April 2, 1929. H. C. SHEVLIN 1,707,497

HYDRAULIC JACK

Filed April 12, 1926

Fig 1

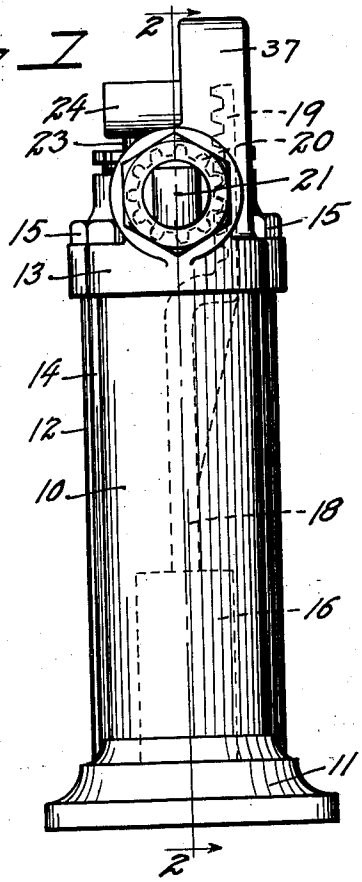


Fig 3

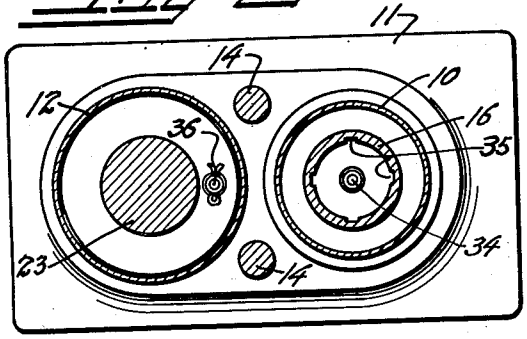


Fig 2

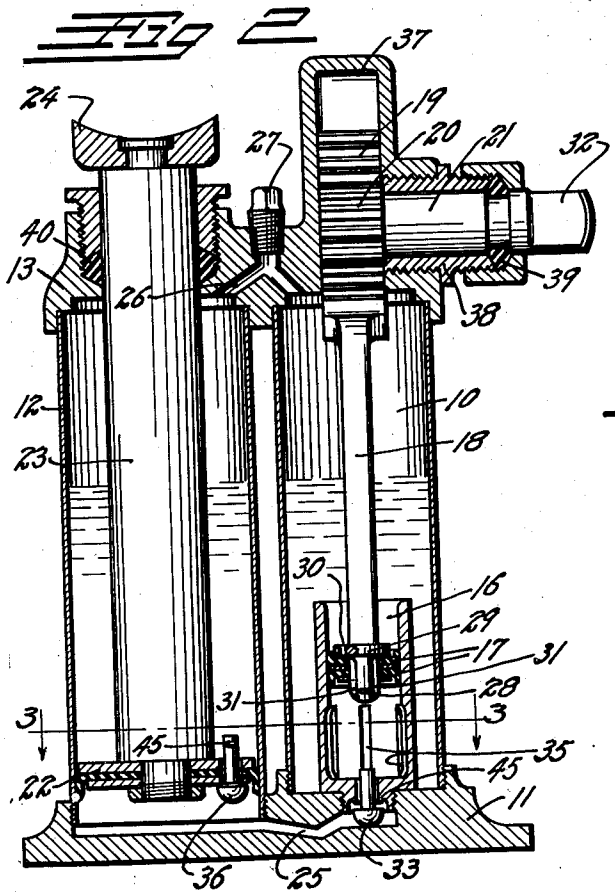
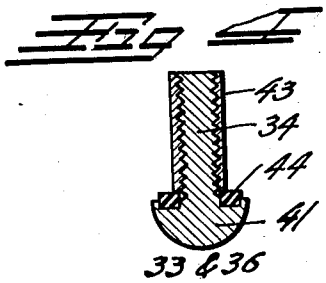


Fig 4



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Patented Apr. 2, 1929. 1,707,497

UNITED STATES PATENT OFFICE.

HAROLD C. SHEVLIN, OF DENVER, COLORADO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO SHEVLIN HYDRAULIC JACK COMPANY, OF DENVER, COLORADO, A CORPORATION OF COLORADO.

HYDRAULIC JACK.

Application filed April 12, 1926. Serial No. 101,267.

This invention relates to a hydraulic lifting jack, more particularly of the type employed in connection with automotive vehicles, and has for its principal object the provision of a hydraulic jack which will have a minimum of moving parts, which will be positive in operation, which can be actuated by a very small arc of movement, and which can be elevated or lowered by the operation of a single crank or lever.

Another object of the invention is to provide a jack in which the liquid under pressure never comes in contact with any of the packed shafts so that leakage is prevented.

A further object of the jack is to eliminate the necessity for atmospheric relief valves above the jack piston.

A still further object is to provide a positively operating, simply constructed valve for a jack of this character.

Other objects and advantages reside in the detail construction of the invention, which is designed for simplicity, economy and efficiency. These will become more apparent from the following description.

In the following detailed description of the invention, reference is had to the accompanying drawing which forms a part hereof. Like numerals refer to like parts in all views of the drawing and throughout the description.

In the drawing:

Fig. 1 is a side elevation of the jack, looking toward the extremity of the shaft.

Fig. 2 is a vertical section through the jack, taken on the line 2—2, Fig. 1.

Fig. 3 is a horizontal section through the jack, taken on the line 3—3, Fig. 2.

Fig. 4 is a detail view of the valve employed.

