Oct. 14, 1924. 1,511,209

W. G. ARMSTRONG

LIFTING JACK

Filed Sept. 1, 1921 3 Sheets-Sheet 1

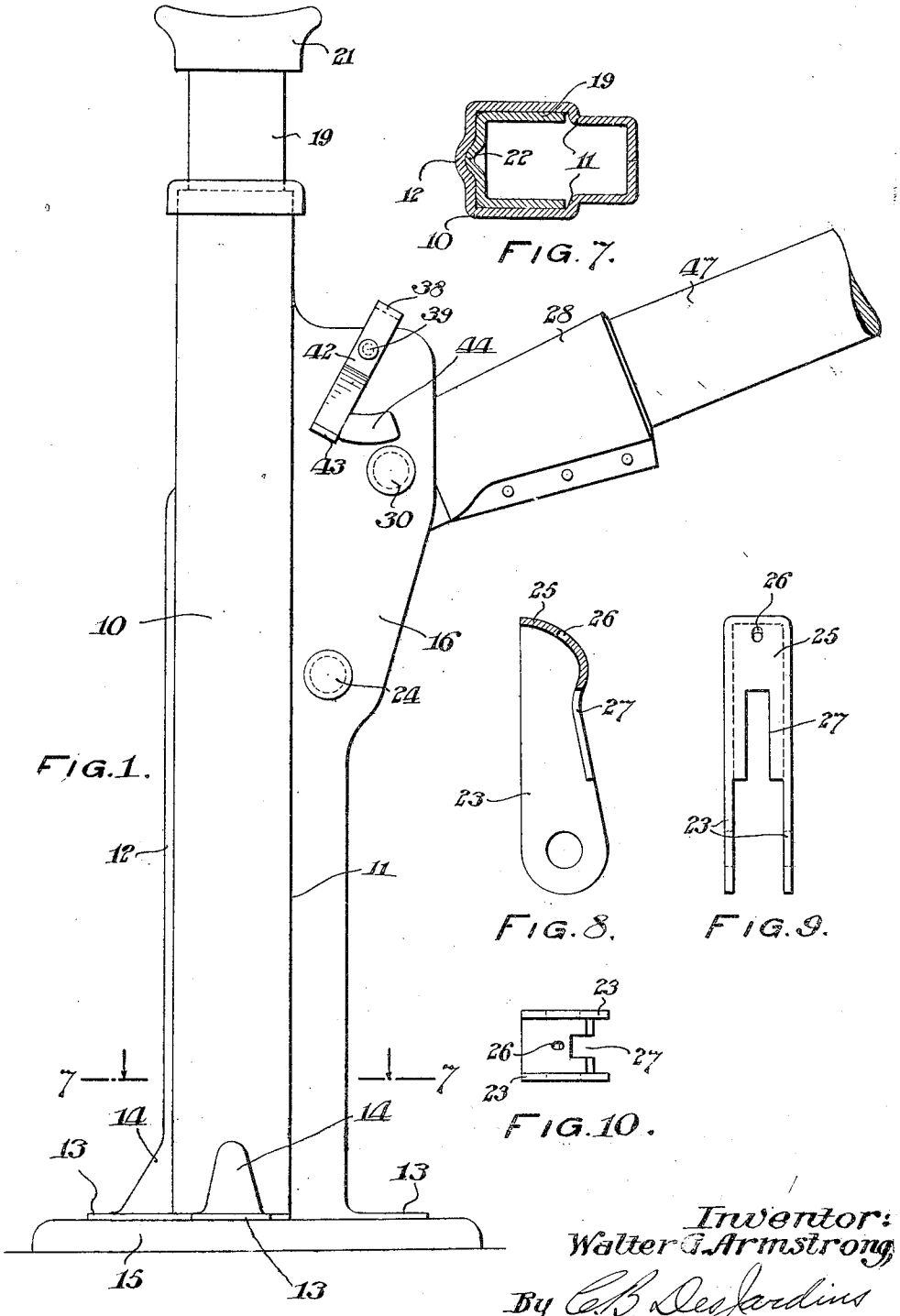

FIG. 1.

