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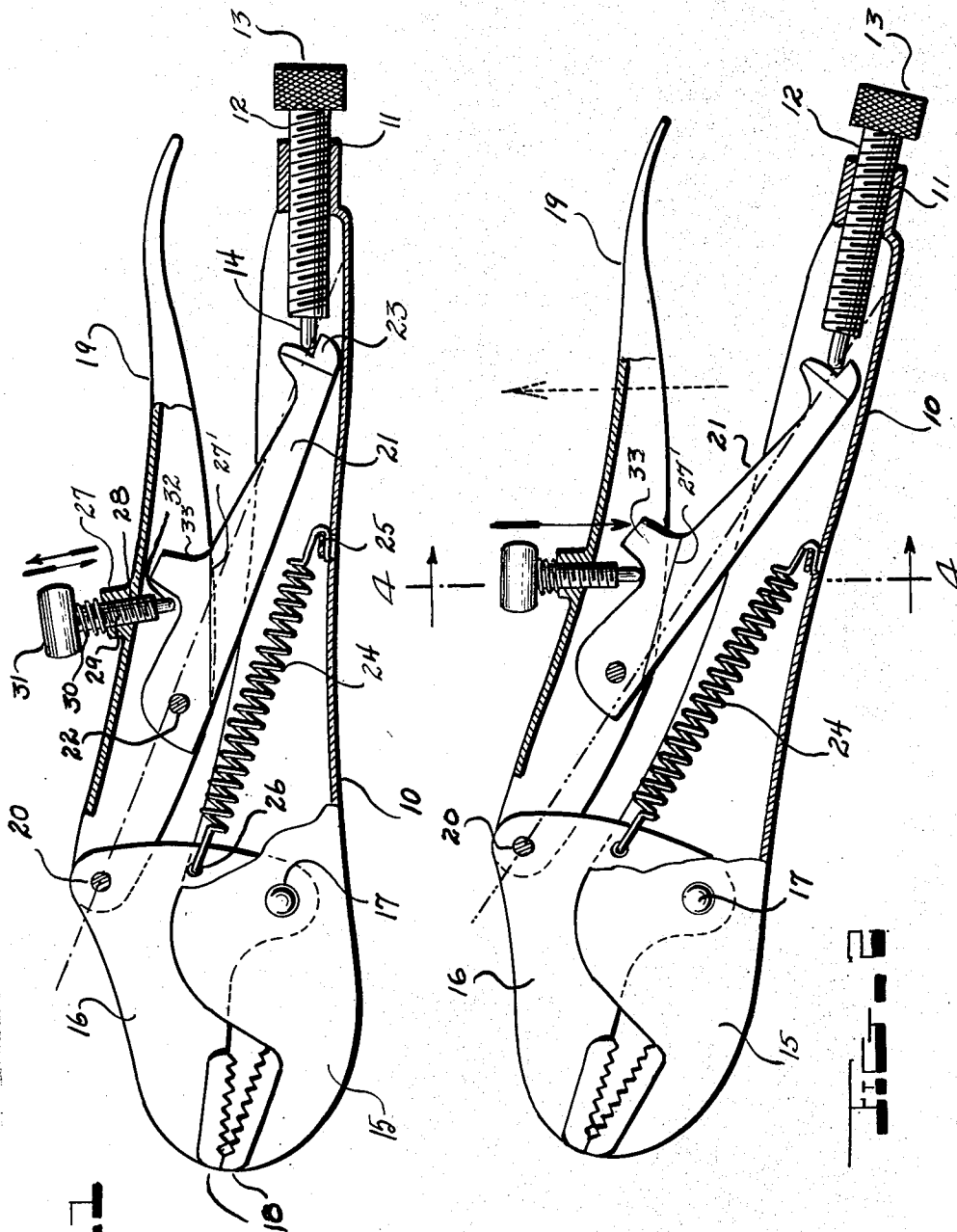
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RELEASE MECHANISM FOR TOGGLE ACTUATED PLIER TYPE WRENCHES

