No. 681,775. Patented Sept. 3, 1901.

G. F. BENTLEY.

RAILWAY TRACK LIFTING JACK.

(Application filed Apr. 27, 1900.)

(No Model.)

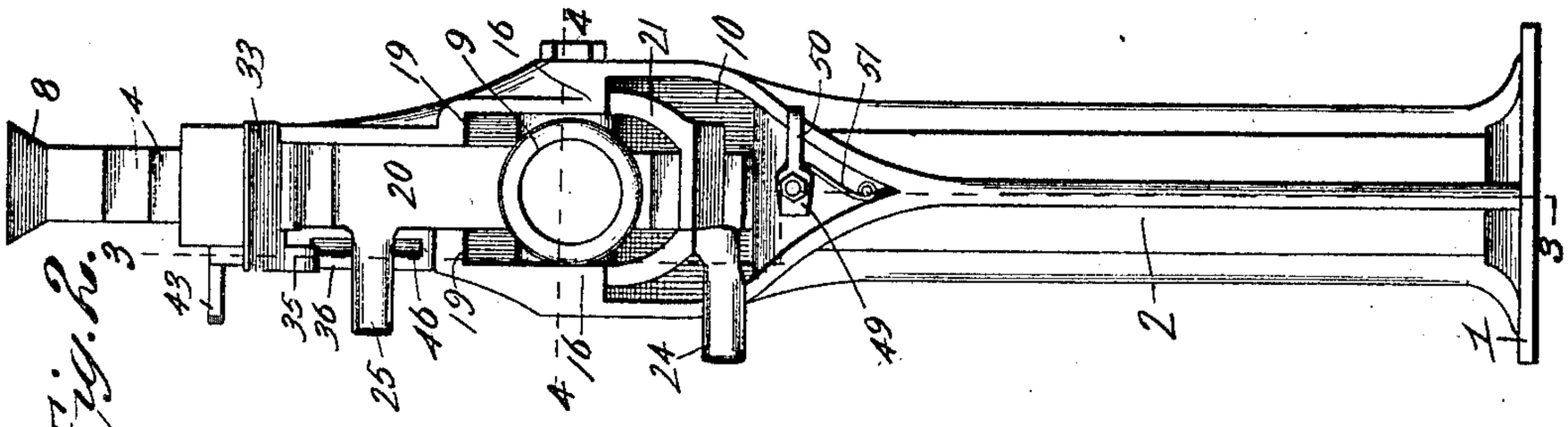

Fig. 2.

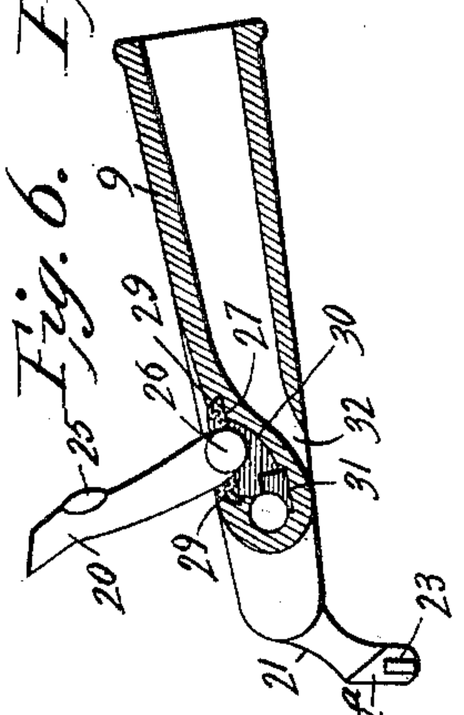

Fig. 6.