FIG. 7.

FIG. 8.

FIG. 9.

FIG. 10.

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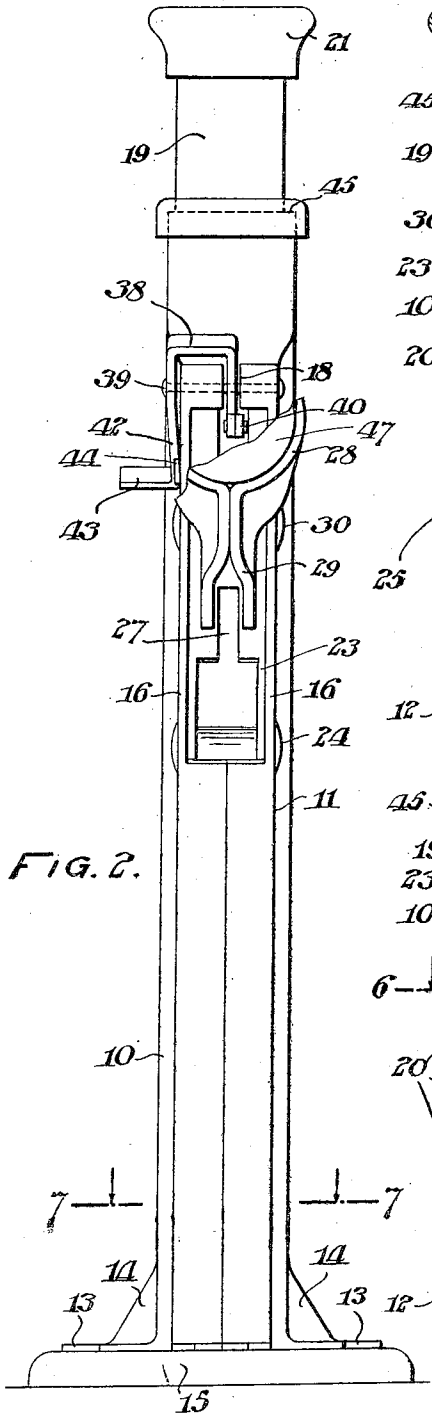

FIG. 2.

