May 19, 1942. C. M. AKINS 2,283,593

HYDRAULIC BUMPER JACK

Filed Dec. 30, 1940

Fig. 1.

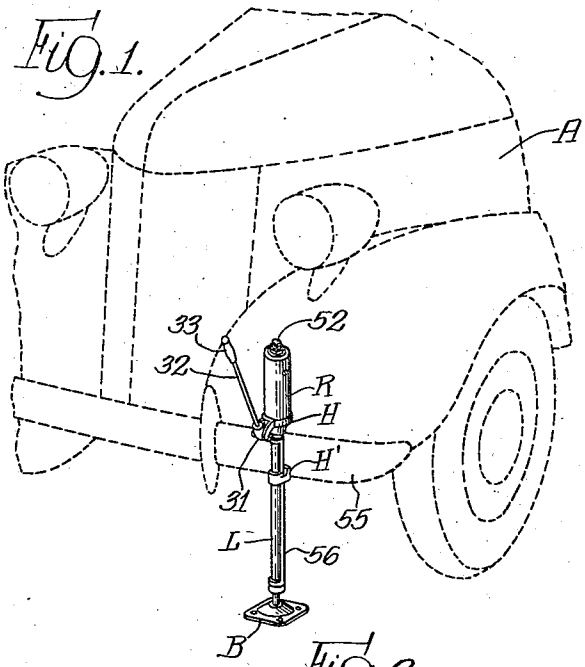


Fig. 2.

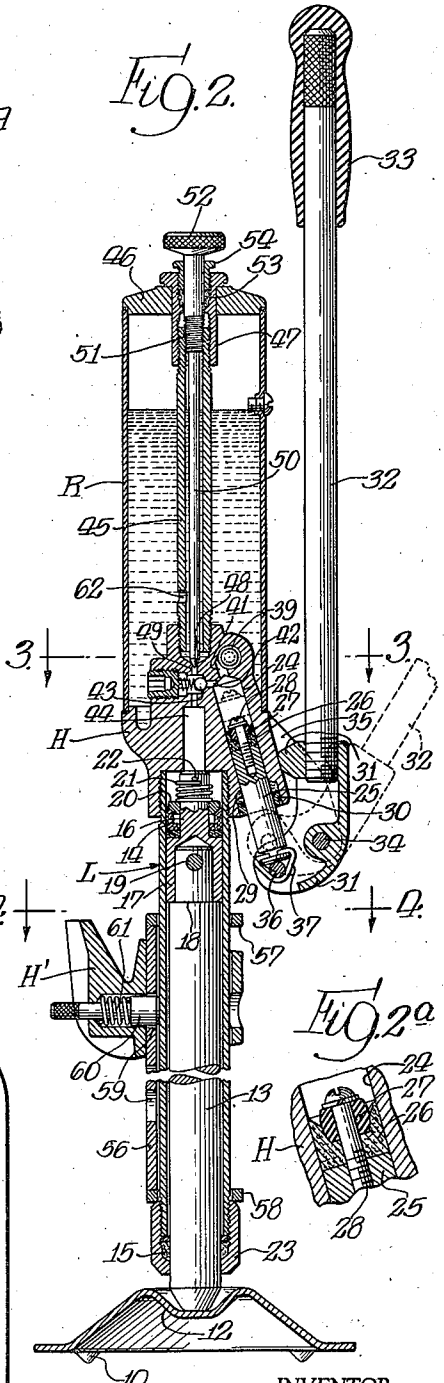


Fig. 3.

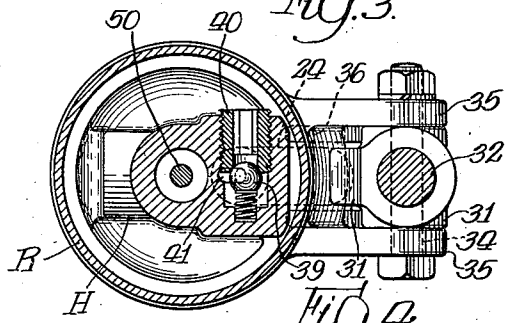


Fig. 4.

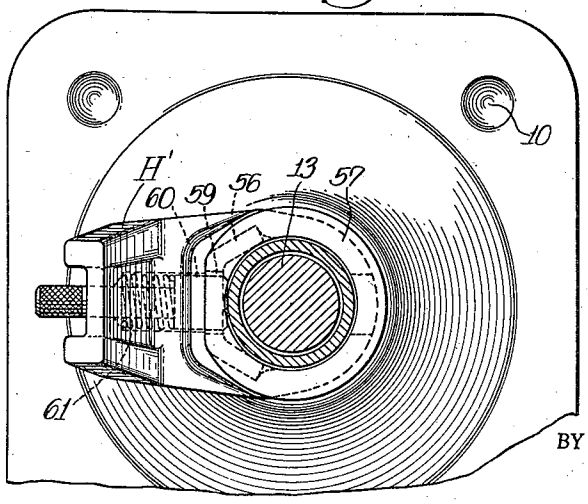


Fig. 2a.