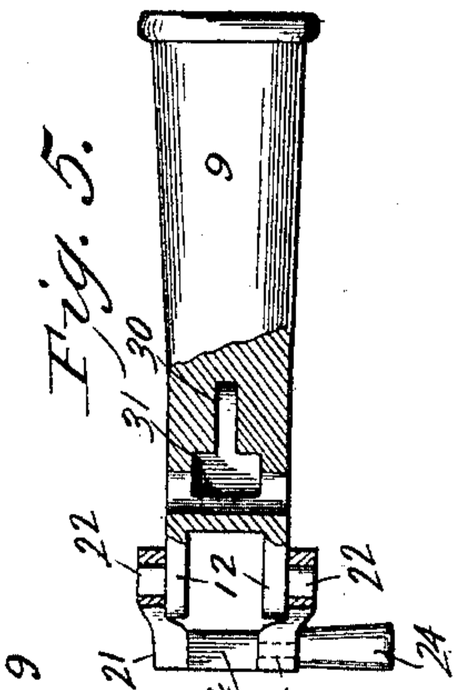

Fig. 5.

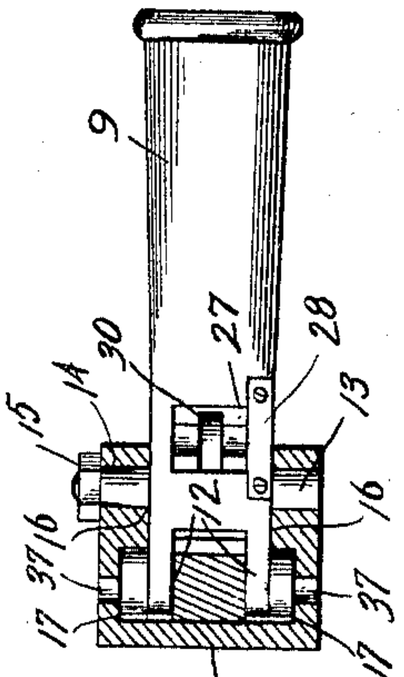

Fig. 4.