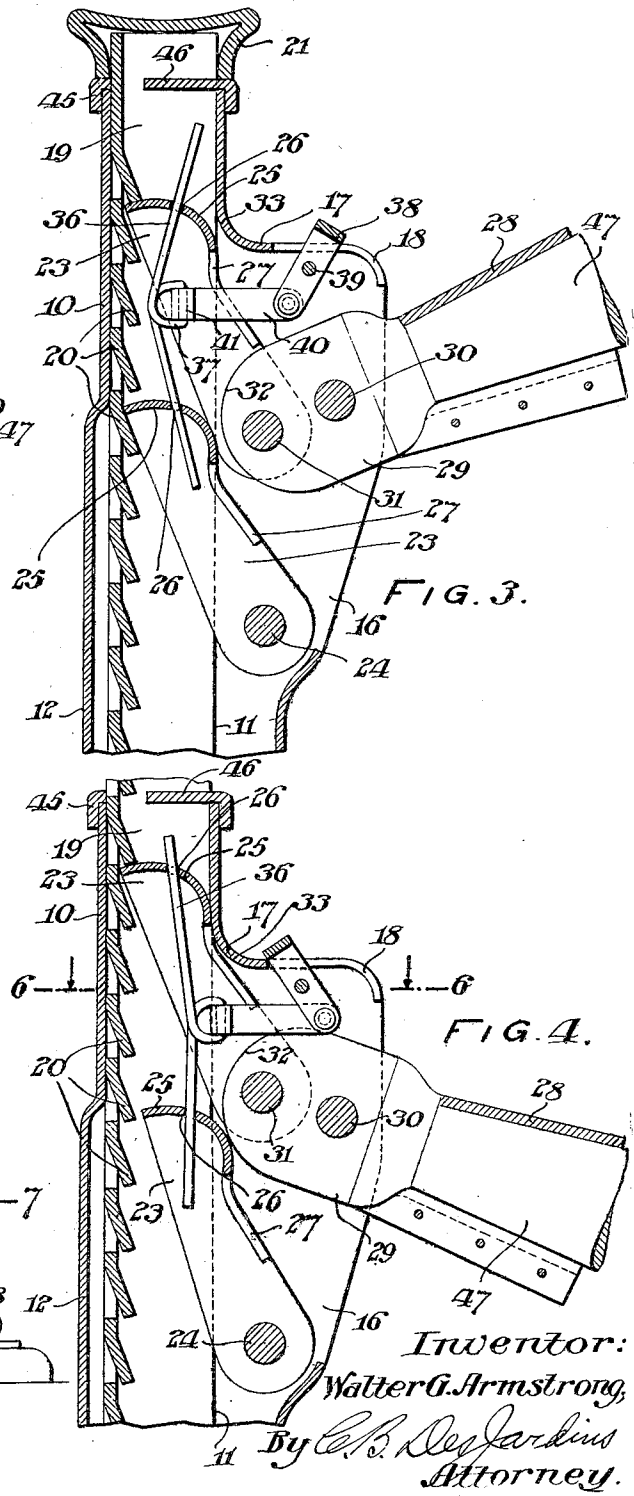

FIG. 3.

FIG. 4.

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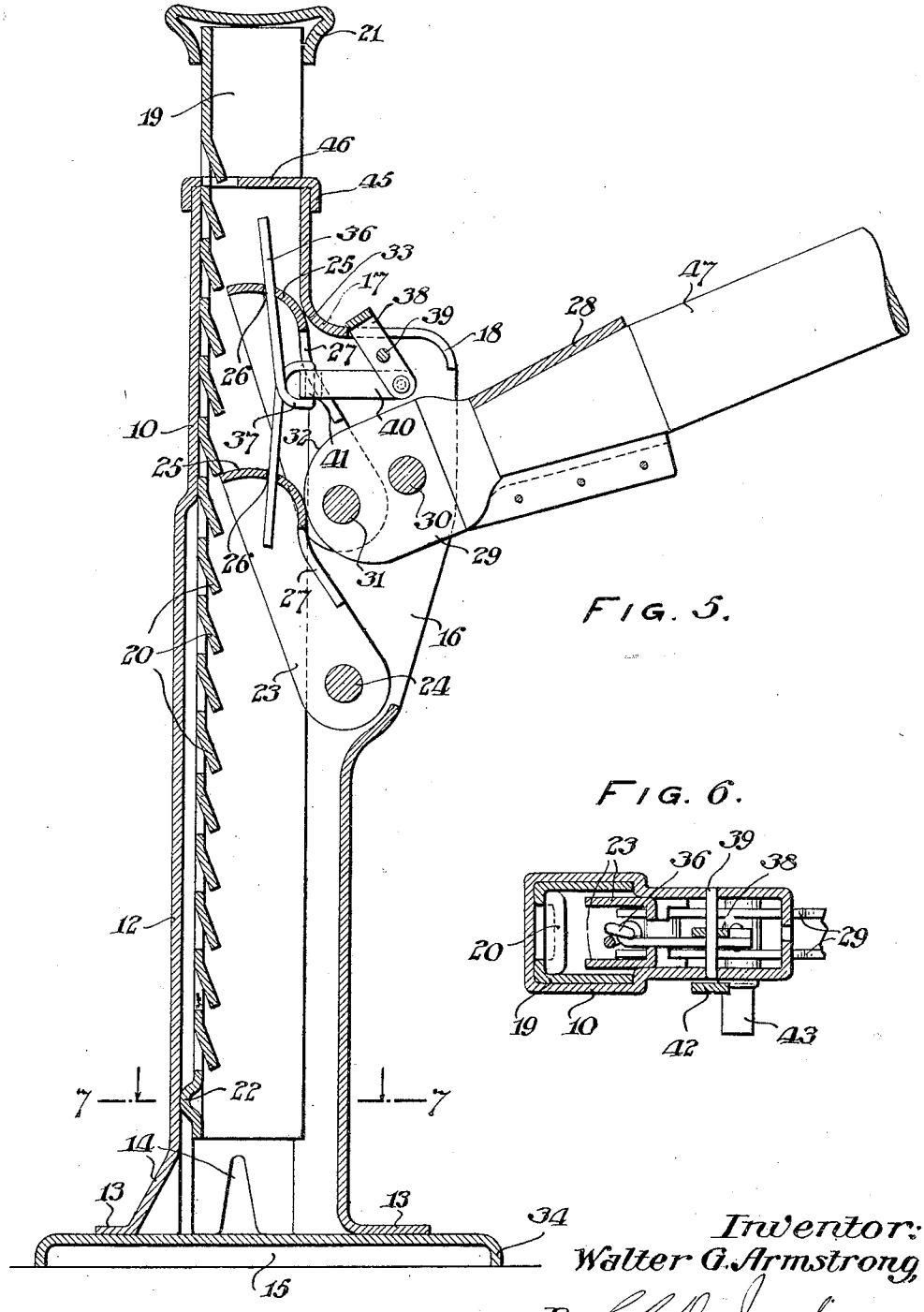