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UNITED STATES PATENT OFFICE

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HYDRAULIC BUMPER JACK

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Application December 30, 1940, Serial No. 372,308

1 Claim. (Cl. 60—52)

My present invention relates to a jack structure, particularly of the hydraulic type, and especially adapted for use as a bumper jack.

One object of the invention is to provide a light weight hydraulic bumper jack structure made of relatively few parts and inexpensive to manufacture and assemble.

Another object is to provide a jack structure whereby hydraulically extensible means effects elevation of a bumper engaging hook or the like, and extension of the means is effected by a compact pump structure mounted in a head at the top of the hydraulically extensible means.

Another object is to provide means for effectively supplying oil to the pump mechanism, consisting of a reservoir extending upwardly from the head in which the pump is mounted. I also provide a release valve for lowering the jack, said valve having an operating stem extending upwardly through the reservoir and provided at the top of the reservoir with an operating knob.

Still another object is to provide a permanently attached handle for the jack which is operated in a vertical plane at the side of the reservoir, a hook structure being mounted on the lifting member of the jack and rotatable relative to the lifting member so that the operating handle for the pump mechanism may be turned to a desired position for operation without interference by any part of the automobile.

A further object is to provide a bumper engaging hook which in addition to being swivelly mounted, is adjustable vertically relative to the lifting member of the jack to engage bumpers or the like at different heights.

Still another object is to provide piston structures in the jack which are of cup leather type and include means to expand the annular walls of the cup leathers to insure an oil tight fit between the cup leather and its cylinder wall at all times.

With the foregoing objects as well as other objects in view, my invention consists in the construction, arrangement and combination of the various parts of my hydraulic jack structure whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in the appended claim and illustrated in the accompanying drawing, in which:

Figure 1 is a perspective view of a jack structure embodying my invention and showing it in use in connection with a bumper of an automobile.

Figure 2 is an enlarged vertical sectional view with parts of the figure broken away to conserve space.

Figure 2a is an enlarged sectional view of a portion of Figure 2 showing a cup leather piston expanding means.

Figure 3 is an enlarged sectional view on the line 3—3 of Figure 2; and

Figure 4 is an enlarged sectional view on the line 4—4 of Figure 2.

On the accompanying drawing I have used the reference character B to indicate a base, L, a lifting cylinder, and R, a reservoir cylinder. The base B has downwardly extending prongs 10 to engage the supporting surface and prevent lateral slippage. A shallow socket 12 is formed in the upper part of the base B to receive the lower end of a plunger 13 seated therein.

The lifting cylinder telescopes over the plunger 13 and is sealed relative thereto by a cup leather piston 14 and a packing 15. The cup leather piston 14 has a central perforation surrounding a stud 16 of a sleeve 17. The sleeve rests on a shoulder 18 adjacent the upper end of the plunger 13 and is pinned to the plunger by a pin 19.

The annular wall or flange of the cup leather piston 14 is beveled to coact with the beveled edge of a washer 20. The washer 20 is biased to engage the annular flange of the cup leather piston by a spring 21, interposed between the washer and a pin 22 carried by the upper end of the stud 16. The packing 15 is retained in position by a packing nut 23.

Secured to the upper end of the lifting cylinder L is a head H. The head H has a pump cylinder 24 therein, in which is mounted a pump plunger 25. The pump plunger 25 has a cup leather piston 26 in which is received a resilient washer 27 of neoprene, rubber or the like, retained in position by a screw 28. As the screw 28 is tightened it effects expansion of the washer 27, shown in Figure 2a, to cause the annular flange of the piston 26 to engage the cylinder wall 24 in an effective oil tight manner. A packing 29 and a packing nut 30 are further provided for sealing against oil leakage.

For operating the pump plunger 25 a lever 31 is provided, to which is secured a pump handle 32. The pump handle 32 terminates in a hand grip portion 33 of rubber or the like. The lever 31 is pivoted at 34, the pivot pin being supported by ears 35 extending from the head H. The plunger 25 is connected to the lever 31 by a pivot pin 36 and a clip 37.