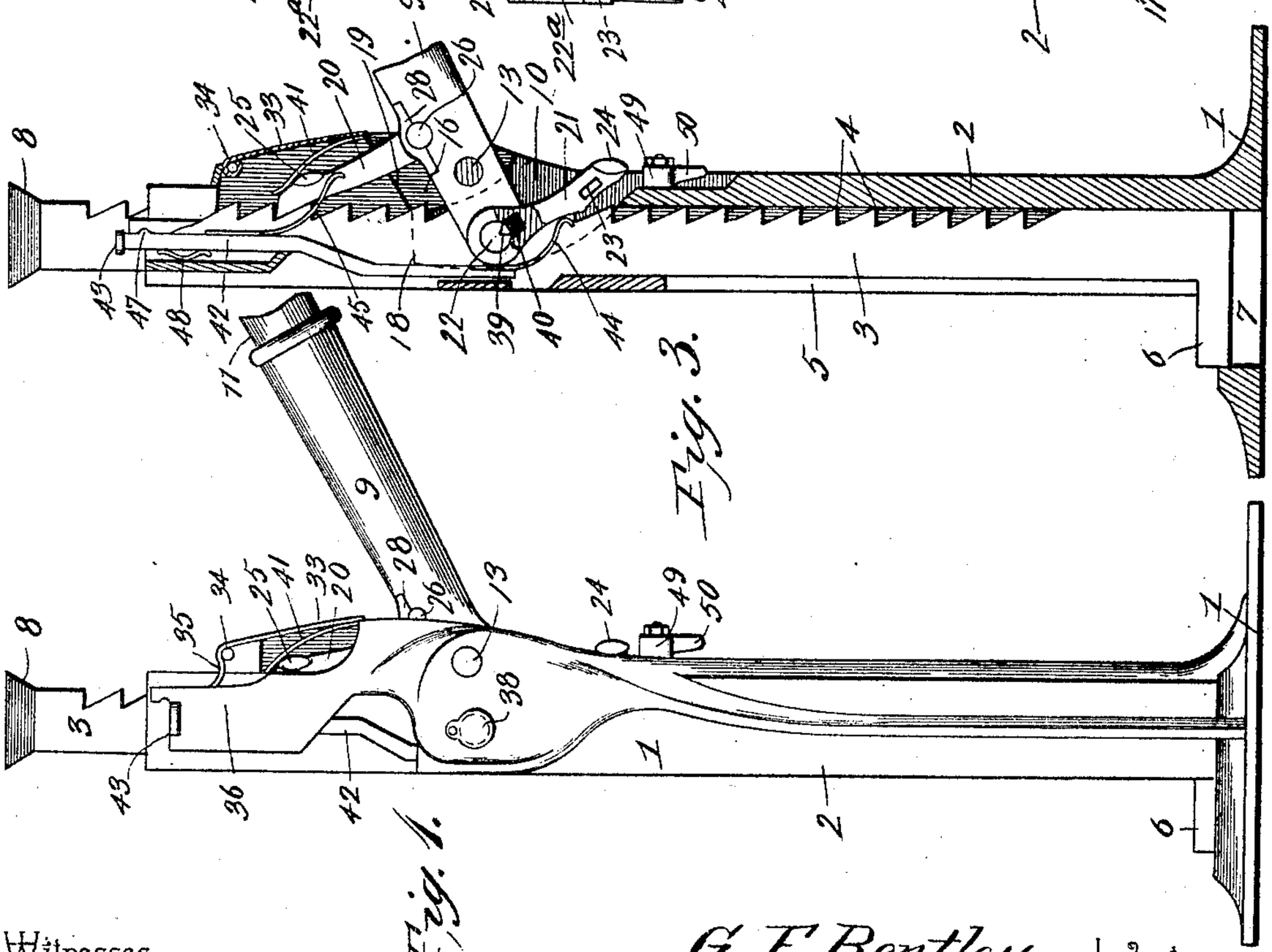

Fig. 3.

Fig. 1.

Witnesses

C. H. Walker.

H. E. Shepard.

G. F. Bentley, Inventor.

by Cushman & Co.

Attorneys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

GEORGE FRANCIS BENTLEY, OF FORT WORTH, TEXAS.

RAILWAY-TRACK LIFTING-JACK.

SPECIFICATION forming part of Letters Patent No. 681,775, dated September 3, 1901.

Application filed April 27, 1900. Serial No. 14,627. (No model.)

To all whom it may concern:

Be it known that I, GEORGE FRANCIS BENTLEY, a citizen of the United States, residing at Fort Worth, in the county of Tarrant and State of Texas, have invented certain new and useful Improvements in Lifting-Jacks of a Style Especially Adapted to Railway-Track Work, of which the following is a specification.

This invention relates to lifting-jacks, and has for its object to provide an improved device of this character which is designed for heavy work, as in railway service, and at the same time to have the device comparatively light in weight in order that it may be conveniently carried from place to place.

It is furthermore designed to provide for gradually lowering the lifting-bar with a step-by-step movement through the manipulation of the operating-lever and also to provide for the quick lowering of the bar to its lowermost position, and, finally, to house all of the operating parts within the standard of the jack, so as to protect the same against dirt and the effects of the weather and also to arrange for maintaining said movable parts in an effectively-lubricated condition.

With these and other objects in view the present invention consists in the combination and arrangement of parts, as will be hereinafter more fully described, shown in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that changes in the form, proportion, size, and minor details may be made within the scope of the claims without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings, Figure 1 is a side elevation of a lifting-jack constructed in accordance with the present invention. Fig. 2 is a back elevation thereof looking toward the operating-lever. Fig. 3 is a vertical longitudinal sectional view taken on the line 3 3 of Fig. 2. Fig. 4 is a transverse sectional view taken on the line 4 4 of Fig. 3. Fig. 5 is a detail top plan view of the lever-socket, parts being broken away to show the oil-reservoir thereof. Fig. 6 is a detail vertical longitudinal sectional view of the lever-socket.

