

Dec. 26, 1922.

L. T. KIMMERLE ET AL.
LIFTING JACK.
FILED SEPT. 13, 1921.

1,440,016.

2 SHEETS—SHEET 1.

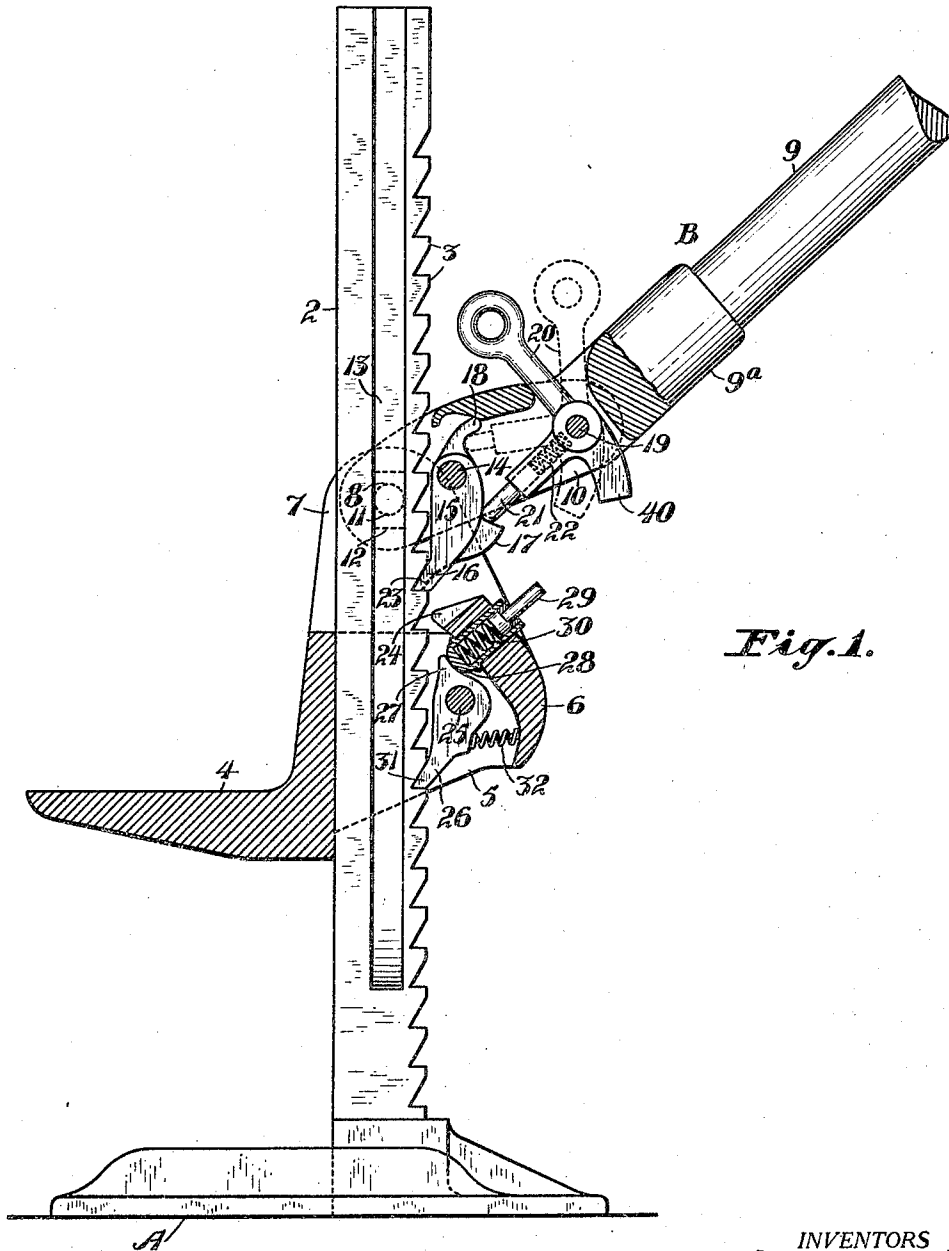


Fig. 1.