FIG. 5.

FIG. 6.

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Patented Oct. 14, 1924. 1,511,209

UNITED STATES PATENT OFFICE.

WALTER G. ARMSTRONG, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO THE AMERICAN TUBE AND STAMPING COMPANY, OF BRIDGEPORT, CONNECTICUT, A CORPORATION OF CONNECTICUT.

LIFTING JACK.

Application filed September 1, 1921. Serial No. 497,508.

To all whom it may concern:

Be it known that I, WALTER G. ARMSTRONG, a citizen of the United States, residing at Bridgeport, Connecticut, have invented certain new and useful Improvements in Lifting Jacks, of which I declare the following to be a full, clear, and exact description.

My invention relates to improvements in lifting jacks and has to do, more particularly, with pressed steel automobile jacks.

The main object of my invention is to provide a lifting jack of light, simple and durable construction, which may be constructed largely from pressed steel parts thus lightening the construction and reducing its cost.

Another object of my invention is to provide improved reversing means by which the parts are changed from raising to lowering position, and vice versa.

Another object of my invention is to provide hollow pawls of such a nature that some of the working parts may act within the pawl, thus permitting an exceedingly compact structure.

Further objects, and objects relating to details and economies of construction and operation, will definitely appear from the detailed description to follow. My invention is clearly defined and pointed out in the appended claims. A structure constituting a preferred embodiment of my invention is illustrated in the accompanying drawings, forming a part of this specification, in which:

Fig. 1 is a side elevation of my improved lifting jack.

Fig. 2 is a view of the jack in front elevation, a part of the handle socket being broken away.

Fig. 3 is a vertical, sectional view through the upper part of the jack, showing the parts in raising position.

Fig. 4 is a similar view, showing the parts in lowering position.

Fig. 5 is a vertical, sectional view through the entire jack, showing the parts in lowering position and the handle raised.

Fig. 6 is a transverse, sectional view taken on the line 6—6 of Fig. 4.

Fig. 7 is a transverse, sectional view taken on the line 7—7 of Figs. 1, 2 and 5, and

Figs. 8, 9 and 10 are views of one of the pawls, both pawls being identical.

In the drawings, the same reference numerals refer to the same parts throughout the several views.