Like characters of reference designate corresponding parts in all of the figures of the drawings.

Referring to the drawings, 1 designates a base-plate, from which rises the tubular standard 2, forming a casing for the operating parts of the jack. The standard is open at opposite ends, so as to accommodate the lifting-bar 3, which is provided upon its inner or back edge with the usual ratchet-teeth 4, forming a rack, whereby the bar is controlled by the operating ratchet-lever. The lower portion of the front of the standard is provided with a longitudinal slot 5 to accommodate the forwardly-projecting foot 6 of the lifting-bar, the base also having an opening 7 to permit of the foot dropping into the same when the bar is at its lowermost limit. It will be understood that the bar is inserted into the tubular standard through the bottom end thereof and is afterward provided with the enlarged head 8 at its upper end. Also the cross-sectional shape of the lifting-bar is angular, so as to prevent accidental turning thereof within the corresponding angular interior of the tubular standard.

For the convenient manipulation of the lifting-bar there is provided a lever-socket 9, which has its inner end received within a laterally-enlarged socket 10, formed in the back of the standard and communicating with the interior thereof, so as to be operatively connected to the lifting-bar. The outer portion of this lever-socket is open, as best indicated in Fig. 6, for the reception of a lever-handle 11, preferably a bar of wood, while the inner extremity thereof is bifurcated, so as to receive the lifting-bar and to provide the opposite bearing-ears 12, which lie at opposite sides of the lifting-bar. The fulcrum-pin 13 of the lever-socket passes transversely and loosely through the same adjacent to the inner end of the bifurcation thereof, and also passes through corresponding openings in the opposite sides of the tubular standard. One of the holes is smaller than the other, and the pin is provided with a flattened or tapered end 14 to snugly fit within the smaller opening, and its adjacent projecting extremity is screw-threaded for the reception of a nut 15, whereby the pin is drawn tightly into the smaller opening, and thereby held against turning. As best indicated in Figs. 2 and 4 of the drawings, it will be seen that the upper portion of the socket 10 in the standard

has its opposite walls thickened inwardly, so as to provide the inwardly-directed shoulders 16, through which the fulcrum-pin passes, said shoulders terminating short of the adjacent side of the lifting-bar, so as to provide the opposite recesses 17, each of which is closed at its upper end by means of the shoulder 18, formed by the top of the laterally-enlarged socket 10. Each of the shoulders 18 has its outer portion inclined upwardly and outwardly across the upper portion of the adjacent shoulder 16, as indicated at 19 in Fig. 3, so as to overhang the lever and prevent the ingress of dirt and also form stops to limit the upward movement of the lever-socket.

The operative connection between the lever-socket and the rack of the lifting-bar is had by means of the upper and lower dogs 20 and 21, which are located at opposite sides of the fulcrum of the lever-socket and pivotally connected to the latter. The lower dog is bifurcated or of yoke shape and has its opposite members working in the respective recesses 17, as best indicated in Fig. 4, and embracing the ears 12 of the lever-socket, to which they are pivotally connected by means of the respective outwardly-directed pivot projections or pins 22, carried by said ears. It will now be observed that the shoulders 16 prevent the ingress of dirt to the pivotal connections between the lever-socket and the lower dog. Also by having the shoulders 16 terminating short of the bottom of the socket 10 and also rounded inwardly and upwardly the lever may be placed in position through the lower portion of the socket 10 and then elevated to receive the fulcrum-pin, whereby the opposite portions or sides of the lower dog are passed inwardly and upwardly at the back of the shoulders 16 and into the respective recesses 17. To facilitate the assembling of the dog 21 and the lever-socket, the former is formed in two detachable parts, one part comprising one side and the beveled transverse bar 22^a, which latter is provided at its outer end with a tenon 23 to fit into a corresponding mortise in the opposite side of the dog. When the parts are assembled and within the respective recesses 17, it is impossible for said parts to become separated, and therefore no additional fastening is necessary. For convenience in manipulating or disengaging the dog from the rack it is provided with a laterally-projecting finger-piece 24, which lies in rear of the standard and projects beyond the adjacent side of the standard, as shown in Fig. 2. As shown in Fig. 6, it will be seen that the upper face of the lower end or cross-bar 22^a of the lower dog is beveled downwardly and outwardly, so as to effectively take into the teeth of the lifting-bar.