The jack comprises a reservoir cylinder 10, mounted in a base 11, adjacent to a power cylinder 12. The cylinders 10 and 12 are threaded into the base 11 and are closed at their upper extremities by a cap casting 13 which is clamped against the cylinders by tie bolts 14. The tie bolts pass through the base 11 and are provided, above the cap casting 13, with nuts 15.

Within the reservoir 10, also threaded into the base casting 11 is a pump cylinder 16, in which, slidable pump washers 17 are reciprocated, by means of a piston rod 18. The pump washers 17 slide along the piston rod 18, their movement being limited by a pin 28 in the rod extremity and a flange 29 formed upon the rod. As the piston rod moves upwardly, the washers 17 will move away from the flange 29 and allow the fluid to flow, through a port 30 in the flange and through flutes 31 in the piston rod, into the pump cylinder. As the piston rod moves downwardly, the washers 17 will compress against the flange 29 effectively closing the port 30 to prevent return of the fluid. The cylinders 10 and 12 are filled with fluid, preferably oil, to substantially the level indicated in Fig. 2.

The piston rod terminates at its upper extremity in a rack 19 which is engaged by a pinion 20 carried on an operating shaft 21. In the power cylinder 12, a piston 22 operates in connection with a jack bar 23 which terminates in a jack socket 24. Communicating between the pump cylinder 16 and the power cylinder 12, is a pressure passage 25, and communicating between the reservoir 10 and the pump cylinder 16, is a relief passage 26. The relief passage also communicates with the exterior of the jack for filling purposes, the exterior opening being closed by a plug 27.

In operation, the operating shaft 21 is rotated through an arc by means of any suitable operating lever or crank (not shown) carried on a squared extremity 32 upon the operating shaft 21. This rotation imparts a vertical reciprocation to the piston rod 18 through the medium of the rack and pinion 19 and 20 and causes the pump washers 17 to force fluid into the passage 25 past a check valve 33, which prevents its return to the pump cylinder. From the passage 25, the fluid flows to the power cylinder 12 beneath the piston 22, forcing the latter and the jack bar 23 upwardly. The fluid above the piston 22 will rise and flow through the relief passage 26 to the reservoir 10.

The check valve 33 will maintain the piston 22 at any desired height. When it is desired to lower the jack bar 23, the operating shaft 21 is rotated so as to force the piston rod 18 downwardly into contact with the stem 34 of the valve 33, thus forcing it away from its seat and allowing the fluid to flow from under the piston 22 into the pump cylinder 16 through grooves 35 formed therein, and around the pump washers 17 into the reservoir 10. The downward motion of the

jack bar 23 may be arrested at any point by rotating the operating shaft 21 to raise the piston rod 18 out of contact with the valve stem 34.

In the piston 22 a relief valve 36 is provided, the stem of which contacts with the cap 13 when the piston 22 reaches the upward limit of its travel, thus allowing the fluid to flow through the piston 22 and prevent further pressure thereon. The valve 36 also acts to allow the fluid to pass through the piston 22 when the jack bar 23 is raised by an external pull. In this capacity, it acts simply as an auxiliary to the valve 33 for the jack bar 23 could be raised without the valve 36 since it would draw fluid through the port 30, the pump cylinder 16, and the passage 25 and discharge fluid from above the piston 22 through the passage 26 to the power cylinder. This flow, however, is relatively restricted and the valve 36 is provided as an auxiliary to facilitate the upward movement of the jack bar.

The piston rod 18 is offset at its connection with the rack 19, as shown in Fig. 2, so as to allow the operating shaft 21 to be placed upon the center line of the jack. The cap 13 is provided with a rack track 37 which guides the rack and maintains it always in contact with the pinion 20. The rack track is entirely closed to prevent leakage. An opening is formed in the cap 13 around the operating shaft 21 sufficiently large to allow insertion of the pinion 20. This opening is closed by a bearing 38 which also forms a gland for packing 39 around the operating shaft. Similar packing 40 is provided around the jack bar 23.

It will be noted that the fluid which comes in contact with any of the packing is not under pressure, therefore the demand upon the packing is relatively light and leakage is effectively prevented.

It is desired to call attention to the specific construction of the valves 33 and 36, illustrated in detail in Fig. 4. Each of these valves have a semi-spherical head 41 carrying a threaded shank 34. A collar 43 is screwed onto the threaded shank 34 and maintains a washer 44, of relatively soft material, such as leather, in a counterbored seat in the head 41. By this construction, the washer 44 always moves with the valve and cannot be forced from its seat by the fluid pressure. The washer 44 contacts with an annular projection 45 around the valve opening so that metal to metal contact is avoided.

While a specific form of the improvement has been described and illustrated herein, it is desired to be understood that the same may be varied, within the scope of the appended claims, without departing from the spirit of the invention.

Having thus described the invention, what I claim and desire secured by Letters Patent is:—

1. In a pump cylinder having a piston rod adapted to reciprocate therein, means for providing a piston and check valve on said rod comprising, a perforated flange formed on said rod adjacent its one extremity, said extremity extending beyond said flange and piston washers slidably carried on said extremity and contacting with said pump cylinder and arranged to close said perforations at predetermined times, said extremity being grooved so as to allow fluid to flow through said washers to said opening.

2. Means for actuating a pump piston in a hydraulic jack comprising a rack operatively connected to said piston; a stationary cap above said piston; a guide formed in said cap for said rack; a pinion having a shaft and adapted to mesh with said rack within said cap, there being an opening of sufficient size in said cap to admit said pinion and a removable bearing adapted to support said shaft and close said opening so as to allow removal of said pinion through said opening.

In testimony whereof, I affix my signature.

HAROLD C. SHEVLIN.