Oct. 14, 1952 E. M. HADLEY 2,613,566

VISE WRENCH

Filed Nov. 5, 1948 2 SHEETS—SHEET 1

Fig. 1

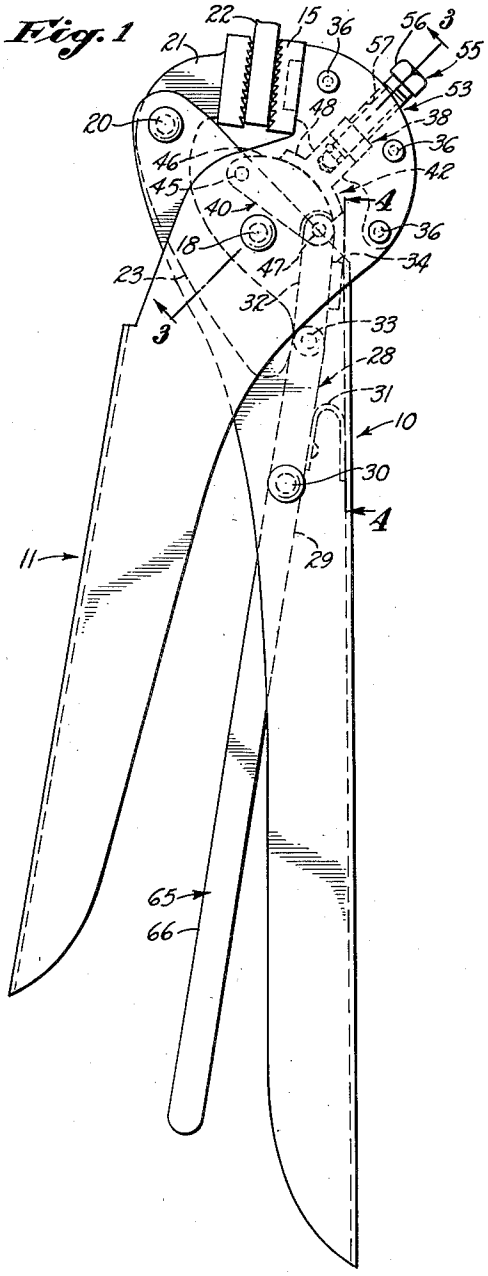
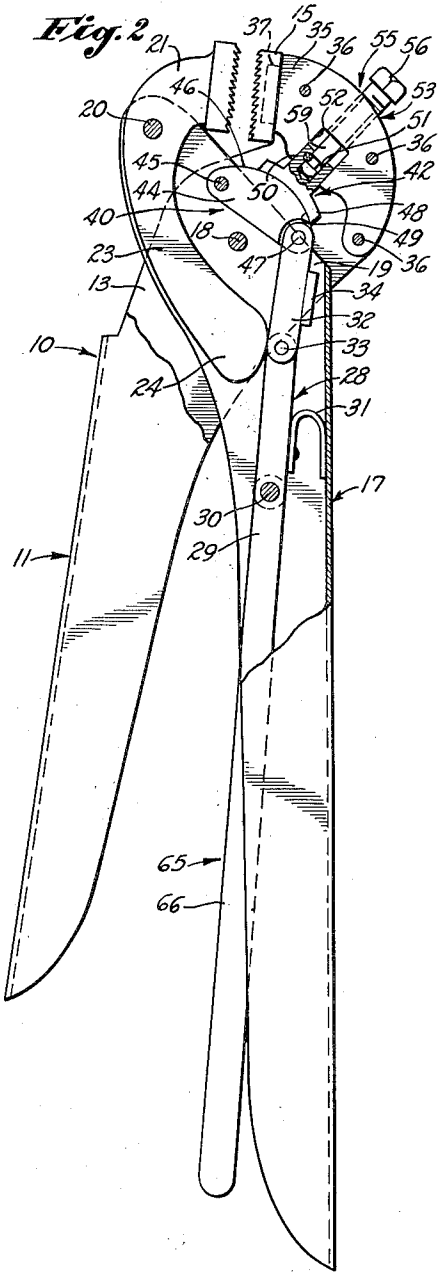