The upper dog 20 has its upper free end beveled to take into the rack of the lifting-bar and is also provided with a lateral finger-piece 25. The lower end of the dog is rounded and provided at each edge with a pivot-pin 26, which rounded end is mounted in a transverse groove extending across the bottom of a recess 27, formed in the upper side of the lever-socket and adjacent to the outer side of the fulcrum thereof. Each pivot-pin is held in place by means of a bearing-strap 28, bridging the pin and secured to the lever-socket. The opposite walls of the recess 27 are undercut, so as to retain therein suitable packing 29 at opposite sides of the pivotal end of the dog, and the bottom of the recess is also provided with a slot 30, extending transversely across the groove therein and communicating with an oil reservoir or socket 31, formed within the lever-socket and also communicating with the opening for the reception of the fulcrum-pin, whereby the fulcrum-bearing and also the bearing of the upper dog are conveniently and effectively maintained in a lubricated condition. Also, as shown in Fig. 6, the inner end of the bore of the lever-socket terminates at about the upper dog and then inclines downwardly, so as to form an exit-opening 32, extending through the lower side of the socket for the escape of such dirt as may fall into the socket, whereby the latter is prevented from being partially filled with foreign matter. It will be observed that this escape-opening for the discharge of foreign matter is an inner terminal opening, so that when the lever-handle is thrust through the entrance-opening at the outer end of the handle-receiving socket all foreign matter will be pushed inwardly and compelled to drop downwardly through the inner terminal opening.

A cover 33 is employed to close the upper portion of the socket in the back of the standard and has its upper end hingedly connected to the back of the standard, as at 34, so as to normally hang downwardly and prevent the ingress of dirt through the upper end of the socket. To hold the cover in either its closed or open positions, there is provided a spring-tongue 35 at one end of the upper edge of the cover and projecting inwardly across the adjacent side of the standard, so as to have its free end frictionally engaging the adjacent concaved edge of a laterally-projected casing or housing 36, carried by the standard.

In order that the pivotal supports of the lower ratchet-dog may be conveniently lubricated without removing the lever-socket from the standard, each side of the laterally-enlarged socket is provided with an opening 37 (best shown in Fig. 4) and alined transversely with the adjacent opening for the fulcrum-pin, whereby the outer end of the adjacent pivot-pin 22 is exposed when the lever is in a substantially horizontal position, the opening being normally closed by means of a lid 38, pivoted to the outer side of the standard. The outer end of the pivot-pin 22 is provided with a marginal notch or groove 39, as shown in Fig. 3, which communicates with an oil reservoir or socket 40, formed in the adjacent link or side of the lower dog and opening outwardly through the marginal edge of the opening which receives the pivot-pin. This res-

ervoir is preferably filled with a suitable packing, so as to absorb the lubricant which is introduced through the notch or groove in the pivot-pin.

To insure the engagement of the upper dog with the rack of the lifting-bar, a leaf-spring 41 has its lower end secured to the inner side of the hinged cover or lid 33, so that its free upper portion may lie in the path of the upward movement of the free end of the dog, whereby the latter strikes the spring and is yieldingly forced into engagement with the lifting-bar.

