

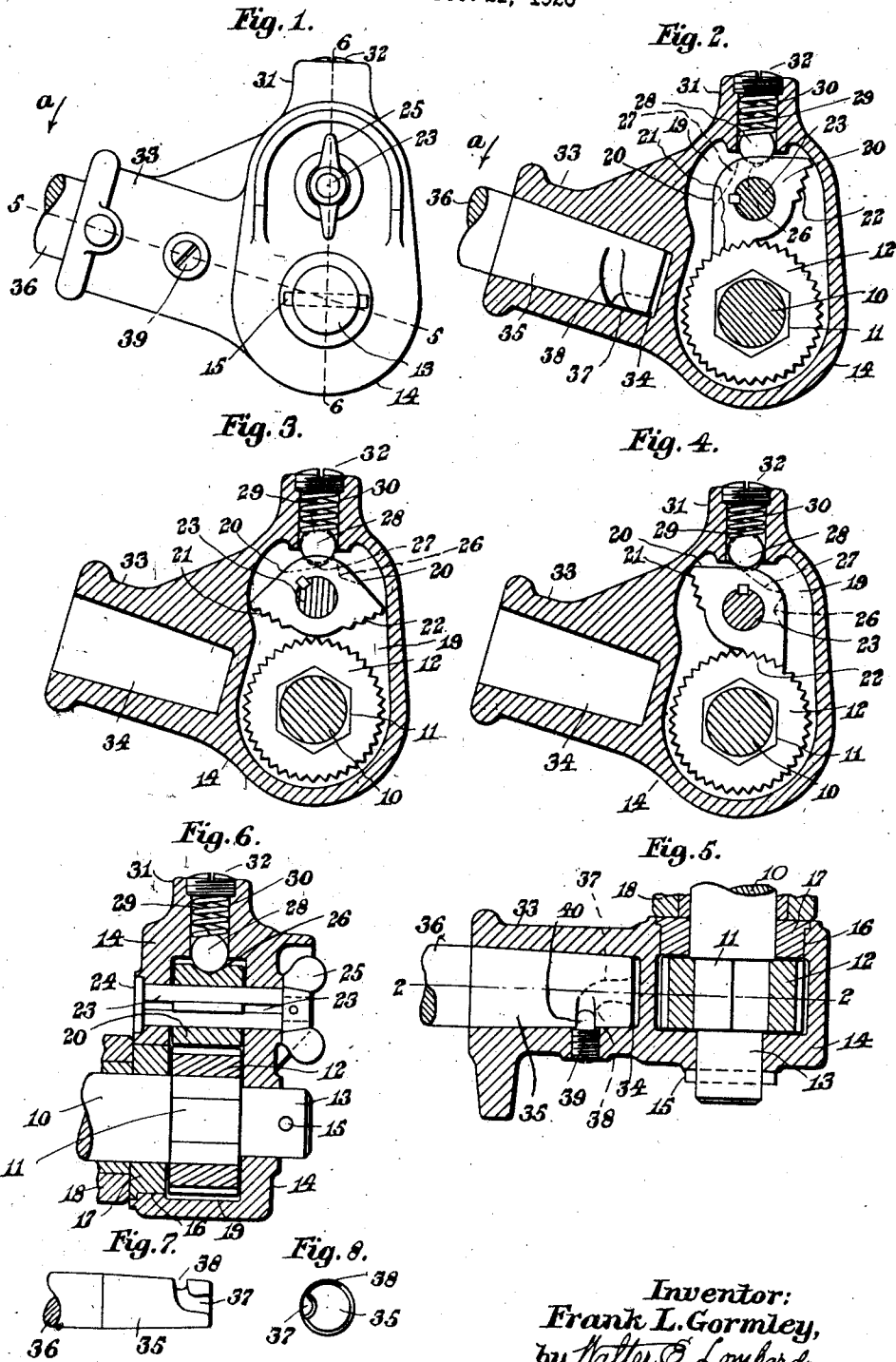
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RATCHET MECHANISM FOR LIFTING JACKS

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RATCHET MECHANISM FOR LIFTING JACKS.

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This invention relates to operating mechanisms for self-lowering lifting jacks and the object of the invention is the production of a device of this character which can be actuated by the operating lever only in one direction and that is when the load is being lifted, which can be actuated manually in either direction without the lever and which may be adjusted very readily to a neutral position in which position no motion can be imparted to the driving shaft through the medium of said operating mechanism.

This object is attained by the mechanism illustrated in the accompanying drawings.

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

Of the drawings:

Figure 1 represents a ratchet mechanism embodying the principles of the present invention.