Fig. 2



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Fig. 3

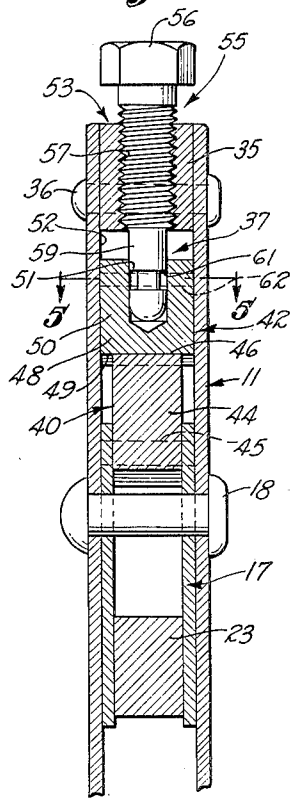


Fig. 4

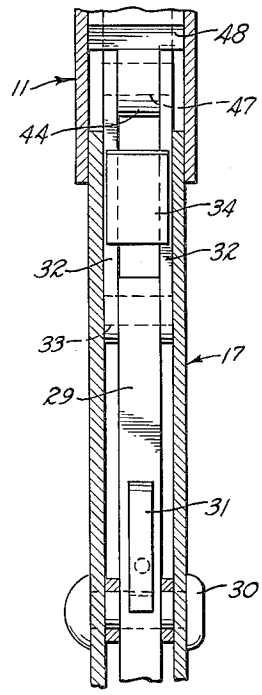


Fig. 6.

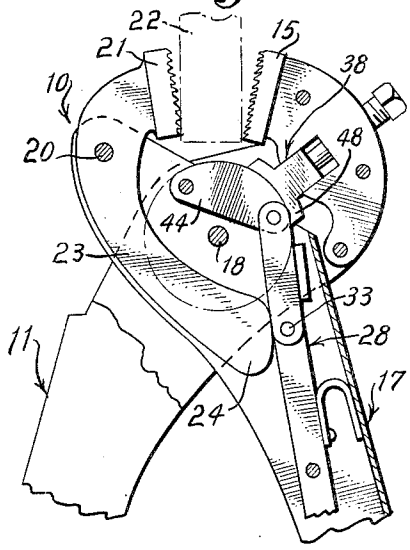
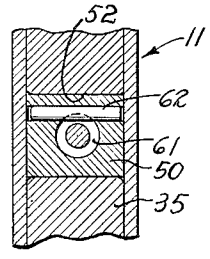


Fig. 5



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UNITED STATES PATENT OFFICE

2,613,566

VISE WRENCH

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Application November 5, 1948, Serial No. 58,553

7 Claims. (Cl. 81—84)

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This invention relates to improvements in vise wrenches and more particularly to improvements in vise wrenches of the type incorporating a fixed jaw and a movable jaw between which an object is adapted to be clamped by the movement of the movable jaw toward the fixed jaw.

Vise wrenches of the type in use at present usually embody toggle linkages or joints pivotally connected to the movable jaw of the wrench and being adapted to clamp and lock the movable jaw against an object when driven over center. The other end of the toggle linkage in conventional vise wrenches is longitudinally shiftable by means of a screw or similar mechanism which adjusts the toggle linkage in such a manner that the movable jaw is brought into contact with the surface of the object which it is desired to clamp by the wrench prior to driving the toggle linkage over center. One of the greatest disadvantages inherent in vise wrenches of the above discussed type is the fact that the toggle linkage must be adjusted to bring the movable jaw into contact with the object each time the wrench is utilized with objects having different thicknesses, no matter how slight the difference in thickness or size of the object may be.

It is, therefore, a primary object of my invention to provide a vise wrench which has embodied therein a fixed jaw and a movable jaw, said movable jaw being pivotally mounted in one of the handles of the wrench and being adapted to be clamped upon objects of different sizes or thicknesses within a predetermined range without the necessity for adjusting the toggle linkage which controls the clamping action of the jaw.

In conventional vise wrenches the locking of the movable jaw upon an object is achieved by adjusting the movable jaw against the object through the medium of the longitudinal adjustment of the toggle linkage and the subsequent driving of the toggle linkage over center by that portion of the linkage which is pivotally connected to the movable jaw.

It is another object of my invention to provide a vise wrench having a movable jaw which is not positively connected to the toggle linkage which controls the locking action of the movable jaw upon an object positioned between said jaw and the fixed jaw of the wrench. In a wrench constructed in accordance with my invention the movable jaw is freely pivoted and its movement in the process of clamping an object causes the toggle linkage to be driven over center to lock the object between the movable jaw and the fixed jaw.

