Aug. 6, 1929. J. H. BURKHOLDER ET AL 1,723,131

HYDRAULIC JACK

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Fig. 1

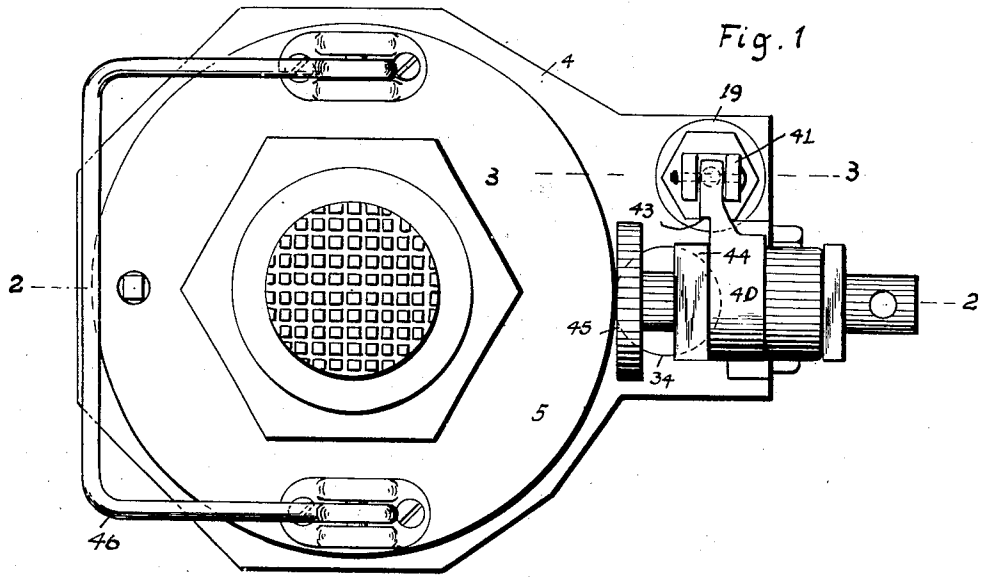
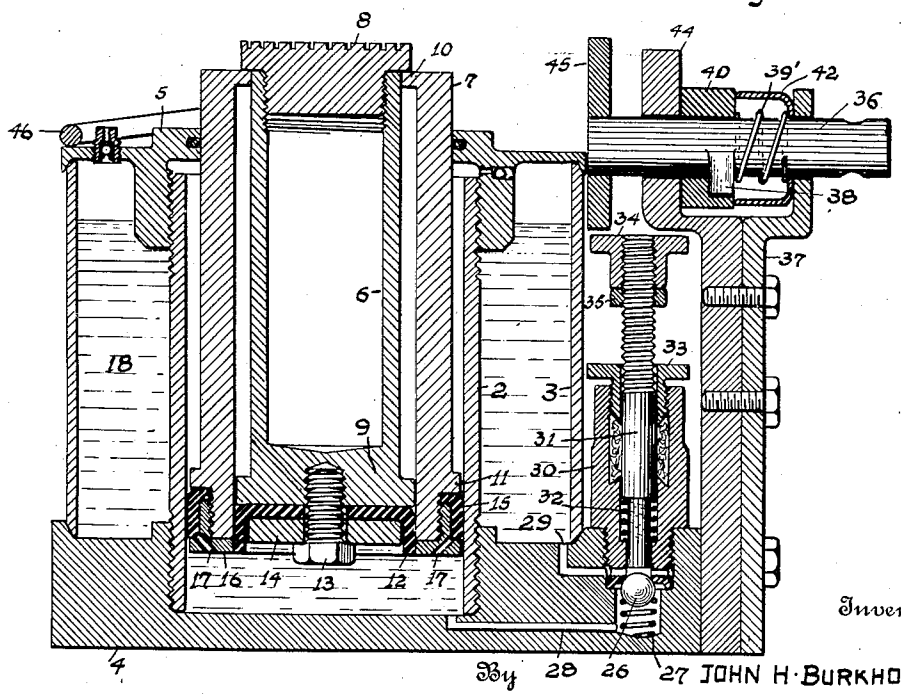