From the foregoing description it will be seen that the ratchet-dogs are located at opposite sides of the fulcrum of the operating-lever, so that the dogs alternate in elevating the lifting-bar and the latter is continually actuated by both movements of the lever. To lower the lifting-bar gradually with a step-by-step movement, it is merely necessary to elevate the outer end of the lever with the lower dog in engagement with the rack and the upper dog thrown out of engagement and then depress the lever with the upper dog in engagement with the rack and the lower dog out of engagement, repeating this operation until the bar has been sufficiently lowered. To facilitate the disengagement of the dogs, the latter have been provided with the finger-pieces, as hereinbefore described.

To obviate the necessity of manually disengaging the dogs from the rack when lowering the lifting-bar, it is designed to provide means for automatically tripping the dogs or ratchet devices, so that the lever may be worked up and down oppositely with respect to the elevating movement and the dogs will be properly disengaged. In carrying out this object there is provided a vertically-slidable trip-rod 42, which is partially housed within the casing 36 and projects at the opposite upper and lower ends thereof. The upper end of the rod is provided with a laterally-projected trip-head 43, which normally rests within a suitable notch in the upper edge of the casing and is also located in the downward path of the head of the lifting-bar, so as to be driven downwardly thereby, as will be hereinafter described. The lower end of the trip-rod works through an opening in the top of the laterally-enlarged socket 10 and is located in front of the inner end of the operating-lever. A pendent and rearwardly-extending trip-spring 44 is secured to the lower end of the trip-rod and is normally located within the socket 10 and sufficiently far below the inner end of the lever as to be out of engagement with the lower dog, and when the trip-rod is drawn upwardly the spring has its free rounded end brought into the path of the downward movement of the adjacent side of the dog, so that the latter is yieldingly tripped out of engagement with the rack at the lowermost position of said dog. A similar upper trip-spring 45 is secured to the upper portion of the trip-rod, so that its lower end may project into the upper portion of the socket 10 and normally out of contact with the upper dog, and when the trip-rod is drawn upwardly the free end of the spring is projected outwardly through the opening 46 in the back edge of the casing 36, as best shown in Fig. 2, so that said spring is in the path of the downward movement of the finger-piece of the upper dog, whereby the latter is tripped out of engagement with the lifting-bar at the lowermost position of the dog. Thus the dogs are alternately tripped out of engagement with the lifting-bar at their lowermost limits, so that while one of the dogs is descending with the lifting-bar the other is held out of engagement with the bar by means of the adjacent trip-spring and is also traveling upwardly for a new and higher engagement with the bar, whereby the latter is lowered with a step-by-step movement by the simple manipulation of the operating-lever in a direction relatively opposite to that employed in elevating the lifting-bar.

As best shown in Fig. 3 of the drawings, it will be seen that the back edge of the trip-rod is provided with a substantially V-shaped stud or tooth 47, which is located adjacent to the upper end of the rod and is designed to take into a corresponding notch or recess in the inner back edge of the casing 36, whereby the trip-rod is held in its upper adjusted position, a suitable intermediately-bowed spring 48 being interposed between the front edge of the rod and the casing 36, so as to yieldingly hold the beveled tooth in engagement with the notch, and thereby prevent accidental displacement of the rod by the impact of the dogs with the springs and at the same time permitting of the rod being manually pushed downwardly in order that the springs may be thrown out of the paths of the dogs when it is desired to elevate the lifting-bar. In view of the fact that the upper end of the trip-rod projects above the upper end of the standard when the lifting-bar is being lowered the head of the lifting-bar will strike the upper end of the trip-rod when said bar reaches its lowermost limit, whereby the trip-rod is automatically returned to its normally inoperative position. Should it be desired to automatically and quickly drop the lifting-bar to its lowermost position, the operating-lever is elevated, the upper dog being previously thrown out of engagement with the rack, and as the lower dog descends it strikes a trip 49, provided upon the back of the standard and below the lower dog, thereby automatically disengaging the said lower dog, whereby the lifting-bar has no support and drops to its lowermost position. This trip 49 is in the form of a cam pivotally mounted upon the standard and normally disposed so that its shortest radius extends upwardly, whereby its peripheral edge is just short of the lowermost limit of the lower dog in order that the latter may not be tripped. A suit-

able finger-piece 50 is carried by the cam-trip for adjusting the same into its operative and inoperative positions; also, a spring 51 has one end secured to the standard and its opposite free end frictionally bearing against the peripheral edge of the cam, so as to hold the same in its opposite positions and at the same time permitting of the convenient adjustment of the cam. The latter may be provided with notches for the reception of the free end of the spring, if it is deemed necessary.