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A further object of my invention is the provision of a vise wrench having embodied therein a movable jaw which possesses an elongated actuating arm adapted to drive the toggle linkage which controls the actuation and locking of the movable jaw over center. A concomitant object of the invention is the provision of a toggle linkage which is not directly connected to the movable jaw but which is adapted to be driven over center by the actuating arm of the movable jaw and which, in addition, is adapted to control and limit the movement of the movable jaw by limiting the movement of the actuating arm of said jaw.

An additional object of my invention is to provide a locking means for the toggle linkage embodied in the vise wrench which serves to lock the toggle linkage over center when the toggle linkage is driven into over center position by the action of the movable jaw.

An additional object of my invention is the provision of a vise wrench having the locking means for the toggle linkage embodied in the head of the wrench adjacent the fixed and movable jaws to facilitate the adjustment of the locking means by the user of the wrench.

Another object of my invention is the provision of locking means which does not need adjustment for varying sizes of material within a predetermined range and which thus permits the wrench to accommodate such varying sizes without the necessity for continually adjusting the locking means.

One of the structural weaknesses of conventional vise wrenches is the fact that the handles of the wrench are not directly connected to each other but are indirectly connected through the medium of the movable jaw itself. A conventional construction usually consists of a movable jaw pivotally mounted from the first handle with the second handle of the wrench pivoted from the movable jaw itself. As a result of such construction failures caused by the shearing of the pivot pins by which the handles are mounted relative to the movable jaw are rather frequent.

Another object of my invention is the provision of a vise wrench in which the handles of the wrench are positively and directly connected to each other and in which said positive connection greatly increases the strength and durability of the wrench.

In most vise wrenches in use at the present time the toggle linkage which serves to control the movement and locking of the movable jaw is usually exposed in such a manner that the throw-

ing of the toggle linkage over center will permit the hand of the user of the wrench to be caught or pinched between the component parts of the toggle linkage.

A further object of my invention is the provision of a vise wrench in which the toggle linkage is completely housed within one of the handles of the wrench.

An additional object of my invention is the provision of a vise wrench which incorporates release means adapted to facilitate the release of the movable jaw from an object upon which it is locked.

Other objects and advantages of my invention will become apparent from a perusal of the following specification and the accompanying drawings, which are for the purpose of illustration only, and in which:

Fig. 1 is a vertical elevation of a wrench constructed in accordance with my invention;

Fig. 2 is a vertical elevation showing the wrench with various portions broken away;

Fig. 3 is an enlarged, vertical sectional view taken on the broken line 3—3 of Fig. 1;

Fig. 4 is an enlarged, vertical sectional view taken on the broken line 4—4 of Fig. 1;

Fig. 5 is a longitudinal sectional view taken on the broken line 5—5 of Fig. 3; and

Fig. 6 is a fragmentary, elevational view showing the wrench in a position of adjustment wherein a relatively large object is clamped between its jaws.

Referring to the drawings, I show a vise wrench 10 which includes a first handle 11 formed of sheet metal or similar material and provided with a recess 13 which may terminate rearwardly of the upper end of the handle but which, in the present embodiment of my invention, extends the full length thereof.

To facilitate the description of the embodiment of my invention, the relative positions of the members and elements thereof will be described as they are shown upon the drawing, and it is not intended that any words such as "lower" and "upper" be taken as having a limiting connotation.

In the upper end of the first handle 11 and secured thereto, by means which will be described in greater detail below, is disposed a fixed jaw 15. Pivotally secured directly to the first handle 11, as by means of a pivot pin 18, is a second handle 17. To permit the pivotal and direct attachment of the second handle 17 to the first handle 11, it is necessary that the upper end of the second handle 17 penetrate and pass through the recess 13 in the upper end of said first handle. The direct pivotal connection of the first handle 11 to the second handle 17 greatly increases the structural rigidity and durability of the vise wrench and is an important feature of my invention.

Pivotally mounted in the upper end of the second handle 17 within a recess 19 in said second handle, as by means of pivot pin 20 or similar fastener, is a movable jaw 21 which is disposed in contiguity to the fixed jaw 15 of the first handle 11 and which is adapted to cooperate with the fixed jaw to secure an object 22 therebetween.

