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OPERATING MECHANISM FOR LIFTING JACKS

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Fig. 1.

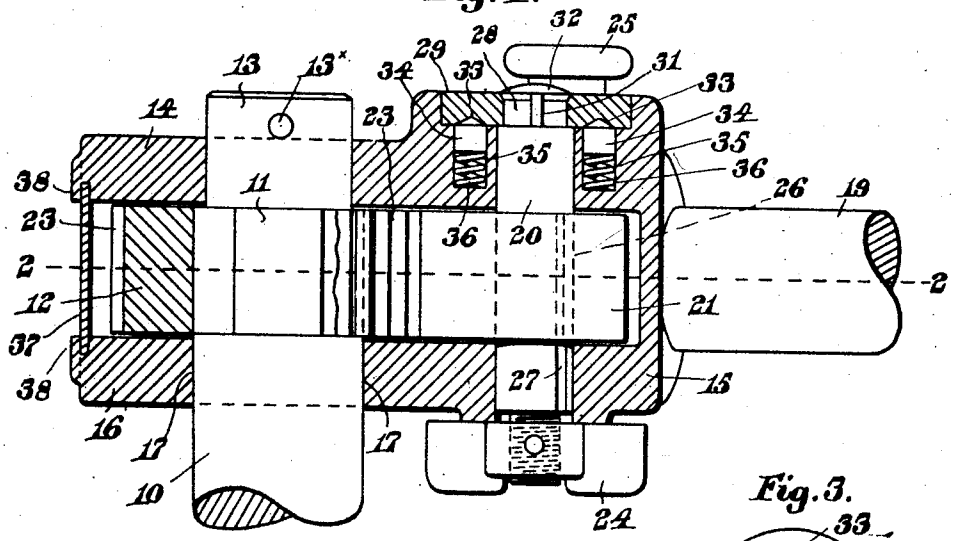


Fig. 3.

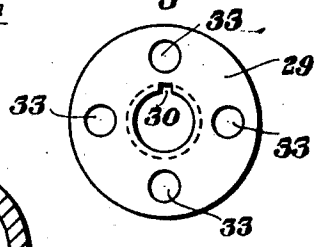


Fig. 2.

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UNITED STATES PATENT OFFICE.

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OPERATING MECHANISM FOR LIFTING JACKS.

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This invention relates to operating mechanism for lifting jacks, one object of the invention being to provide a sure grip upon the driving shaft while another object is the provision of means for changing the position of the pawl coacting with the ratchet upon said shaft, in order to reverse the motion of said driving shaft.

These objects are attained by the mechanism illustrated in the accompanying drawings.

For the purpose of illustrating the invention, one preferred form thereof is shown in the drawings, this form having been found to give satisfactory and reliable results, though it is to be understood that the various instrumentalities of which the invention consists can be variously arranged and organized and that the invention is not limited to the precise arrangement and organization of the instrumentalities as herein shown and described, except as required by the scope of the appended claims.

Of the drawings;

Fig. 1 represents a horizontal section of an operating mechanism embodying the principles of the present invention, the cutting plane being on line 1, 1, on Fig. 2.

Fig. 2 represents a vertical section of the same on line 2, 2, on Fig. 1, and

Fig. 3 represents an elevation of the plate keyed to the pawl pin.

Similar characters indicate like parts throughout the several figures of the drawing.

In the drawings, 10 is the driving shaft of any well known construction of screw type lifting jack, this shaft having a flat sided portion 11 on which is mounted a ratchet 12.

The outer end of the shaft 10 has a portion 13, reduced in diameter and extending through one wall 14 of a bifurcated socket casing 15, the opposite wall 16 of which has a bearing 17 therein for the shaft 10. The casing 15 is retained upon the shaft 10 by means of the pin $13^{\times}$ extending through the reduced end 13.

The casing 15 is provided with a socket 18 for the reception of one end of an operating lever or handle 19 by which said casing 15 may be moved about the axis of the shaft 10.

The walls 14, 16 are provided with bearings for the pin 20 having keyed thereto the double-ended pawl 21, the teeth 22 of which are adapted to engage with the teeth 23 of the ratchet 12.

One end of the pin 20 has secured thereto the wing nut 24 by which the pawl 21 may be moved through an angle of 90° to remove one set of teeth 22 from engagement with the teeth 23 of the ratchet 12 and bring another set of teeth 22 into engagement therewith.

Each set of teeth 22 on the pawl 21 are formed on the arc of a circle conforming to the arc of the teeth 23, so that when a set of teeth 22 is in engagement with the teeth 23, each of the four teeth thereof is firmly seated between the teeth of the ratchet so that it would be impossible for the teeth 22, 23 to become disengaged while the lever 19 is moving in the direction of the arrow *a* on Fig. 2 of the drawing.