From the foregoing description it will be seen that the movable parts of the jack are effectively housed within the standard and at the same time are accessible for the purpose of being lubricated and also may be conveniently taken apart whenever necessary for repairs or for any other purpose. Moreover, the parts are assembled in compact form and the device is comparatively light in view of its strength. The ratchet-dogs are arranged closely to opposite sides of the fulcrum of the operating-lever, so that there is comparatively no lateral strain against the lifting-bar, and therefore the power applied to the lever is all expended in elevating the lifting-bar, thereby providing an exceedingly powerful jack.

Having thus described the invention, what is claimed, and desired to be secured by Letters Patent, is—

1. In a lifting-jack, the combination with a standard and a lifting-bar, of an operating-lever fulcrumed intermediate of its ends upon the standard, and having its inner end bifurcated and loosely embracing the lifting-bar, and alternately-acting ratchet-dogs pivoted to the lever and at opposite sides of the fulcrum thereof, both dogs being in operative relation to the same side of the lifting-bar.

2. The combination with a tubular standard, having a socket formed in the back thereof and communicating with the interior of the standard, opposite inwardly-directed shoulders in the upper portion of the socket and terminating short of the back thereof, and forming opposite recesses, which are open at their bottoms and closed at their outer sides, and a lifting-bar slidably mounted within the tubular standard, of an operating-lever having its inner end bifurcated, located within the socket and embracing the lifting-bar, an intermediate fulcrum-support carried by the shoulders, a pendent bifurcated ratchet-dog pivotally embracing the inner end of the lever and having its opposite upper portions working in the respective recesses in rear of the shoulders, and an upstanding ratchet-dog pivoted upon the lever and located upon the outer side of the fulcrum thereof.

3. In a lifting-jack, the combination with a tubular standard, having a socket communicating with the interior of the standard, and a lateral opening communicating with the socket, of a lifting-bar mounted within the standard, an operating-lever fulcrumed within the socket, a pivot-pin carried by the lever and having a peripheral notch or groove opening outwardly through the outer end thereof, and a ratchet-dog pivotally connected to the pivot-pin, and having an oil reservoir or socket in communication with the notch in the pivot-pin, the latter also being accessible through the opening in the standard.

4. In a lifting-jack, the combination with a tubular standard, having a socket in its back and communicating with the interior thereof, and a lifting-bar mounted within the standard, of an operating-lever having its inner end received within the socket, and provided with a transverse fulcrum-pin opening, there being an oil reservoir or socket in communication with said opening, a transverse groove, and a slot communicating between the reservoir and the groove, a fulcrum-pin fixedly carried by the standard and loosely received within the fulcrum-opening of the lever, and a ratchet-dog mounted in the transverse groove of the lever.

5. In a lifting-jack, the combination with a tubular standard, and a lifting-bar mounted therein and having ratchet-teeth upon the back thereof, of an operating-lever, having its inner end bifurcated to straddle the lifting-bar and fulcrumed in a socket in the back of the standard, a pendent bifurcated ratchet-dog pivotally swung from the inner bifurcated end of the lever and in operative relation to the ratchet-teeth of the lifting-bar, and an upstanding ratchet-dog pivoted to the lever at the opposite or outer side of the fulcrum thereof and arranged in operative relation to the ratchet-teeth of the lifting-bar.