Figure 2 represents a vertical section of same on line 2, 2, on Fig. 5, with the ratchet engaging pawl in lifting position.

Figure 3 represents a similar section with the pawl in neutral position.

Figure 4 represents a similar section with the pawl in position to permit the socket to be manually actuated.

Figure 5 represents a horizontal section of same on line 5, 5, on Fig. 1.

Figure 6 represents a vertical section of same on line 6, 6, on Fig. 1.

Figure 7 represents an elevation of the butt end of the operating lever, and

Figure 8 represents an end elevation of the lever.

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

In the drawings, 10 is the driving shaft of a machine such as a self-lowering jack.

This shaft 10 has a squared portion 11 on which is mounted a ratchet wheel 12 and has a reduced cylindrical portion 13 extending

through a bearing in the outer wall of a casing or lever socket 14.

Through the outer end of the reduced cylindrical portion 13 extends a pin 15 which retains the casing 14 in position on said shaft 10.

Surrounding the shaft 10 there is a cylindrical opening 16 in the inner wall of the casing 14, which opening has fitted thereto a collar 17 having a bearing therein for said shaft.

The inner face of the collar 17 abuts the outer face of a hub 18 of the machine, which hub is provided with a bearing for said shaft.

The upper end of the casing 14 has a chamber 19 therein in which is disposed a double ended pawl 20, the opposite ends of which are provided with a plurality of teeth 21, 22, which are adapted to coact with the teeth of the ratchet 12 at different times during the operation of the ratchet mechanism.

These teeth 21, 22 are in a curved plane, the radius of which is the same as that of the ratchet 12 so that all of the teeth of each set 21 or 22 are adapted to simultaneously engage the ratchet teeth.

The pawl 20 is keyed to a pin 23 having a head 24 in a recess in the outer face of the inner wall of casing 14, and provided on its opposite end with a winged turning member 25 pinned thereto.

The pawl 20 is provided with two depressions 26, 27 in the upper walls thereof with either of which coacts a ball 28 pressed towards the axis of said pin 23 by a spring 29.

The spring 29 and the greater part of the ball 28 are disposed in an opening 30 in a boss 31 extending upwardly from said casing 14.

This opening 30 is closed by a threaded member 32 which may be adjusted to vary the tension of the spring 29 in an obvious manner.

The casing 14 has a larger boss 33 extending from one side thereof which is provided with a tapered socket 34 to receive the tapered end 35 of the lever 36 for actuating said casing when it is desired to lift the load.

When lifting a load the lever 36 is moved downwardly in the direction of the arrow *a* on Figs. 1 and 2 of the drawings.

When the lever 36 is used the pawl 20 is in the position shown in Fig. 2 with the set of teeth 21 in engagement with the teeth of the ratchet and the ball 28 extending into the depression 26 of the pawl 20.

The center of this depression 26 is slightly at one side of the axis of the cylindrical opening 30 so that the ball 28 bears normally on only one wall of the depression 26.

When the lever 36 is moved upwardly prior to another downward or lifting movement the ball 28 will be moved upwardly while the pawl teeth 21 are moving over the ratchet teeth.

At the termination of the upward movement of the lever 36 the spring 29 acting upon the ball 28 will force the teeth 21 of the pawl 20 into a new set of ratchet teeth and the operation may be repeated.

The lever 36 cannot be used in lowering as there is no depression in the pawl 20 for the ball 28 to enter when the pawl 20 is in the position indicated in Fig. 4. This is the position the pawl 20 must be in when it is desired to lower by hand and the pawl must be manually held in this position while the lowering is being accomplished. As soon as the pawl is released it will be automatically returned to its neutral position (see Fig. 3) by ball 28 coacting therewith.

When the ball 28 is in the depression 27 of the pawl 20, this pawl is retained in a neutral position with both sets of teeth 21, 22 disengaged from the ratchet teeth as shown in Fig. 3.

When in this position no movement of the ratchet 12 can be effected by the movement of the casing or lever socket 14 about the axis of the shaft 10.

When it is desired to lower manually without any load on the jack the teeth 22 are brought into engagement with the ratchet teeth by turning the member 25 clockwise as viewed from the outer end of pin 23, the operator grasping the lever socket 14 and moving it clockwise about the axis of the shaft 10.

The brake mechanism usually embodied in self-lowering jacks must first be released before the jack may be lowered by hand.

When the jack has been lowered sufficiently the operator releases the socket 14 and the pawl 20 will return to its neutral position automatically.