The movable jaw 21 is provided with an integral actuating arm 23 which is of elongated nature and which projects downwardly into the recess 19 provided in the second handle 17. The lower end 24 of the actuating arm 23 is adapted to contact a toggle joint 28 and to cause said toggle joint to be driven over center in a manner which will be described in greater detail below. The toggle joint 28 is substantially completely housed within the recess 19 of the second handle 17 and includes a first toggle link 29 which is pivotally mounted upon a pivot pin 30 secured in the second handle 17 and which bears a spring means 31 adapted to maintain the toggle joint 28 in nonoperative position.

The upper end of the first toggle link 29 is pivotally secured to the lower end of a second toggle link 32 by means of a pivot pin 33. The point at which the first and second toggle links 29 and 32 are pivotally connected by the pivot pin 33 is the point at which the lower end 24 of the elongated actuating arm 23 contacts the toggle joint 28. As may be best seen from Figs. 1 and 2 of the drawings, the lower end 24 of the actuating arm 23 of the movable jaw 21 is adapted to contact the toggle joint 28 and to drive said joint over center when the first and second handles 11 and 17 are moved toward each other and an object 22, which it is desired to clamp, is positioned between the fixed jaw 15 and the movable jaw 21. When the first and second handles 11 and 17 are moved toward each other with the object 22 fixed between the movable jaw 21 and the fixed jaw 15, the portion of the movable jaw 21 disposed above the pivot pin 20 is moved to the left and the lower end 24 of the actuating arm 23 is moved to the right into contact with the toggle joint 28, to drive the toggle joint over center against the force of the spring means 31, as best shown in Fig. 1 of the drawings. Secured upon the upper side, or the right side, of the second toggle link 32 is a stop plate 34 which is adapted to limit the over center motion of the toggle joint 28, as induced by the actuating arm 23 of the movable jaw 21, by impingement upon the interior of the second handle 17 when the toggle joint 28 is thus driven over center.

A mounting plate 35 is secured in the upper end of the first handle 11, as by means of rivets 36, and is provided with an integral boss 37 upon which the jaw 15 is adapted to be mounted. It is intended, in certain fields of application, to provide a fixed jaw 15 which is made of rubber or similar resilient material, but, in other applications, it is intended that the jaw 15 be formed integrally with the mounting plate 35.

Positioned in the upper end of the first and second handles 11 and 17 is a locking means indicated generally at 38 which is adapted to frictionally lock the first and second handles 11 and 17 against relative movement with respect to each other to clamp the fixed jaw 15 and the movable jaw 21 upon an object disposed between said jaws. The locking means also includes adjusting means which is adapted to permit the adjustment of the locking means, indicated generally at 38, to control the amount of pressure which must be applied to the first and second handles to throw the toggle joint 28 over center. The locking means 38 includes a locking element 40 and a motion limiting member 42. The locking element 40 is constituted by a lobe member 44 which is pivotally mounted upon a pivot pin 45 secured in the walls of the upper end of the second handle 17 and which is provided with a substantially arcuate face 46 on the upper side thereof. The motion-limiting member 42 includes an arcuate plate 48, the face 49 of which is adapted to be contacted by the arcuate face 46 of the lobe member 44 in a

manner which will be described in greater detail below.

As best seen in Figs. 2 through 5, the arcuate plate 48 has formed on the upper side thereof an integral, rectangular boss 50 which is provided with a cylindrical recess 51 and which is adapted to move within a bore 52 formed in the mounting plate 35. Adjusting means 53 adapted to control the movement of the boss 50 of the arcuate plate 48 within the bore 52 is indicated generally at 53 and includes a screw member 55 having a head 56 and a threaded boss portion which is engaged in the mounting plate 35 as at 57. Although the adjusting means is described as embodied in a screw member 55, it is, of course, conceivable that other analogous means of adjustment may be provided for causing the movement of the boss 50 within the bore 52, and it is not intended that the invention be limited to the specific construction shown.

