevis 31 and pivoted therein on the pivot pin 32, is one end of a cam plate 27. The opposite end of the cam plate 27 is pivoted on the pin 23 between the companion links 21. The operative edge of the cam plate, shown at 33, is held in contact with a roller or pin 24 mounted between the face plates 2 and 3. This arrangement is such that by manipulation of the

knurled adjusting nut 30, the adjusting screw 29 is moved up and down, and the curvature of the cam edge 33 of plate 27 is such that as it bears against the roller or pin 24 it will cause links 21 to be swung on the pivot pin 25 to the required angularity to determine the spacing of the gripping face 9 of jaw 8 from the face 6 of the fixed jaw 4.

It will be seen from the structure described, that when the actuating handle 15 is moved toward the fixed handle portion of the frame 1, it will cause the movable jaw 8, through the arrangement of linkage disclosed, to swing toward the fixed jaw 4 to an extent determined by the angular position of the cam 27 relative to the links 21. The movable jaw will assume a position of parallelism to the fixed jaw when the movable jaw reaches the limit of its inward swing and then, when the pin 14 passes the over-center position, the parts will be locked in close clamping relation with any object to be grasped between the jaws. When releasing the object by swinging the handle 15 outwardly, or to the position shown in Fig. 2, it will be noted that the slots 13 permit the descent of the pivot pin 12 to the lower ends of these slots, and this descending movement of the pivot 12 under the swing of the handle 15, exerts a longitudinal pull on the links 11, causing them to impart a swinging movement on the movable jaw, thus swinging said jaw about the pivot 22 to bring its gripping face 9 to the angular position shown in Fig. 2, and at once permitting the release of the object then located between the jaws.

In the construction described it will be noted that the use of springs is avoided; that the adjustment of the movable jaw relative to the fixed jaw is secured by cam means, allowing an accurate and precise setting of the jaws and resulting in a sturdy and rugged structure.

While we have shown and described one embodiment of the invention, it is obvious that the same is not to be restricted thereto but is broad enough to cover all structures coming within the scope of the annexed claims.

What we claim is:

1. In a tool of the character described, a frame having a fixed jaw and a movable jaw, a handle and linkage by which movement of the handle swings the movable jaw toward the fixed jaw, said linkage including a pair of links pivoted at one end to the frame and at their other end to the movable jaw, a cam plate pivoted at one end to said links, an adjusting screw and means for adjusting it within the frame, one end of said screw being pivotally attached to the second end of the cam plate, the cam plate having a cam-shaped edge portion, and a fixed element in the frame against which said edge portion is maintained, whereby the shape of said edge portion will cause the links to which the cam plate is pivotally attached to be swung either toward or away from the fixed jaw upon adjustment of the adjusting screw.

2. In a tool of the character described, a frame including a fixed jaw, linkage by means of which a movable jaw is swung to or from the fixed jaw, a movable jaw connected to said linkage, pivoted links for limiting the swing of the movable jaw toward the fixed jaw, said links being connected at one end to the movable jaw and at the other end to the frame, a cam plate pivotally connected to said links, a roller against which the cam plate is maintained, and an adjusting screw attached to the cam plate to vary the angularity of said cam plate relative to the links to which it is attached.

3. In a tool of the character described, a frame having a fixed jaw, a movable jaw connected to a substantially parallel linkage, one side of said linkage including an actuating handle, the other side of the linkage including a pair of links connected at one end to the movable jaw and at the other end to the frame, an adjusting screw movable longitudinally in the frame, a cam in the form of a link having one end attached to an end of the adjusting screw and a second end attached to the last-mentioned pair of links, and means constantly maintained in engagement with the cam and causing said cam to shift the links to which it is connected to the desired position of angularity according to the adjustment of the adjusting screw.

4. In a tool of the character described, a frame including a fixed jaw, a movable jaw comprising part of a linkage connected at two points to the frame, said linkage including an actuating handle by the movement of which the linkage is caused to swing the movable jaw toward the fixed jaw, said linkage including a cam-shaped link having one end connected through pivotal means to the movable jaw, an adjusting screw and means for moving it axially, one end of the adjusting screw being provided with a clevis, the second end of the cam-shaped link being pivotally attached to said clevis, the pivotal means to which the first end of the cam-shaped link is attached including a link that is pivoted at one end to the movable jaw and at its other end to the frame, and a fixed element in the frame against which the cam-surface of the cam-shaped link is operative.

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REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
1,280,405	Collison et al.	Oct. 1, 1918
1,984,622	Babin	Dec. 18, 1934
2,388,580	Snell	Nov. 6, 1945