Fig. 2



Inventor

JOHN H. BURKHOLDER

GUY A. COUNTRYMAN

Fisher, Moser & Moore
Attorney

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Fig. 3

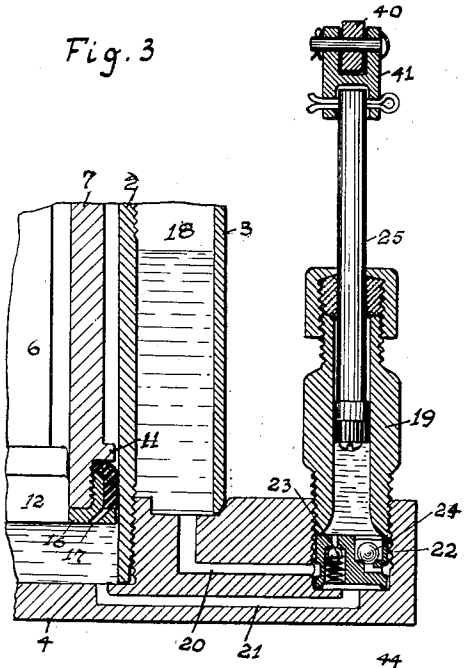


Fig. 4

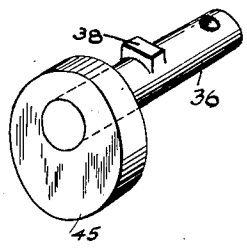


Fig. 5

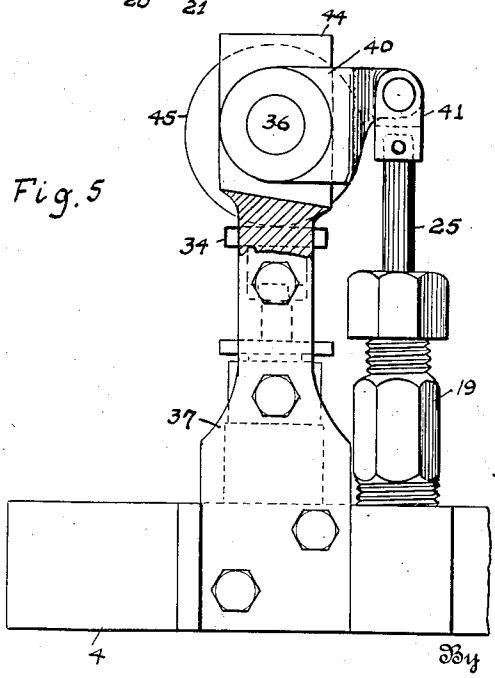
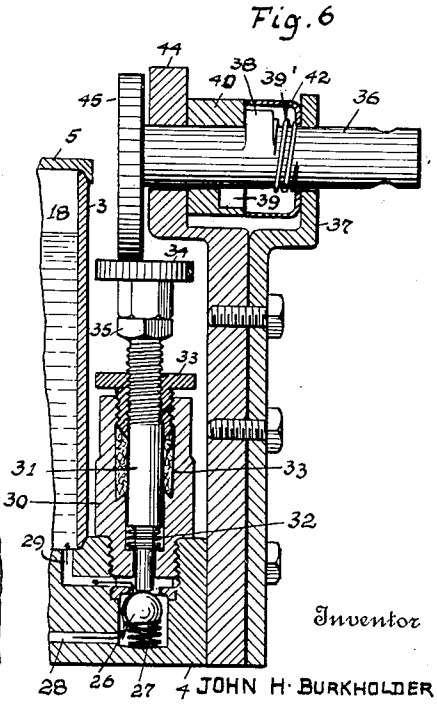


Fig. 6



Inventor

JOHN H. BURKHOLDER

GUY A. COUNTRYMAN

By Fisher, Moser & Moore Attorney

Patented Aug. 6, 1929. 1,723,131

UNITED STATES PATENT OFFICE.