As best seen in Fig. 3 of the drawings, the lower portion 59 of the screw 55 is substantially reduced in diameter and is provided with a smooth periphery. The recess 51 in the boss 50 of the arcuate plate 48 is adapted to receive the lower portion 59 of the screw 55, and the plate 48 is secured thereto through the medium of an annular groove 61 formed in the lower portion of the screw and a pin 62 (Fig. 5) passing through the boss 50 and the annular groove 61. The rotation of the screw 55 will cause the concomitant rotation of the lower portion 59 thereof within the boss 50 and will also cause the boss 50 to be carried up and down in the bore 52 to permit the adjustment of the face 49 of the arcuate plate 48 in relation to the arcuate face 46 of the lobe member 44.

The adjusting means 53 associated with the arcuate plate 48 permits the arcuate plate 48 to be moved, by relatively slight increments of movement, toward and away from the arcuate surface of the locking element 40 constituted by the lobe member 44. The adjusting means 53 is provided to permit varying the pressure which must be applied to the first and second handles 11 and 17 of the wrench to throw the toggle joint 28 over center to lock the lobe member 44 against the face 49 of the arcuate plate 48. In addition, the adjusting means 53 permits the arcuate plate 48 to be adjusted in a direction toward the lobe member 44 to accommodate for wear in the component parts of the toggle joint and the pivot pins which maintain the links of the toggle joint and the lobe member in operative relationship with one another.

The lower end of the lobe member 44 is pivotally secured to the upper end of the second toggle link 32 by means of a pivot pin 47. As is best shown in Figs. 1 and 2 of the drawings, when the toggle joint 28 is driven over center by the movement of the actuating arm 23 of the movable jaw 21 to the right, the lobe member 44 is urged upwardly to cause the face 46 thereof to frictionally engage and lock upon the face 49 of the arcuate plate 48 and to limit the over center movement of the toggle joint 28, thus limiting the movement of the actuating arm 23 of the movable jaw 21 to the right to limit the movement of the upper portion of said jaw to the left and cause it to clamp upon an object 22 positioned between it and the fixed jaw 15.

The wrench is adapted to accommodate relatively large objects 22, the lobe 44 being carried further to the left, as seen in Fig. 6, to permit the arcuate plate 48 to contact a portion of the periphery of the lobe adjacent the point of connection of the toggle joint 28 to the lobe 44. Thus, the fixed jaw 15 and the movable jaw 21 are maintained in operative relationship with the object 22 clamped therebetween because the frictional lock between the lobe 44 and the arcuate plate 48 prevents relative movement between the first and second handles 11 and 17. The adjusting means 53 serves to increase or decrease the amount of pressure necessary to be applied to the first and second handles 11 and 17 to throw the toggle joint 28 over center and to adjust for wear in the component elements of the wrench.

Because of the relatively large contact areas of the faces 46 and 49 of the lobe member 44 and the arcuate plate 48, a relatively secure locking action is achieved within a predetermined range so that objects of various sizes and within said range may be held between the fixed jaw 15 and the movable jaw 21 without adjusting the position of the arcuate plate 48 in reference to the lobe member 44.

The lower end of the first toggle link 29 is provided with an integral elongated release means 65 which is disposed adjacent the second handle 17 between said handle and the first handle and which constitutes a releasing handle 66 adapted to drive the toggle linkage from its over center position into its released position to cause said movable jaw 21 to be released from the object 22 upon which it is clamped by releasing the lobe member 44 from contact with the arcuate plate 48.

I thus provide by my invention a wrench which is adapted to be utilized to clamp elements of various sizes and thicknesses within a predetermined range, without adjusting the toggle linkage embodied therein. My invention also provides a vise wrench which permits the handles thereof to be positively and directly connected to each other. A feature of my invention is the incorporation of the toggle linkage within one of the handles of the wrench to eliminate the possibility of injuring the hand of the user when the toggle linkage is driven over center and an additional feature of my invention is the provision of the locking means for the toggle linkage in the handle of the wrench adjacent the fixed jaw thereof.

Although I have shown and described a preferred embodiment of my invention for the purpose of illustrating the manner of construction and mode of operation thereof, it is readily apparent that changes, modifications and substitutions may be made therein. Therefore, I do not intend to be limited to the specific details of the construction shown but prefer, rather, to be afforded the full scope of the following claims.