When the pawl 21 is in the position for lowering load as indicated in Fig. 2, the tendency is to move the ratchet 12 in the direction of the arrow *b* on Fig. 2 and in such a case the teeth 23 cannot pass the line between the axes of shaft 10 and pawl pin 20 without greatly separating these axes, which separation the construction of the operating mechanism does not permit.

Obviously when the elements are in the position indicated in Fig. 2, the greater the strain applied to the lever 19 in the direction of arrow *a*, the tighter will the pawl 21 be held in contact with the ratchet 12, the tendency being during such upward movement to force the teeth of the pawl 21 toward the axis of the shaft 10.

It is quite evident therefore that this construction of pawl and ratchet produces a sure and positive grip which will effectually prevent any accidental slipping.

The casing 15 is provided with a knob 25 by which the mechanism may be operated without the lever 19, moving the casing 15 about the axis of shaft 10 by means of short strokes when the jack is to be operated without any load thereon.

This construction is particularly desirable when working in close quarters.

The pawl 21 is provided with a key 26 extending into a slot 27 in the pawl pin 20.

The pin 20 has a reduced end 28 extending through a flat head 29 having a slot 30 therein into which extends a key 31 projecting from the reduced end 28 which is

upset as at 32 to prevent the displacement of the head 29.

By means of this construction the pin 20, pawl 21, flat head 29, and wing nut 24 all rotate together about the axis of said pin 20.

The inner face of the flat head 29 is provided with the depressions 33 having inclined walls into which extend the pointed ends of plungers 34, positioned in sockets 35 in the casing 15 and forced outwardly by the springs 36.

For convenience, in illustrating, four depressions 33 are shown in the head 29 with two plungers 34 in the casing 15, these plungers registering with two of the depressions 33 when the pawl 21 is in the position shown in full lines in Fig. 2 and with the other two depressions when said pawl is in the position indicated by dotted lines in said figure.

The tension of the springs 36 is sufficient to retain the pawl 21 in adjusted position.

When the teeth 22 of the pawl 21 are passing over the teeth 23 of the ratchet 12 these plungers 34 are operating in the depressions 33 and as a consequence there is always a spring tension on the teeth of the pawl as each tooth thereof passes from one tooth of the ratchet to another tooth.

The casing 15 is made open at one end which end is closed by the curved plate 37 held in position by the ears 38 extending thereover from the casing 15.

The ratchet 12 and pawl 21 are assembled in the casing 15 before the plate 37 is positioned and the entire interior of the casing is subsequently filled with heavy grease.

This closing plate 37 prevents the admission of dirt to the interior of the casing.

This operating mechanism is simple in construction, but very effective when in use.

It is believed that the operation and many advantages of the invention will be apparent without further description.

Having thus described my invention, I claim;

1. The combination of a driving shaft; a ratchet secured thereto having V-shaped teeth; a casing movable about the axis of said shaft; a pawl wholly enclosed within said casing having a plurality of V-shaped teeth in a curved plane and all adapted to fit the teeth of said ratchet; a pin mounted in the walls of said casing to which said pawl is keyed; and means on the outer end of said pin whereby said pin may be oscillated.

2. The combination of a driving shaft; an actuating ratchet therefor secured thereto; a casing straddling said shaft and movable about its axis; a double-ended pawl pivotally mounted in said casing, each end of said pawl having a plurality of teeth in a curved plane and all adapted to fit the teeth of said ratchet, said pawl being wholly enclosed within said casing; means extending through one side wall of said casing whereby said pawl may be moved about its pivot, said means including an oscillating pin; and means within the opposite side of said casing coacting with said pin for retaining said pawl in adjusted position but permitting the pawl to pass the ratchet teeth on its return movement.

3. The combination of a driving shaft; an actuating ratchet therefor secured thereto; a closed casing movable about the axis of said shaft, said casing having parallel side walls provided with bearings for said shaft on opposite sides of said ratchet; a double-ended pawl wholly enclosed within said casing adapted to engage said ratchet; a pin extending laterally through one wall of said casing and to which said pawl is keyed; means on the outer end of said pin whereby it may be oscillated; and yielding means at the other end of said pin and separated from said pawl for retaining the pawl in adjusted position.