JOHN H. BURKHOLDER AND GUY A. COUNTRYMAN, OF ASHLAND, OHIO, ASSIGNORS, BY MESNE ASSIGNMENTS, TO ELITE MANUFACTURING COMPANY, A CORPORATION OF OHIO.

HYDRAULIC JACK.

Application filed March 14, 1927. Serial No. 175,159.

The present invention pertains to hydraulic jacks, and in the means for operating and controlling such jacks, the object in general being to provide a single controlling element which may be used in one position to operate a pump to raise the load and then shifted to another position to operate a pressure release valve to lower the load. The jack also comprises a pair of telescopic rams having cupped packing rings which are particularly constructed to promote closure and sealing of the rams within their respective cylinders.

In the accompanying drawings, Fig. 1 is a top view of the jack, and Fig. 2 is a sectional view vertically through the jack on line 2—2 of Fig. 1. Fig. 3 is a sectional view of the jack on line 3—3 of Fig. 1. Fig. 4 is a perspective view of the shiftable member for controlling the operation of the jack. Fig. 5 is a side elevation of the pump and its operating connections, and Fig. 6 is a sectional view showing the controlling and operating member holding the pressure release valve in an open position.

The jack comprises a hollow inner cylinder 2 and a hollow outer cylinder 3 affixed in concentric relation to a base member 4 by a clamping cover 5 having screw-connection with the upper end of cylinder 2. A pair of telescopic rams 6 and 7, respectively, extend upwardly from cylinder 2 through cover 5, and the inner ram 6 is provided with a screw-cap member 8 adapted to engage and support the article to be lifted and also adapted to limit the downward movement of the inner ram 6 within the outer ram 7. The enlarged piston head 9 of inner ram 6 is adapted to engage an inwardly-extending flange 10 at the top of outer ram 7 when the inner ram is raised to its limit, and the enlarged head 11 of the outer ram limits the upward movement thereof by engaging cover 5, thus preventing separation and collapse of the parts when these rams are extended to their full height in lifting operations. The piston head of the inner ram comprises a leather cup or packing member 12 affixed to the bottom of the ram by a bolt 13 and plate 14, and the outer ram also comprises a leath cup or packing member 15 held in place by a flanged screw ring 16. The bottom edge of cup member 15 is overlapped by the flange on ring 16 and the flange is therefore provided with perforations 17 leading to the inner wall of the cup to permit the fluid within the pressure chamber to expand the same outwardly with fluid-tight closing and sealing effect.

The liquid or fluid which is used to raise the ram is stored in the reservoir or outer compartment 18 formed between the two cylinders, and it is transferred from reservoir 18 to and beneath the rams within the inner cylinder by a pump 19 through two communicating passages 20 and 21 in base member 4, see Fig. 3. A separate valve unit 22 is clamped within the base member by the pump cylinder, and two ball valves 23 and 24 respectively, within the block or unit 22 control the flow of the fluid in one direction. That is to say, when the pump piston 25 is drawn upwardly the fluid is drawn through passage 20 into the pump cylinder, and on the reverse stroke of the piston the fluid is forced through passage 21 into ram cylinder 2, thereby lifting the rams correspondingly. A repetition of such operations is required to raise the rams to the limit, but a lowering movement is effected more simply by merely opening a release valve 26 in greater or lesser degree to permit the fluid beneath the rams to escape and return to reservoir 18.

Thus referring to Fig. 2, valve 26 comprises a ball which is held to its seat by a spring 27, and two fluid return passages 28 and 29, in base 2, extend from opposite sides of the ball seat to ram cylinder 2 and reservoir 18, respectively. The seating and confining body 30 for ball valve 26 is screw-connected with the base and contains a depressible stem or shaft 31 adapted to engage and unseat ball 26 but which shaft is held normally in a raised position by a compression spring 32. Packing and a packing gland 33 in body 30 prevent leaking around shaft 31, and the upper end of the shaft is screw-threaded and carries an operating head 34 which may be adjusted vertically thereon and locked thereto by a lock nut 35.