I claim as my invention:

1. In a wrench the combination of: a first handle; a fixed jaw mounted in one end of said first handle; a second handle pivotally connected to said first handle; a movable jaw mounted in one end of said second handle adapted to coact with said fixed jaw to secure an object therebetween; a toggle joint having one end mounted in said second handle adapted to be actuated by said movable jaw; and locking means mounted in said first and second handles, said locking means including a movable locking element mounted in said second handle having said toggle joint connected thereto, said locking element being adapted to be actuated by said toggle joint to prevent relative movement between said first and second handles.

2. In a wrench the combination of: a first handle; a fixed jaw mounted in one end of said first handle; a second handle pivotally connected to said first handle; a pivoted jaw mounted in said second handle adapted to coact with said fixed jaw to secure an object therebetween, said pivoted jaw having an integral actuating arm; a toggle joint having one end pivotally secured in said second handle adapted to be actuated by the arm of said pivoted jaw; and locking means mounted in said first and second handles, said locking means including a movable locking element mounted in said second handle having said toggle joint pivotally connected thereto, said locking element being adapted to be actuated by said toggle joint and to prevent relative movement between said first and second handles.

3. In a wrench the combination of: a first handle; a fixed jaw mounted in one end of said first handle; a second handle, said first and second handles having recesses formed therein and one end of said second handle being pivotally mounted within the recess of said first handle; a pivoted jaw mounted in said second handle adapted to coact with said fixed jaw to secure an object therebetween, said pivoted jaw having an integral arm projecting into said recess in said second handle; a toggle joint having one end mounted in one end of said second handle adapted to be actuated by the arm of said pivoted jaw; and locking means including a locking element pivotally mounted in said second handle having said toggle joint connected thereto and a plate mounted in said first handle engageable by said locking element, said locking element being adapted to be actuated by said toggle joint to frictionally lock said locking element against said plate to prevent relative movement between said first and second handles.

4. In a wrench the combination of: a first handle; a fixed jaw mounted in one end of said first handle; a second handle pivotally connected to said first handle; a pivoted jaw mounted in one end of said second handle adapted to coact with said fixed jaw to secure an object therebetween, said pivoted jaw being adapted for pivotal movement within said second handle; a toggle joint having one end mounted in said second handle adapted to be actuated by the pivotal movement of said pivoted jaw; and locking means mounted in said first and second handles, said locking means including a movable locking element mounted in said second handle having said toggle joint connected thereto, said locking means including adjustment means for determining the amount of pressure which must be applied to said first and second handles to throw said toggle joint over center to energize said locking means.

5. In a wrench the combination of: a first handle; a fixed jaw mounted in one end of said first handle; a second handle pivotally connected to said first handle; a pivoted jaw mounted in one end of said second handle adapted to coact with said fixed jaw to secure an object therebetween; a toggle joint having one end mounted in said second handle adapted to be activated by said pivoted jaw; and locking means mounted in said first and second handles, said locking means including a pivotally mounted locking element to which the other end of said toggle joint is connected and a motion-limiting member adapted to be contacted by said pivotally mounted locking element, said locking element being adapted to be actuated by said toggle joint to prevent relative movement between said first and second handles.

6. In a wrench the combination of: a first handle; a fixed jaw mounted in said first handle; a second handle pivotally connected to said first handle; a pivoted jaw mounted in said second handle adapted to coact with said fixed jaw to secure an object therebetween, said pivoted jaw having an elongated arm extending into said second handle; a toggle joint having one end mounted in said second handle adapted to be actuated by said arm of said pivoted jaw; and locking means mounted in said first and second handles, said locking means including a locking element and a motion-limiting member, the other end of said toggle joint being pivotally connected to said locking element to cause said toggle joint to move said locking element into contact with said motion-limiting member to prevent relative movement between said first and second handles.

7. In a wrench the combination of: a first handle; a fixed jaw mounted in said first handle; a second handle pivotally connected to said first handle; a pivoted jaw mounted in said second handle adapted to coact with said fixed jaw to secure an object therebetween; a toggle joint having one end mounted in said second handle adapted to be actuated by said pivoted jaw; locking means mounted in said first and second handles, said locking means including a movable locking element mounted in said second handle having one end of said toggle joint connected thereto, said locking element being adapted to be actuated by said toggle joint to prevent relative movement between said first and second handles; and release means disposed between said first handle and said second handle connected at one end to said toggle joint for breaking said toggle joint after said toggle joint has been actuated by said pivoted jaw.

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