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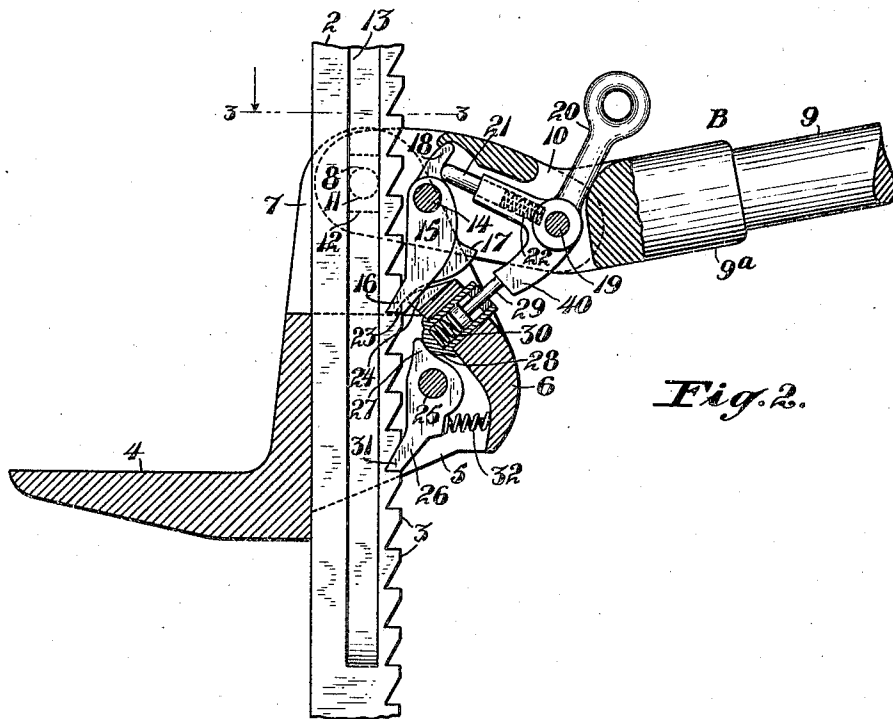
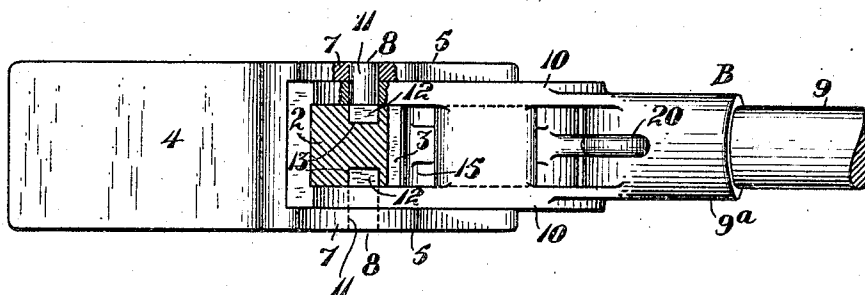


Fig. 2.

Fig. 3.



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UNITED STATES PATENT OFFICE.

LARNED T. KIMMERLE AND DANIEL S. KIMMERLE, OF SAN FRANCISCO, CALIFORNIA.

LIFTING JACK.

Application filed September 13, 1921. Serial No. 500,413.

To all whom it may concern:

Be it known that we, LARNED T. KIMMERLE and DANIEL S. KIMMERLE, citizens of the United States, residing in the city and county of San Francisco and State of California, have invented new and useful Improvements in Lifting Jacks, of which the following is a specification.

This invention relates to lifting jacks, and especially to jacks of the pawl and rack actuated type.

One of the objects of the present invention is to generally improve and simplify lifting jacks of the character described, and especially to provide a substantial heavy duty jack adapted for wrecking work and the like.

Another object of the invention is to provide a jack so constructed and designed that it may be readily placed in position to engage or lift a load even though the clearance between the load and its support be comparatively small.