6. In a lifting-jack, the combination with a hollow or tubular standard, having an opening in the back thereof, and a lifting-bar mounted within the standard, of an operating-lever fulcrumed within the opening in the standard, an upstanding ratchet-dog, and a pendent ratchet-dog, both of which are pivotally connected to the lever at opposite sides of its fulcrum, means for disengaging the upstanding dog from the lifting-bar, and a dog-disengaging cam for the pendent dog, said cam being mounted upon the back of the standard adjacent to the bottom edge of the opening therein and at the lowermost limit of the dog, also having its shortest radius normally turned toward the dog, and also being rotatable to bring its longest radius toward the dog for engagement thereby.

7. In a lifting-jack, the combination with a standard, and a lifting-bar, of an operating-lever fulcrumed upon the standard, and having opposite ratchet-dogs, and a longitudinally-adjustable dog-disengaging trip device mounted upon the standard, and having opposite trip projections, which are adjustable with the trip device into the paths of the inner sides of the respective dogs.

8. In a lifting-jack, the combination with a standard, and a lifting-bar mounted thereon, of an operating-lever fulcrumed upon the

standard, opposite ratchet-dogs carried by the lever, said dogs projecting respectively above and below the lever and in operative relation to the same side of the lifting-bar, and a longitudinally-adjustable trip device, having a laterally-projecting finger-piece, and opposite trip projections directed toward the ratchet-dogs and adjustable with the trip device into the paths of the inner sides of the respective dogs.

9. In a lifting-jack, the combination with a standard, and a lifting-bar, of an operating-lever, having a bar-engaging lifting-dog, an adjustable dog-engaging trip, and means for returning the trip to its normally-inoperative position by a movement of the lifting-bar.

10. In a lifting-jack, the combination with a standard, and a lifting-bar, having an enlarged head, of an operating-lever fulcrumed upon the standard, and provided with a bar-engaging ratchet-dog, a vertically-reciprocating and longitudinally-adjustable dog-tripping rod, having its upper end projected above the top of the standard and in the path of the downward movement of the head of the lifting-rod, in the operative position of the trip, whereby the latter is automatically returned to its normal position by engagement with the lifting-bar.

11. In a lifting-jack, the combination with a standard, and a lifting-bar, of an operating-lever, having a ratchet-dog for engagement with the bar, an adjustable dog-engaging trip, having a tooth or projection to fit in a corresponding notch in the standard and hold a portion of the trip in the path of the lifting-bar, and a spring yieldingly holding the tooth or projection in the notch.

12. In a lifting-jack, the combination with a standard, having an external casing which is open at its upper end and also at its back edge, and a lifting-bar having an enlarged head, of a vertically-slidable trip-rod mounted within the casing, and having its upper end projected above the casing and in the path of the downward movement of the head of the lifting-bar, in the operative position of the trip, a tooth or projection upon one side of the trip-rod and received within a notch in the adjacent wall of the casing in the elevated position of the trip, a tension-spring interposed between the opposite side of the rod and the adjacent wall of the casing, a leaf-spring carried by the trip-rod and projected outwardly through the back opening of the casing in the elevated position of the trip-rod, and an operating-lever fulcrumed upon the standard, and having a bar-engaging ratchet-dog arranged for engagement with the trip-spring.

13. In a lifting-jack, the combination with a tubular standard, having a socket in its back and communicating with the interior of the standard, and a lifting-bar mounted within the standard and having a laterally-enlarged head, of an operating-lever fulcrumed intermediate of its ends within the socket, and provided with upper and lower ratchet-dogs mounted at opposite sides of the fulcrum of the lever, an adjustable dog-engaging trip carried by the standard and arranged at the lowermost limit of the lower dog, and a vertically-slidable trip-rod mounted upon the standard, and having means for yieldingly holding the upper end thereof in the path of the downward movement of the head of the lifting-bar, and opposite trip-springs disposed in the paths of the respective dogs, in the elevated position of the trip-rod.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE FRANCIS BENTLEY.

Witnesses:
S. W. SMITH,
A. P. GWYNN.