Filed Aug. 30, 1947

2 SHEETS—SHEET 1



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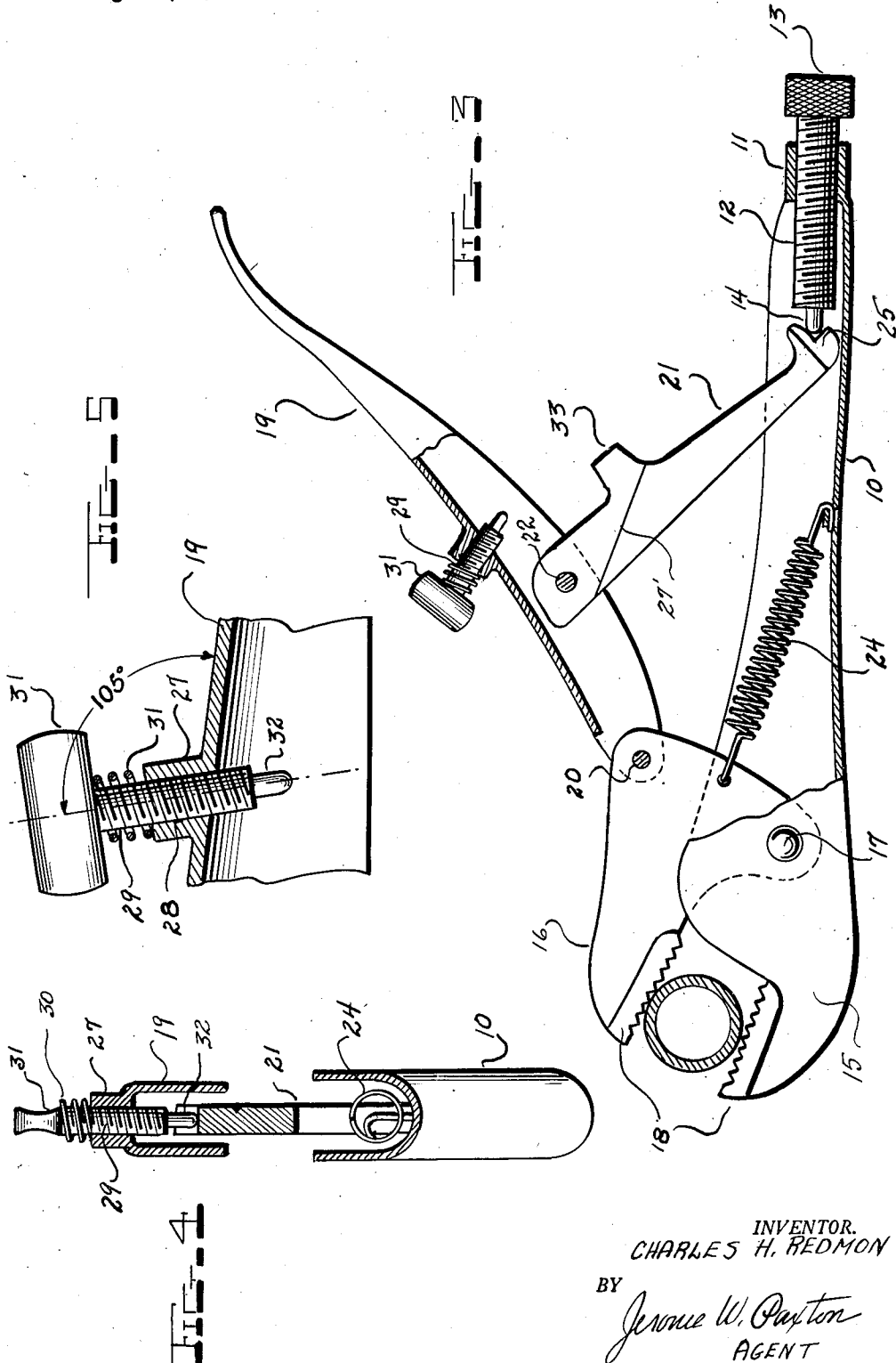
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2 SHEETS—SHEET 2



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RELEASE MECHANISM FOR TOGGLE
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1 Claim. (Cl. 81-84)

1

This invention relates to hand tools; and more particularly has reference to pliers or wrenches of the so-called "vise-grip" type, having means whereby the handles and gripping jaws may be locked and readily opened from the locked position or prevented from locking during operation.