Another object of the invention is to provide an actuating lever and a novel arrangement of reversible pawls whereby the movement of the lever may be transmitted to either raise or lower the load.

Further objects will hereinafter appear.

The invention consists of the parts and the construction, combination and arrangement of parts as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which—

Fig. 1 is a side elevation in section showing the jack.

Fig. 2 is a detail side elevation showing the position of the pawls during the lowering of a load.

Fig. 3 is a detail section on line 3—3, Fig. 2.

Referring to the drawings in detail, A indicates a base member or plate of suitable construction, and vertically disposed and secured thereto is a bar 2, on one face of which are formed rack teeth 3. Slidably mounted on the bar is a shoe 4, and guiding the shoe with relation to the bar is a pair of side extensions 5 and a connecting cross bar or section 6. The side extensions 5 are extended

to form journal members 7 for an operating lever generally indicated at B. This lever consists of a handle section 9, a socket 9^a and a pair of fork shaped extending arms 10. These arms being pivotally supported by the journal members 7, as indicated at 8; the pivotal support being formed by pins 11 extending through the bearings and the lever fork 10, and having formed on their ends shoes 12, which extend into channel shaped grooves 13 formed in the respective sides of the bar and serving the function of further guiding the main shoe 4 whereby a load is engaged or lifted. Pivotally mounted between the arms of the fork 10, as at 14, is a pawl 15 on the lower end of which is formed a dog 16 which is adapted to engage the teeth 3. Formed on the rear side of the pawl is a lug 17, and formed on the upper end thereof is a somewhat similar lug 18. Pivotally mounted between the arms of the fork, as at 19, is a bell crank shaped lever, one end of which is extended to form a lever 20, while the opposite end serves as a support for a plunger 21; the plunger 21 being so positioned as to alternately engage the lugs 17 and 18, as will hereinafter be described. The lower end of the bell crank is drilled to receive the plunger 21, and a spring 22 is also provided which normally functions to project the plunger. Formed on one side of the pawl 15, and at the lower end thereof is a recessed cam portion 23, and formed on the cross bar 6 is a guide lug 24 with which the cam engages during the lowering of a load as will later be described. Pivotally mounted, as at 25, between the lower ends of the side sections 5, is a pawl 26. The upper end of this pawl terminates in a lug 27 adapted to be engaged by a plunger 28. This plunger is a compound plunger inasmuch as it is hollow and carries a secondary plunger 29, which is normally held in projected position by means of a spring 30. The lower end of the pawl terminates in a dog 31, adapted to engage the teeth 3 on the bar, and the dog is normally held in engagement with the teeth by means of a spring 32.

The operation of the device will be as follows:

Assuming that the shoe 4 has been placed under a load and it is desired to raise the load, it is only necessary to leave the reversing lever 20 in the full line position shown in Fig. 1, and then to impart a rocking movement to the lever 9 about the pivot 8. When a downward movement is imparted to the lever, it can be seen that the load will be supported by the pawl 15, as the dog 16 thereon will engage one of the teeth of the rack bar 3. In other words the lever will fulcrum on the pivotal point 14 of the pawl, and the shoe 4 and the load supported thereby will thus move upwardly in a vertical direction. The lower pawl 31, which is supported by the shoe, will also lift in unison therewith and the next tooth on the rack bar will be engaged. At this time extreme movement of the lever 9 is reached and it is reversed by swinging it in an upward direction. The load will during the upward movement be carried by the pawl 31 as the fulcrum point of the lever will now be changed from that indicated at 14 to the inner end indicated at 8. In other words the shoe 4 will remain stationary, while the lever is swinging about the fulcrum point 8, thus the pawl 15 will be lifted to a point where the dog 16 will engage the next tooth on the rack bar; the dog being automatically thrown into engagement when this tooth is reached, due to the pressure of the spring actuated plunger 21. This cycle of operation is repeated until the load has been lifted the desired distance. When it is desired to lower the load, it is accomplished by merely reversing the position of the lever 20, or in other words swinging it about its fulcrum 19 to assume the position shown in Fig. 2. The plunger 21 will during this movement change its position, that is it will move out of engagement with the lug 17 and into engagement with the lug 18, thus exerting a reverse pressure on the pawl 15 which will tend to free it with relation to the teeth of the rack bar. The pressure on the pawl 31 has however not been changed and it will therefore remain in engagement with the teeth of the rack bar and thus temporarily support the load. A rocking movement may now be imparted to the lever 9 as previously described. The first downward movement of the rocking lever will take place when the pawl 15 has been released with relation to the teeth of the rack bar, and the fulcrum point assumed will be that indicated at 8. As the lever swings about its fulcrum in a downward direction, the lower end of the pawl 15, or in other words the cam groove 23 formed in one side thereof will engage the guide lug 24. The pawl 15 or the dog 16 formed thereon will thus be swung inwardly and it will be forced into engagement with the next tooth. At the same time that the dog 16 formed on the pawl 15 is being swung into engagement with the lower tooth on the rack bar, a foot extension 40 on the reversing lever will engage the upper end of the plunger 29, that is engagement of the foot with relation to the plunger is made a moment before the dog bottoms in the lower tooth of the rack bar and the plunger 29 is therefore partially depressed when the dog bottoms in the teeth. This partial depression of the plunger 29 places the spring 30 under increased pressure; the increased pressure produced being sufficient to overcome the tension of the spring 32. However as the entire load is supported by the pawl 31, it is obvious that the increased tension on the spring 30 is not sufficient to swing the pawl 31 out of engagement with this tooth until the pressure on the pawl 31 is at least partially released. This release of pressure takes place when the dog 16 engages the lower tooth and it changes the fulcrum of the lever from the point 8 to the point 14, thus while the downward movement of lever 9 is still continued, or at a point where its lowermost position is almost reached, a change of fulcrum takes place, thus imparting a slight upward movement to the shoe 4 and the pawl 31 carried thereby. This slight upward movement is sufficient to release the pressure on the pawl, and as the tension on the spring 30 has been increased, it can be seen that the plunger 28 actuated thereby will exert sufficient pressure on the upper end of the pawl to swing it free with relation to the teeth on the rack bar. The pawl thus released permits lowering of the shoe 4 and the load carried thereby as the lever may now be swing in an upward direction, employing the point 14 as the fulcrum point. The moment upward movement is imparted to the lever 9, downward movement will take place as far as the shoe 4 is concerned. The foot member 40 on the lever 20 will also move away from the plunger 29 and the added pressure imparted to spring 30 will be relieved, thus permitting spring 32 to again function so as to swing the lower end of the pawl 31 into engagement with the teeth of the rack bar. It will thus be in position to engage the next tooth as the shoe is moving downwardly and in fact engages and bottoms in the next tooth when the extreme upward movement of lever 9 is reached. The load is thus transferred from the pawl 15 to the pawl 31 and as the pawl 15 is acted on by the plunger 21, through means of the lug 18, this will automatically swing out of engagement with the teeth of the rack bar and the lever may now be lowered, using the pivot 8 as the fulcrum point. During the lowering movement the cam section 23 will engage the lug 24 and the dog 16 will again

be swung inwardly into engagement with the next tooth of the rack bar. The cycle of operation will thus be repeated and it can therefore be seen that a load may be raised or lowered as occasion may demand, and that the entire control functions through the action of lever 20. The load is at all times intermittently changed from one pawl to the other, whether raising or lowering a load, but the change from one pawl to another is automatically taken care of by the swinging movement of the lever 9 and the position of the reversing lever 20.