In general, my improved jack comprises a pressed steel casing having a longitudinally-extending channel in which a pressed steel lifting rack is slidably mounted. A base plate is rigidly secured, for instance, by spot-welding, to the lower end of the casing. A head is secured on the upper end of the lifting rack and the movement of the rack is controlled by two pawls, a lifting pawl and a retaining pawl, arranged within the casing. The retaining pawl is mounted on a fixed pivot and the lifting pawl is pivotally carried by an operating lever which, in turn, is pivoted in the casing. Both pawls, of course, engage the teeth of the rack. A single spring engages fixed points on each pawl and the mechanism is changed from raising to lowering position, and vice versa, by shifting the center of the spring from one side to the other of the straight line connecting said points of engagement of the spring with the pawls. In one position, the spring acts normally to throw both pawls into engagement with the rack, while, in the other position, the spring tends to throw the pawls out of engagement with the rack. The casing is formed with a cam surface which coacts with the lifting pawl to force it positively into engagement with the rack at the proper point in the stroke of the handle. The inner end of the operating lever is also formed with a cam surface which engages the retaining pawl and forces it into engagement with the rack at the proper point in the stroke of the handle.

My invention consists in an improved pawl construction and improved means for shifting the center of the spring, by means of which I have been able to make an exceptionally compact, light and simple jack. I use a hollow lifting pawl and the free ends of the spring extend through holes in the backs of the two pawls. A reversing lever is pivoted to the casing and connected to the center of the spring, within the hollow of the lifting pawl, by means passing through a slot in the back of said lifting pawl. The reversing lever may have a part in engagement with and arranged to snap over a boss on the casing, to hold the lever in adjusted position.

The lifting jack, which I have illustrated in the drawings, comprises a pressed steel casing, 10, made from a blank bent to form a tubular casing, generally rectangular in cross-section. The shoulders, 11, are formed in the side walls of the casing and extend longitudinally thereof and there is also a longitudinally-extending groove, 12, formed in the rear wall of the casing. The lower end of the casing is formed with the laterally-extending flanges, 13, to which the base plate, 15, is spot-welded. The gussets, 14, may be struck out from the lower part of the casing so as to strengthen the structure. The base plate, 15, is dished, as shown in Fig. 5, having the marginal flange, 34, depending from the body of the plate. This makes an exceptionally firm and solid base and one which seats the jack firmly and solidly even in loose dirt. In the central part of the casing, there are the forwardly-extending side walls, 16, between which the operating mechanism is arranged, the upper edges of these side walls being connected by the portion, 17, in which there is provided the central slot, 18.

The lifting bar or rack, 19, is of channel shape with a plurality of teeth, 20, struck up from the base of the channel. A head, 21, is mounted on the upper end of the rack. The rack is slidably mounted in the casing, being guided between the rear wall thereof and the shoulders, 11. A projection, 22, struck up from the base of the rack, at its lower end, slides in the groove, 12, and prevents the complete removal of the rack from the casing.

The retaining pawl is pivoted on the pin, 24, carried by the side wall extensions, 16, of the casing. This pawl comprises the sides, 23, connected by the curved back, 25, which has a hole, 26, and a central slot, 27, formed therein. The operating lever comprises the handle socket, 28, and the pair of parallel, spaced arms, 29, extending from said handle socket between the side wall extensions, 16, of the casing and pivoted on the pin, 30, carried by such extensions. The lifting pawl is pivoted on a pin, 31, carried by the inner ends of said arms, and is identical in construction with the retaining pawl, comprising the sides, 23, and curved back, 25, having a hole, 26, and a central slot, 27.