The invention is an improvement on hand tools such as disclosed in Patent No. 2,280,005. In this latter construction, when the knurled screw or bolt was adjusted for a particularly tight grip of the jaws, it was advisable to open the handle members by the use of a rigid tool, since the hands were often injured by the sudden release of the spring tension if opening was attempted by applying a force to the auxiliary handle by the hand. With this type of tool, when pressure is applied to move the auxiliary handle toward the main handle, the fulcrum pivot will move beyond a straight line extending between the pivot point of the auxiliary handle to the movable jaw and the inner end of the knurled screw, whereby the spring will maintain the gripping jaws closed tightly. On the other hand, if it is not desired to lock the gripping jaws on the object to be rotated, the knurled screw cannot be manipulated to move forwardly in the main handle, thus moving the fulcrum bar to a point of pivot where the point of pivot to the auxiliary handle is above a straight line drawn between the pivot of the auxiliary handle to the movable jaw and the inner end of the knurled screw, effecting satisfactory work with ease of application. Hence, upon release of pressure from the handles, the spring will urge the jaws apart.

An object of my invention is to provide pliers or wrenches of the character described with means whereby the jaws may be readily and easily released from the locked position.

Another object of this invention is to provide a novel adjusting device associated with the auxiliary handle whereby the jaws may be prevented from locking, so that an automatic or self-opening of the handles and jaws is accomplished upon release of pressure from the operating handles.

Yet a further object of my invention is to provide a novel adjusting attachment which may be incorporated with hand tools of the type under consideration without interfering with the normal operation of the tool.

And a still further object of the invention is to provide a hand tool of the character described with an adjusting screw so located with respect to the fulcrum bar that the degree of lock tension may be regulated within very fine limits.

In order to achieve the foregoing and other

2

advantageous objects, my invention broadly encompasses the idea of so locating an adjustment screw on the auxiliary handle that it may be manipulated to accomplish first, a quick and easy release of the jaws when locked, second, preventing the jaws from locking to provide automatic opening of the handles when pressure is released, and third, a regulation of the amount of lock tension.

With the foregoing and other objects in view, the invention consists in the details of construction, and in the arrangement and combination of parts to be hereinafter more fully set forth and claimed.

In describing the invention in detail, reference will be had to the accompanying drawings forming part of this application, wherein like characters denote corresponding parts in the several views, and in which:

Figure 1 is a view in side elevation, partly in section, showing the location of my novel attachment, with the jaws in locked position.

Figure 2 is a view similar to Figure 1, showing the attachment rotated to a position where the fulcrum bar pivot has been moved above a straight line extending between the pivot of the auxiliary handle to the movable jaw and the inner end of the knurled screw.

Figure 3 is a view in side elevation, partly in section, showing the auxiliary handle in its completely open position.

Figure 4 is a sectional view taken along the line 4-4 of Fig. 2, looking in the direction of the arrows.

Figure 5 is a detail view, partly in section, of the spring loaded screw device for achieving the desired results.

Referring to the drawings, and particularly Figure 1, there is shown a main handle member 10 of general channel configuration having the rear end thereof formed with an interiorly threaded sleeve 11. An exteriorly threaded screw or bolt 12 having a knurled operating head 13 is threaded into the sleeve 11, and the front end provided with a contact head 14 projects into the handle 10. The opposite end of the handle 10 carries a fixed jaw 15 and a movable jaw 16 is pivoted thereto, as shown at 17. Each jaw is provided with a gripping surface 18. An auxiliary handle 19, also of channel shape, is pivoted to the movable jaw 16, as indicated at 20. A fulcrum bar 21 is hinged to the auxiliary handle rearwardly of the pivot point 20 by a stud or the like 22. The opposite or free end of the fulcrum bar 21 is formed with a contact surface 23 which

3

is adapted to engage the contact end 14 of the adjusting screw 12. A helical spring 24 is attached at one end to the main handle 10, as shown at 25, and at the opposite extremity to the movable jaw, as shown at 26. The spring 24 tends to maintain the movable jaw normally away from the fixed jaw 15 (Figure 3) and holds the contact end 23 of the fulcrum bar 21 against the screw 12.