The jack illustrated in the present instance is particularly designed for heavy duty work, such as handling wrecks and the like. In many instances it is rather difficult to place the jack between a load and the support upon which it rests as the clearance may be very small. Such difficulty is avoided in the present instance as the shoe 4 may be lowered into engagement with the base A, thus permitting the shoe to be placed under the load even though the clearance be exceedingly small. The general construction and design is furthermore such that heavy, substantial parts may be employed, thus taking care of practically any desired load. Another important feature is the fact that the operations of the pawls are entirely automatic, whether raising or lowering the load as they are positively released and thrown into engagement by the action of the main operating lever 9 and the reversing lever 20, thus avoiding all accidental delays and materially reducing the responsibility and care required on the part of the operator.

While certain features of the present invention are more or less specifically illustrated, we wish it understood that various changes in form and proportion may be resorted to within the scope of the appended claims, similarly that the materials and finish of the several parts employed may be such as the experience and judgment of the manufacturer may dictate or varying uses may demand.

Having thus described our invention, what we claim and desire to secure by Letters Patent is—

1. A lifting jack comprising a standard, having rack bar teeth formed thereon, a lifting shoe vertically slidable on the standard, a main lifting bar pivotally attached to the shoe, a pawl carried by the lever and engageable with the teeth, a second pawl carried by the shoe and also engageable with the teeth, and means for reversing the action of the respective pawls.

2. A lifting jack comprising a standard, having rack bar teeth formed thereon, a lifting shoe vertically slidable on the standard, a main lifting bar pivotally attached to the shoe, a pawl carried by the lever and en-

gageable with the teeth, a second pawl carried by the shoe and also engageable with the teeth, and means carried by the lifting lever for reversing the action of the respective pawls.

3. A lifting jack comprising a standard having rack bar teeth formed thereon, a lifting shoe vertically slidable on the standard, a main lifting lever pivotally attached to the shoe, a pawl pivotally mounted on the lever and engageable with the teeth formed on the standard, a spring actuated plunger engageable with the pawl and movable to engage opposite ends of the pawl to reverse the action thereof, a pawl pivotally mounted on the shoe, and means operable in unison with the spring actuated plunger for reversing the action of the last named pawl.

4. A lifting jack comprising a base, a rack bar secured to the base, a lifting shoe slidably mounted on the rack bar, a main lifting lever pivotally mounted on the shoe, a pawl pivotally mounted in said lever and engageable with the teeth of the bar, a reversing lever also pivotally mounted on the main lifting lever, a spring actuated plunger on the reversing lever adapted to alternately engage opposite ends of the pawl, a second pawl pivotally mounted on the shoe and engageable with the teeth on the rack bar, a spring actuated plunger engageable with one end of said pawl, and means on the reversing lever for engaging said spring actuated plunger.

5. A lifting jack comprising a base, a rack bar secured to the base, a lifting shoe slidably mounted on the rack bar, a main lifting lever pivotally mounted on the shoe, a pawl pivotally mounted in said lever and engageable with the teeth of the bar, a reversing lever also pivotally mounted on the main lifting lever, a spring actuated plunger on the reversing lever adapted to alternately engage opposite ends of the pawl, a second pawl pivotally mounted on the shoe and engageable with the teeth on the rack bar, a spring actuated plunger engageable with one end of said pawl, means on the reversing lever for engaging said spring actuated plunger, a stop member on the shoe adapted to limit the movement of the first named pawl in one direction, and a cam member formed on said pawl engageable with the stop and adapted to swing the pawl inwardly into engagement with the rack bar teeth when the main lifting lever is lowered during reversing action.

6. A lifting jack comprising a standard having teeth formed thereon, a lifting shoe slidably mounted on the standard, a lifting lever pivotally mounted on the shoe, a pawl pivotally mounted in said lever and engageable with the teeth of the standard, a reversing lever pivotally mounted on the lifting lever, means carried by the reversing lever

adapted to alternately engage opposite ends
of the pawl, a second pawl pivotally mount-
ed on the shoe and engageable with the teeth
on the standard, spring means for normally
5 urging one end of said pawl into engage-
ment with the teeth on the standard, a spring
actuated plunger engageable with the other

end of said pawl and means on the reversing
lever for engaging said actuated plunger
to cause the reversing of the pawl, said 10
means being operable only when the pres-
sure on the pawl has been released.

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