It is self-evident, therefore, that provision is made in this ratchet mechanism for retaining the actuating pawl 20 in a neutral position in which no rotary movement may be imparted to the shaft 10 through the ratchet 12; for retaining this pawl in a position in which the lifting operation may be performed by the operating lever 36; and may be retained in engagement with the ratchet in order to lower the jack manually when no load is being supported.

This feature is of great advantage as it makes the mechanism fool-proof.

The tapered end 35 of the lever 36 is provided with a groove 37 having a flaring mouth extending from the end of said lever and terminating in a curved portion 38 extending partly around the periphery of said lever.

The boss 33 has threaded thereto a screw 39 having at its inner end a rounded projection 40 which extends into the tapered socket 34.

When the tapered end 35 of the lever 36 is inserted into the socket 34 the rounded projection 40 will enter the groove 37, and when a right hand turn is imparted to the lever 36, said projection 40 will enter the curved portion 38 and force the tapered portion 35 into tight contact with the wall of the socket 34.

If the end 35 becomes slightly worn after continued use it may be forced further into the socket 34 by giving the lever a further turn to the right about the axis of said lever.

By this construction a tight fit is always assured and there never can be any lateral play of the portion 35 in the socket 34.

The ratchet mechanism when installed upon the shaft 10 wholly encloses the movable elements and makes it possible to fill the interior chamber 19 with lubricant in which said elements may operate, thus prolonging their life.

This device is simple in construction but most effective in operation.

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

Having thus described my invention, I claim:

1. The combination with the driving shaft of a lifting jack; an actuating ratchet therefor secured thereto; a casing surrounding said ratchet and movable about the axis of said shaft; a double ended pawl pivotally mounted in said casing and having a plurality of teeth at opposite ends adapted to engage the ratchet teeth, one set of teeth being for lifting and the other set for lowering the load supported by said jack; and means within said casing for retaining only the lifting set of teeth in engagement with the ratchet or both sets of teeth disengaged from the ratchet teeth.

2. The combination with the driving shaft of a lifting jack; an actuating ratchet therefor secured thereto; a casing surrounding said ratchet and movable about the axis of said shaft; a double ended pawl pivotally mounted in said casing and having a plurality of teeth at opposite ends adapted to engage the ratchet teeth, one set of teeth being for lifting and the other set for lowering the load supported by said jack; means within the casing for retaining only the lifting

set of teeth in engagement with the ratchet; and means outside the casing for manually retaining the other set of teeth in engagement with the ratchet teeth.

3. The combination with the driving shaft of a lifting jack; an actuating ratchet therefor secured thereto; a casing surrounding said ratchet and movable about the axis of said shaft; a double ended pawl pivotally mounted in said casing and having teeth at opposite ends adapted to engage the ratchet teeth, the teeth at one end being for lifting and at the other for lowering the load supported by said jack; and a spring pressed member within said casing coacting with depressions in said pawl for retaining only the lifting set of teeth in engagement with the ratchet or both sets of teeth disengaged from the ratchet teeth.

4. The combination with the driving shaft of a lifting jack; an actuating ratchet therefor secured thereto; a casing surrounding said ratchet and movable about the axis of said shaft; a double ended pawl pivotally mounted in said casing and having teeth at opposite ends adapted to engage the ratchet teeth, the teeth at one end being for lifting and at the other for lowering the load supported by said jack; and a spring-pressed ball within said casing coacting with depressions in said pawl for retaining only the lifting set of teeth in engagement with the ratchet or both sets of teeth disengaged from the ratchet teeth.

5. The combination with the driving shaft of a lifting jack; an actuating ratchet therefor secured thereto; a casing surrounding said ratchet and movable about the axis of said shaft, said casing having a cylindrical socket; a pawl pivotally mounted in said casing beneath said socket and having two sets of teeth, and two depressions in the wall thereof, one set of teeth being for lifting and the other for lowering the load supported by said jack; a spring pressed ball in said socket adapted to project into one depression when the lifting set of teeth is in engagement with the ratchet and to project into the other depression when neither set of teeth is engaging the ratchet teeth; and manually actuated means for bringing the lowering set of pawl teeth into engagement with the teeth of the ratchet and retaining the teeth in engagement.

6. The combination of the driving shaft of a lifting jack; a ratchet secured thereto having V-shaped teeth; a casing movable about the axis of said shaft; a pawl within said casing having two sets of teeth adapted to fit the teeth of said ratchet; a pin mounted in the walls of said casing to which said pawl is keyed; means for oscillating said pawl to bring either set of teeth into engagement with said ratchet, said pawl having two V-shaped depressions therein; and a

spring pressed ball adapted to extend into said depressions and retain said pawl either in a neutral position or in position to effect a lifting operation.