Within the head H an inlet valve 39 is provided for receiving oil through a bushing 40 from the space within the reservoir cylinder R. The oil passes through a passageway 41 into the cylinder

24 and from the cylinder through a passageway 42. The passageway 42 communicates with an outlet valve 43, which in turn communicates by a passageway 44 with the interior of the lifting cylinder L.

The reservoir cylinder R is seated at its lower end against the head H, and such seating is effected through the medium of a tubular tie rod 45, a closure member 46, and a sleeve nut 47 for the tie rod. The lower end of the tie rod is threaded into the head H.

A release valve 48 seats against the upper end of a return passageway 49 and is formed on a stem 50 extending upwardly through the tubular tie rod 45. The stem 50 is threaded at 51 in the tube 45 and has an operating knob 52 outside of the closure member 46. A packing 53 and a packing nut 54 are provided to prevent leakage from the upper end of the reservoir.

A supporting hook H' is provided for engagement with a bumper 55 or the like, of an automobile A, as shown in Figure 1. The hook H' surrounds the lifting cylinder L and a connector bar 56, which is welded at its upper and lower ends to washers 57 and 58. The washer 58 rests against the packing nut 23, which serves as a stop shoulder therefore. The connector bar 56 has a series of spaced openings 59 to selectively receive a latch pin 60. The latch pin 60 is biased toward a position of coaction with one of the openings 59 by a spring 61.

My jack construction has a number of advantages which contribute to light weight and efficiency of operation. Among these may be mentioned the relatively rugged but compact character of the hydraulically operated extensible mechanism comprising the plunger 13 and the lifting cylinder L. The pump mechanism is then arranged as a simple and small unit entirely within the head H, and the reservoir R extends upwardly from the head so that the head is at the bottom of the reservoir, in order to effectively receive oil under pressure of gravity from the reservoir. The operating handle 32 is conveniently operated from a comfortable standing position, and when the jack is stored away under the seat or in the tool box, the handle may assume a position close to the reservoir R, as shown in full lines in Figure 2, without taking up prohibitive room. The control means 52 is conveniently located at the very top of the reservoir, where it is readily accessible and may be conveniently operated. The hook H' may be roughly adjusted with respect to the connector bar 56 to the approximate position of the bumper or other part to be engaged and elevated. Thereafter, such part may be elevated by operating the pump mechanism which will exert tremendous lifting power compared to the force exerted on the hand grip 33, due to leverage and difference in size between the pump plunger and the lifting cylinder areas.

The hook H' may be rotated to the proper position for coaction with the part to be lifted, and the operating handle 32 may be also rotated to any desired position from the standpoint of convenience of operation and to avoid interference with projecting portions of the automobile or other structure being lifted. Leakage of the pump and lifting pistons is effectively eliminated by the expander devices 20 and 27 for the cup leather pistons thereof. Simple ball check valves are used at 39 and 43, which have proven through many years of use to be very effective in hydraulic jacks. A simple release valve at 48—49 provides a direct return communication between the lifting cylinder and the reservoir by way of passages 44, 49 and the interior of the tubular tie rod 45. Finally, the oil issues from the tubular tie rod through a port 62 in the wall of the tie rod 45.

Some changes may be made in the construction and arrangement of the parts of my device without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claim any modified forms of structure, or use of mechanical equivalents, which may be reasonably included within their scope.

I claim as my invention:

A hydraulic bumper jack comprising a supporting base, a plunger having the longitudinal axis thereof extending vertically upward in normal operative position, a lifting cylinder telescopingly receiving said plunger, a separate head in axial alignment with and surmounting the cylinder, a cylindrical reservoir in axial alignment with the head and plunger having the lower edge in sealed engagement with the head at the perimeter thereof and having a separate closure member at the other end, said head having a boss extending upwardly within the lower end of the reservoir and surrounded thereby, an axially aligned recess in the boss and a tubular tie rod secured in said recess between the head and the closure member for anchoring said reservoir and closure to the head, said head having an oblique pump chamber extending from the lower end thereof upwardly into the boss whereby the pump chamber axis lies at an acute angle relative to the axis of the jack, a pump intake passage in the boss between the lower end of said reservoir and the pump chamber having a check valve and fitting therein, a discharge passage between the pump chamber and the interior of said lifting cylinder having a check valve and fitting therefor within the boss, a by-pass extending between said discharge passage, said tubular tie rod and said reservoir having a valve seat therein, an elongated valve element for said valve seat extending through said tie rod having a manual control outside of the closure member, a pump plunger and a pump handle pivoted to the head loosely anchored to the pump plunger having a normal inoperative position adjacent and substantially parallel to the reservoir and having an operative position angularly outward therefrom.

CLIFFORD M. AKINS.