The action of the pawls is controlled through a straight wire spring, 36, having a central loop, 37. The ends of the spring pass through the holes, 26, in the backs, 25, of the lifting and retaining pawls. A U-shaped reversing lever, 38, is pivoted on the pin, 39, and one leg of the lever passes into the casing through slot, 18, and is connected to link, 40, the other end of which is bent upon itself to form an eye, 41, embracing one wire of the loop, 37. The other leg, 42, of the reversing lever, 38, extends downwardly on the outside of the casing and is bent toward the casing slightly, terminating in the handle, 43, extending laterally therefrom. The lower end of the leg, 42, of said reversing lever is adapted to snap over the boss, 44, struck out from the side of the casing and acting as a stop to limit the movement of the reversing lever. The inner ends of the parallel arms, 29, of the operating lever are curved at 32 to form cam surfaces which engage and coact with the back of the retaining pawl, when the jack is set for lowering and the handle is being raised, to force the retaining pawl positively into engagement with the rack. A cam surface, 33, is also formed on the casing, which engages and coacts with the lifting pawl, on the down-stroke of the handle, to force the lifting pawl positively into engagement with the rack. A reinforcing ring, 45, is provided which fits over the top edges of the casing, 10, and this ring has a tongue, 46, which extends between the side walls of the channel rack, 19, and keeps dust and dirt from the working parts. A handle, 47, is inserted in the handle socket, 28, of the operating lever.

From the description of the parts given above, the operation of this lifting jack should be understood very readily. With the parts in the position shown in Figs. 1 and 3, the jack is placed with the head, 21, beneath the load to be lifted, for instance, the axle of an automobile. The handle, 47, is forced down and this moves the lifting pawl upward carrying the rack, 19, with it. Meanwhile, the retaining pawl rides over one tooth of the rack and the spring, 36, causes it to spring back into engagement with the rack. On the up-stroke of the handle, the retaining pawl holds the rack in the position to which it has been lifted, while the lifting pawl moves down and engages the next lower tooth of the rack. In this position of the parts, the spring, 36, tends to move both pawls into engagement with the rack. When it is desired to lower the load, the reversing lever is swung to the position shown in Fig. 4. The leg, 42, yields enough so as to snap over and engage the front edge of the boss, 44. In this position, due to the link, 40, connecting the inner leg of the reversing lever with the central loop, 37, of spring, 36, the action of the spring is reversed so that it tends to throw both pawls out of engagement with the rack. Of course, this tendency is not effective when there is a load on the pawl but it becomes effective as soon as the load is released. In Fig. 4, the parts are shown with the load on the lifting pawl, which is in engagement with the rack, and the retaining pawl thrown out of engagement by the spring, 36. As the handle, 47, is moved upward, under the

control of the operator, the lifting pawl and the rack move downward until, near the end of the up-stroke, the cam surfaces, 32, on the arms, 29, engage the back of the retaining pawl and force it into engagement with the rack so that it stops the downward motion of the rack. This takes the load from the lifting pawl and spring, 36, causes that pawl to spring out of engagement with the rack. On the down-stroke of the handle, the lifting pawl moves up and is engaged by the cam surface, 33, of the casing which forces it into engagement with the rack so that it takes the load from the lifting pawl and allows the latter to spring out of engagement.

The reversing mechanism operates by shifting the center of the spring, 36, from one side to the other of the straight line connecting the holes, 26, in the backs of the pawls, which holes constitute the fixed points at which the spring engages the pawls. This shifting of the center of the spring is effected by the pivoted reversing lever, 38, and the link, 40, connecting the central loop of the spring with the inner leg of the reversing lever. By making the pawls hollow, I not only reduce the weight of the parts but also make the jack much more compact, since the central loop, 37, of the spring lies within the hollow of the lifting pawl and the link, 40, passes through the slot, 27, in the back, 25, of the lifting pawl. This permits the simplification of the mechanism and its arrangement within a comparatively narrow space. The reversing lever is so positioned as to be very conveniently accessible and it may be actuated either by grasping the handle, 43, or the top of the U-shaped lever, 38. The spring, 36, is connected to the pawls in a very simple and convenient manner by inserting its ends through the holes, 26, in the backs of the pawls. The central loop, 37, prevents the spring from kinking and the ends of the spring act like independent straight springs fastened to the end of the link, 40.

I am aware that the embodiment of my invention, which I have described here, may be altered considerably without departing from the spirit of my invention, and, therefore, I claim my invention broadly as indicated by the appended claims.