7. The combination of the driving shaft of a lifting jack; a ratchet secured thereto having V-shaped teeth; a casing movable about the axis of said shaft; a pawl within said casing having two sets of teeth adapted to fit the teeth of said ratchet; a pin mounted in the walls of said casing to which said pawl is keyed; means for oscillating said pawl to bring either set of teeth into engagement with said ratchet, said pawl having a V-shaped depression in one edge face thereof at one side of its center; a pocket in said casing above said pawl; a ball therein extending into said depression; and a spring for forcing said ball inwardly into said depression to retain said pawl in position to effect a lifting operation.

8. The combination of the driving shaft of a lifting jack; a ratchet secured thereto; a casing surrounding said ratchet with one end of the shaft extending therethrough; a pin extending through the projecting end of said shaft; a closure surrounding said shaft and closing an opening in the inner wall of said casing; a double ended pawl having two sets of ratchet engaging teeth; means for retaining only one set of teeth in mesh with the ratchet teeth; an oscillating pin keyed to said pawl and extending through both walls of the casing; and means keyed to the outer end of said pin whereby said pin may be oscillated.

9. The combination of the driving shaft of a lifting jack; 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; 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 yielding means radial to said pin for retaining said pawl either in neutral position or position to effect a lifting operation.

10. The combination of the driving shaft of a lifting jack; a ratchet secured thereto having V-shaped teeth; a casing movable about the axis of said shaft; a pawl within said casing having two sets of teeth adapted to fit the teeth of said ratchet; a pin mounted in the walls of said casing to which said pawl is keyed; means for oscillating said pawl to bring either set of teeth into engagement with said ratchet, said pawl having a V-shaped depression therein; and a spring pressed ball adapted to extend into said depression and retain said pawl in position to effect a lifting operation, said depression being at one side of the plane between the axis of said pin and the path of movement of said ball.

11. The combination in a lifting jack 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 two sets of teeth adapted to fit the teeth of said ratchet; and means confined within said casing for holding only one set of teeth in engagement with said ratchet when the lifting lever is being used and this engagement being with the pawl in position to lift the load supported by said jack.

12. The combination with the driving shaft of a lifting jack; an actuating ratchet therefor secured thereto; a casing enclosing said ratchet and movable about the axis of said shaft, said casing having a cylindrical socket; a pawl pivotally mounted in said casing beneath said socket and having two sets of teeth, of which one set is used when lifting a load and two tapered depressions of equal depth in the wall thereof, one of said depressions being midway between said sets of teeth and the other at one side thereof; a spring pressed ball in said socket adapted to project into the side depression when the lifting set of teeth is in engagement with the ratchet during the lifting of the jack and to project into the center depression when neither set of teeth is engaging the ratchet teeth.

13. The combination with the driving shaft of a lifting jack; an actuating ratchet therefor secured thereto; a pawl having two sets of teeth each set containing a plurality of teeth adapted to simultaneously engage the ratchet teeth, said pawl having two depressions only in an edge face thereof, one depression being central between said sets of teeth and the other at one side of said central depression; and means coacting with one depression for retaining said pawl in a

neutral position with both sets of teeth disengaged or with the other depression to retain the pawl in position to rotate said driving shaft in a direction to lift the load supported by said jack.

14. The combination of the driving shaft of a lifting jack; a ratchet secured thereto having V-shaped teeth; a casing movable about the axis of said shaft; a pawl within said casing having two sets of teeth adapted to fit the teeth of said ratchet, one set of pawl teeth being for lifting and the other set for lowering the load supported by said jack; a pin mounted in the walls of said casing and to which said pawl is keyed; means for oscillating said pawl to bring either set of teeth into engagement with said ratchet; and yielding means coacting with depressions in said pawl to retain it in adjusted position, said yielding means being operable only when said pawl is in neutral position or in position to effect a lifting operation.

15. The combination of the driving shaft of a lifting jack; a ratchet secured thereto having V-shaped teeth; a casing movable about the axis of said shaft; a pawl within said casing having two sets of teeth adapted to fit the teeth of said ratchet, each set of teeth being in a curved plane; a pin mounted in the walls of said casing to which said pawl is keyed; means for oscillating said pawl to bring either set of teeth into engagement with said ratchet; and yielding means coacting with depressions in said pawl to retain it in adjusted position, said yielding means being operable only when the pawl is in neutral position or in position to effect a lifting operation.

Signed by me at 746 Old South Bldg., Boston, Mass., this 27th day of November, 1926.

FRANK L. GORMLEY.