In using this tool to lock the jaws 15 and 16 on a given object, the screw 12 is rotated to a position so that when the handle 19 is moved toward the main handle 10, the pivot point 22 will be below a straight line drawn from the contact point 14 to the pivot point 20, as illustrated by the broken lines in Figure 1. In this position, the jaws are firmly locked and considerable force must be applied to the end of the handle 19 to move the pivot point 22 above the straight line previously mentioned. To accomplish this result with ease and simplicity, it will be noted in Figs. 1 and 5 that the auxiliary handle 19 is formed with an upwardly extending boss 27 having a threaded bore 28. A screw 29 is threaded into the bore 28, and a spring 30 surrounds the screw between the upper face of the boss and an operating head 31. The lower end of the screw is reduced as at 32, so as to contact a projection or lug 33 extending approximately at right angles from the fulcrum bar 21. The boss 27 is located rearwardly of the pivot point 22 of the fulcrum bar to the handle 19 and is disposed at a suitable angle with respect to the upper surface of the handle 19, as shown in Figure 5. A scribe mark 27' is provided on the fulcrum bar 21 to facilitate rapid adjustment of the screw 29.

Assuming the jaws 15 and 16 are locked as shown in Figure 1, this lock may be quickly broken by rotating the screw 29 downwardly to a point where the end 32 thereof engages the lug 33, and by continued rotation of the screw in the same direction, the pivot point 22 of the fulcrum bar will be moved upwardly beyond the straight line drawn between the pivot 20 and the end 14 of the screw 12, whereupon the handle 19 is automatically released from the closed position. By virtue of this novel arrangement, it will be appreciated that it is not necessary to apply any force to the auxiliary handle to release the jaws from the locked position which is entirely advantageous over the tools of this type currently being used.

On the other hand, if automatic opening of the jaws 15 and 16 is desired, upon release of pressure from the auxiliary handle, this may be readily accomplished by rotating the screw 29 downwardly a sufficient distance so that the pivot point 22 will not reach or pass beyond the straight line drawn between the end 14 of the screw 12 and the pivot 20 of the handle 19 to the movable jaw 16. With the tool in this position, the spring 24 will urge the jaws 15 and 16 apart as soon as pressure is relieved from the auxiliary handle 19.

Another important advantage is that the screw 29 may be manipulated so as to set the screw in a position with respect to the fulcrum bar 21 whereby the jaws 15 and 16 may be locked yet released by a very light pull on the free end of the auxiliary handle 19.

4

I believe it is readily apparent from the foregoing description that I have provided a very simple attachment which may be incorporated in hand tools of the type described which easily effects an unlocking of the gripping jaws without danger of injuring the operator's hands. Furthermore, by proper adjustment of the screw 29, the tool can be easily converted so that the handles will automatically open upon release of pressure from the auxiliary handle and, in addition, the lock tension may be regulated within very close limits.

The invention is not to be confined to any strict conformity with the showing in the drawing but may be changed or modified so long as such changes or modifications mark no material departure from the salient features of the invention as expressed in the appended claim.

I claim:

In a hand tool of the character described, a handle provided with a fixed jaw, a movable jaw pivoted to the handle, an auxiliary handle pivoted to the movable jaw, a fulcrum bar pivoted to the auxiliary handle and having a free end, a lug on the fulcrum bar in proximity to the pivot point of the fulcrum bar to the auxiliary handle and extending in the direction of the auxiliary handle, a member longitudinally adjustable in the main handle adapted to contact the free end of the fulcrum bar for adjusting the movable jaw relative to the fixed jaw, the arrangement being such that when the pivot of the fulcrum bar is below a straight line extending from the pivot point of the auxiliary handle to the movable jaw and the free end of the fulcrum bar and the inner end of the longitudinally extending member, the jaws will be tightly closed, spring means normally moving the movable jaw away from the fixed jaw, the improvement comprising manually operated screw means in the auxiliary handle rearwardly of the point of pivot of the fulcrum bar to the auxiliary handle adapted to be rotated to contact the fulcrum bar to move the pivot point of the fulcrum bar up to a point where the auxiliary handle is above the aforementioned straight line so that said spring means will move the movable jaw away from the fixed jaw.

CHARLES HARRISON REDMON.

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