The means for operating pump 19 and for controlling valve 26 comprises a short shaft 36 which is adapted to be oscillated to operate the pump or to be shifted axially and rotated to operate the release valve as the operator may elect. The outer end of shaft 36 is therefore connected to or pro-

vided with a handle or other manipulating device which is not shown. However it is obvious that any suitable handle or operating connection may be used to control the shaft manually. As shown shaft 36 is journaled in a forked bearing or standard 37 and provided with a lug or key member 38 adapted to occupy a recess or socket 39 in the hub of a crank arm 40 which is sleeved upon the shaft. The outer end of arm 40 is connected by a link 41 to the upper end of the pump piston 25, see Fig. 5, and when the lug 38 on the shaft is interlocked with the crank arm the pump piston may be reciprocated by imparting an oscillatory movement to the shaft. A coiled compression spring 39′ is interposed between lug 38 and the end wall of a cover member or collar 42 which is sleeved upon the shaft within the forked part of standard 37, thereby maintaining the lug and crank arm in interlocking connection during oscillatory movements of the shaft. Shaft 36 can only be oscillated in a limited degree when the pump is being operated, a shoulder 43 on the crank arm being always in position to strike the post 44 to fix the limits of oscillatory movement of the arm. During such pumping operations a cam or eccentric 45 on the inner end of shaft 36 opposite the valve operating head 34 also oscillates or turns with the shaft, but the degree of oscillation being limited said cam or eccentric will not engage said head and depress the stem nor open the release valve 26. To obtain the latter result it is first necessary to slide or shift shaft 36 in its bearings and compress spring 39′ until the lug 38 is withdrawn from the recess or socket 39 in crank arm 41. This disconnects shaft 36 from the crank arm and renders the pump inoperative, and then the shaft may be rotated in greater degree to bring the cam or eccentric 45 into contact with the valve-operating head 34 so that the valve stem may be depressed in lesser or greater degree, see Fig. 6, thereby unseating the ball valve, and permitting the rams to descend and the fluid to return to the reservoir, either slowly or more rapidly as desired. When this has been accomplished, the shaft may be turned until lug 38 is again adjacent the recess in the arm whereupon the coiled spring 39′ will slide the shaft 36 and cause lug 38 to interlock with the crank arm, or this sliding movement of the shaft may be effected manually through the handle or other operating connection attached to the shaft. In either case, only a single operating and controlling member is required to raise the load by pumping or to lower the load by opening a release valve.

A jack constructed as herein shown and described may be of the portable type, having a handle or bail 46 attached to the cover or body thereof, or the same jack may be mounted upon a wheeled base and provided with operating connections adapted to be manipulated more or less remotely from the jack as in the so-called truck type of vehicle jacks in common use. It should also be understood that the present device also exemplifies only one form of the invention, and that it may be modified or adapted to meet varying requirements without necessarily departing from the inventive concept and working arrangement set forth in the specification and embraced within the terms of the following claims.

What we claim, is:

1. In a hydraulic jack including a ram, a valved intake for said ram, a release valve for said ram, a pump adapted to force a liquid into said ram through said intake, a shiftable operating element for said pump, clutching means between said element and said pump adapted to be disengaged by shifting of said element, and means associated with said element to operate said release valve by said shiftable element, when rendered inoperative in respect to said pump.

2. A hydraulic jack including a ram, a valved intake for said ram, a release valve for said ram, a pump, an oscillating operating element for said pump, a shiftable shaft for pivotal support of said element, means associated with said shaft adapted to operate said release valve, clutching means between said shaft and said operating element disengageable by shifting of said shaft, and means to stop the oscillation of said element when operatively connected with said shaft by said clutch, said means on said shaft being adapted to operate said release valve only when said clutch connecting said shaft and said operating element for the pump being disengaged.

In testimony whereof we affix our signatures.

JOHN H. BURKHOLDER.
GUY A. COUNTRYMAN.