4. The combination of a driving shaft; an actuating ratchet therefor secured thereto; a closed casing provided with means for moving it about the axis of said shaft; a pawl wholly enclosed within said casing coacting with said ratchet; a pin extending through one wall of said casing and to which said pawl is keyed; means on the outer end of said pin whereby it may be oscillated; a plate disposed in a recess in the outer face of the casing and secured to the opposite end of said pin having detents in its inner face; and means within sockets formed in the wall of said casing coacting with said detents for locking said pawl in adjusted position.

5. The combination of a driving shaft; an actuating ratchet therefor secured thereto; a closed casing provided with means for moving it about the axis of said shaft and having bearings on said shaft on opposite sides of said ratchet; a pawl wholly enclosed within said casing coacting with said ratchet; a pin to which said pawl is secured; means movable independently of said casing actuating means secured to one end of said pin for oscillating it; a plate disposed in a recess in the outer face of the casing and secured to the opposite end of said pin; and yielding means within sockets formed in the casing coacting with said plate for locking said pawl in adjusted position.

6. The combination of a driving shaft; an actuating ratchet therefor secured thereto; a casing provided with means for moving it about the axis of said shaft; a double ended pawl within said casing secured to an oscillating pin and having a set of teeth on each end thereof; means at one side of said casing for moving either set of pawl teeth

into engagement with said ratchet, said pawl-moving means being operable independently of said casing actuating means; and automatic means within recesses in the outer face of said casing and at one end of the pawl pin for locking said pawl in adjusted position.

7. The combination of a driving shaft; a ratchet secured thereto; a casing movable about the axis of said shaft; a pin mounted in bearings in the walls of said casing; a wing nut on one end of said pin; a double ended pawl keyed to said pin and having a set of teeth at each end, either set of which is adapted to be brought into engagement with said ratchet; and means at the opposite end of said pin for retaining said pawl in adjusted position.

8. The combination of a driving shaft; a ratchet secured thereto; a casing movable about the axis of said shaft; a pin mounted in bearings in the walls of said casing; means for oscillating said pin positioned at one end thereof; a double-ended pawl keyed to said pin and adapted to coact with said ratchet; a disk keyed to the opposite end of said pin within a recess in the outer face of the casing; and means on said casing coacting with said disk to retain said pawl in adjusted position.

9. The combination of a driving shaft; a ratchet secured thereto; a casing movable about the axis of said shaft; a pin mounted in bearings in the walls of said casing; means at one end of said pin for oscillating it; a double ended pawl secured to said pin and having a set of ratchet engaging teeth at each end; a disk keyed to the opposite end of said pin and having detents on its inner face; and spring pressed members on said casing having cone shaped ends coacting with said detents.

10. The combination of a driving shaft; a ratchet secured thereto; a casing movable about the axis of said shaft; a pin mounted in bearings in the walls of said casing; means at one end of said pin for oscillating it; a double ended pawl secured to said pin and having a set of ratchet engaging teeth at each end; a disk keyed to the opposite end of said pin and having cone shaped depressions on its inner face; and spring pressed members on said casing having cone shaped ends extending into said cone-shaped depressions.

11. The combination of a driving shaft having a flat-sided portion and cylindrical portions on opposite sides thereof; a ratchet securely mounted upon said flat-sided portion; a casing having bearings on said cylindrical portions and provided with means for moving it about the axis of said shaft; a double ended pawl within said casing each end having a set of teeth adapted to engage the teeth of said ratchet simultaneously; means at one side of the casing for oscillating said pawl to bring either set of teeth into action; and means within said casing on the opposite side of the pawl for retaining it in adjusted position but permitting the pawl to pass the ratchet teeth on its return movement.

12. The combination of a driving shaft; an actuating ratchet therefor secured thereto; a casing provided with means for moving it about the axis of said shaft and having a chamber therein to receive said ratchet; a double ended pawl disposed in said chamber; an oscillating pin to which said pawl is keyed and extending through one wall of said casing; means at the outer end of said pin for oscillating it to bring either end of said pawl into engagement with the ratchet teeth; means at the other end of the pin for retaining said pawl in adjusted position; and a closing plate for said chamber concentric to the axis of said shaft.

13. The combination of a driving shaft; a ratchet secured thereto having V-shaped teeth; a casing having a chamber formed therein with parallel side walls provided with bearings for said shaft; a semi-cylindrical plate secured to said side walls and closing said chamber; a pawl within the inner end of said chamber having a plurality of V-shaped teeth in a curved plane and all adapted to fit the teeth of said ratchet; a pin mounted in the walls of said casing to which said pawl is keyed; and means on the outer end of said pin whereby said pin may be oscillated.

Signed by me at Harvey (Chicago suburb), Illinois, this 4th day of August, 1925.

FRANK L. GORMLEY.