Having thus described my invention, what I claim as new and useful and desire to secure by Letters Patent is:

1. A device of the class described comprising a casing, a lifting rack slidably mounted therein, a lever pivoted in said casing, and a hollow lifting pawl carried by said lever and engaging the teeth of said rack, said pawl having side walls and a back wall and the front side of said pawl being open so that said pawl forms a channel opening toward the rack, the back wall of said pawl being perforated to receive an actuating spring.

2. A device of the class described comprising a casing, a rack slidably mounted therein, an operating lever pivoted in said casing, a hollow lifting pawl carried by said lever and engaging the teeth of said rack, a retaining pawl pivoted in said casing, and engaging said rack, a spring having its ends extending through holes provided in the backs of said pawls, and means for shifting the center of said spring from one side to the other of a straight line connecting said holes.

3. A device of the class described comprising a casing, a rack slidably mounted therein, an operating lever pivoted in said casing, a hollow lifting pawl carried by said lever and engaging the rack, a retaining pawl pivoted in the casing and engaging the rack, said pawls being provided with holes in the backs thereof, a spring provided with a central loop and having its free ends passing through said holes, and means engaging said central loop for shifting the central portion of said spring.

4. A device of the class described comprising a casing, a lifting rack slidably mounted therein, an operating lever pivoted in the casing, a hollow lifting pawl carried by said lever and engaging the rack, a retaining pawl pivoted in the casing and engaging said rack, the backs of said pawls being provided with holes, a spring having its ends extending through said holes, a reversing lever pivoted on the casing, and a link connecting said lever and the central portion of said spring.

5. A device of the class described comprising a casing, a rack slidably mounted therein, an operating lever pivoted in the casing, a hollow lifting pawl carried by said lever and provided with a hole and a slot in the back thereof, a hollow retaining pawl pivoted in the casing and provided with a hole in the back thereof, said pawls engaging the rack, a spring having its ends extending through said holes, a pivoted reversing lever, and a link passing through said slot and connecting the reversing lever to the central portion of said spring.

6. A device of the class described comprising a casing, a rack slidably mounted therein, an operating lever pivoted in the casing, a hollow lifting pawl carried by said lever and provided with a hole and a slot in the back thereof, a hollow retaining pawl pivoted in the casing and provided with a hole in the back thereof, said pawls engaging the rack, a spring having a central loop therein and having its ends extending through said holes, a pivoted reversing lever, and a link

passing through said slot and having one end connected to said central loop and the other end to said reversing lever.

7. A device of the class described comprising a casing, a rack slidably mounted therein, an operating lever pivoted in the casing, a lifting pawl carried by said lever, a retaining pawl pivoted in the casing, a spring having its ends engaging said pawls, a U-shaped reversing lever pivoted on the casing and having one leg extending within the casing, and a link connecting said leg and the central portion of said spring.

8. A device of the class described comprising a casing, a rack slidably mounted therein, an operating lever pivoted in the casing, a lifting pawl carried by said lever, a retaining pawl pivoted in the casing, said pawls engaging the rack, a spring having its ends engaging said pawls, a U-shaped reversing lever pivoted on the casing and having one leg extending within the casing and one leg lying on the outside of the casing, a stop on the casing with which the last-named leg cooperates, and a link connecting the leg within the casing with the central portion of the spring.

9. In a lifting jack, in combination with a casing, a rack and an operating lever, a pawl carried by said lever and adapted to engage said rack, said pawl comprising spaced side walls and a back wall, the latter being provided with a hole and a slot, and a pawl-actuating spring extending into said hole.

10. In a lifting jack, a pressed metal casing having an opening at its upper end, a lifting rack slidably mounted in said casing and extending through said opening, said rack being of channel cross-section, a collar embracing the upper edge of said casing at said opening and provided with a tongue extending into the channel of said rack, an operating lever pivoted in the casing, and means actuated by the lever for moving said rack.

In testimony whereof, I affix my signature.

WALTER G. ARMSTRONG.