

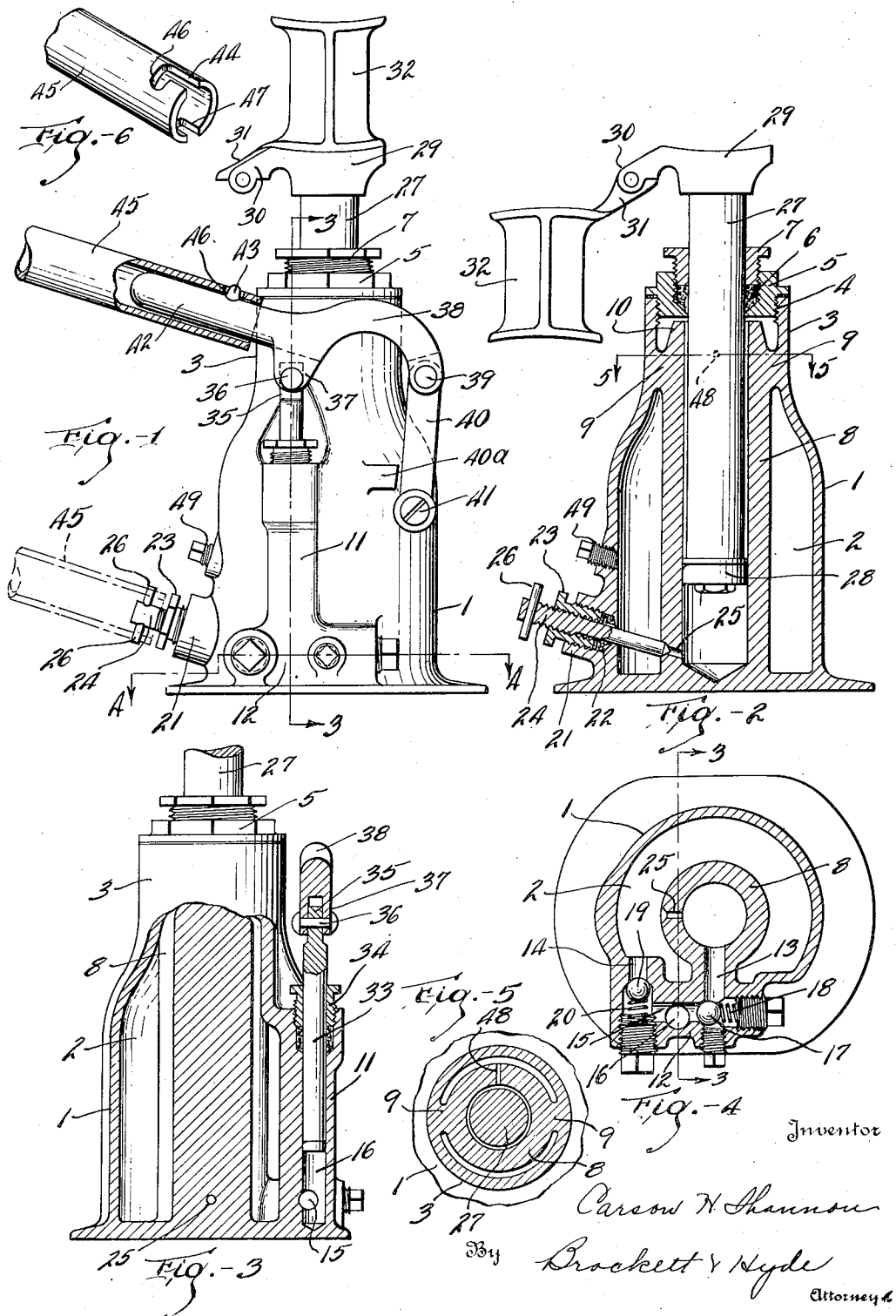
Feb. 5, 1935.

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1,990,004

JACK

Original Filed Feb. 13, 1923



UNITED STATES PATENT OFFICE

1,990,004

JACK

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Application February 13, 1928, Serial No. 253,954
Renewed April 4, 1933

10 Claims. (Cl. 60—52)

This invention relates to portable jacks and particularly to those of the hydraulic type.

The object of the present invention is to provide a simple effective self-contained jack for use particularly for jacking up automobile axles and the like. The inventive thought back of the arrangement is the idea of constructing a hydraulic jack in such a manner, and arranging its parts in such a way, that it is effective in operation and easy to manipulate without danger of leakage of the oil or other liquid used in the hydraulic operation.

The particular inventive features are the following, to wit, the arrangement and the support of the hydraulic cylinder within the base open at its top to permit any leakage to drain into the reservoir; the arrangement of a seal, such as a stuffing box, between the plunger and the reservoir to prevent loss of oil or other liquid and to transmit the lateral thrust of the plunger to the combined base and reservoir; the arrangement of the valves between the hydraulic pump and the jack cylinder in the base to permit the use of relatively large valves and avoid the necessity for special valve fittings; the provision of safety limit means to prevent the jamming of the plunger against the stuffing box at the upper limit of movement of the plunger; and the provision of a suitable pump lever and removable handle also capable of manipulation of the relief valve together with other details to be brought out in the following description, drawing and claims.

In the drawing, Fig. 1 is a side elevation of the jack with parts broken away; Fig. 2 is a vertical section; Fig. 3 is a view on the line 3—3 of Fig. 1; Fig. 4 is a section upon the line 4—4 of Fig. 1; Fig. 5 is a section upon the line 5—5 of Fig. 2; and Fig. 6 is a detailed view of the end of the handle.

In the embodiment of the invention set forth in the drawing, the jack is provided with a combined base and reservoir 1, which is of a suitable size to provide a suitable liquid reservoir 2 for oil or other liquid. The upper end of the reservoir is drawn in or reduced at 3 and is internally threaded at 4 for the reception of a suitable stuffing box 5 receiving packing 6 and a gland nut 7.

The reservoir 1 is provided internally with a suitable cylinder 8 preferably integral at two opposed points 9 with the reservoir 1 and also integral with the base at the bottom, as shown in Fig. 2. The upper end 10 of this cylinder is spaced from the underside of the stuffing box

5 so that any oil or other liquid passing out of the cylinder will overflow at the top and pass into the recess 2.

The combined base and reservoir 1 is also provided with an integral pump cylinder 11 extending down and forming a part of and integral with, a valve body structure 12, as shown in Fig. 4. This valve body provides two ports 13 and 14, the former establishing communication between the bore of the jack cylinder 8 and a connecting bore 15 in communication with the bore 16 of the pump cylinder 11. The other port 14 establishes communication between this same bore 15 and the reservoir 2. The passage of liquid from the pump cylinder 11 is checked toward the pump cylinder by a ball check 17 held in place by a spring 18 while liquid passing from the pump cylinder 11 toward the reservoir is checked by a ball check 19 seated by a spring 20. From the foregoing, it is obvious that upon the operation of the liquid pump, liquid will be drawn from the reservoir 2 and forced into the cylinder 8.

The combined base and reservoir 1 is still further provided with a boss 21, forming a stuffing box for receiving a packing 22, a gland nut 23 and a relief valve stem 24 threaded into the gland nut. This valve stem extends through the reservoir chamber 2 and is adapted to seat in a suitable seat provided about a relief opening establishing communication between the reservoir chamber 2 and the bottom part of the bore of the cylinder 8.

Mounted in the jack cylinder 8 and in the stuffing box having the gland ring 7, is a jack plunger 27 provided at its lower end with a cup washer 28 engaging the inner wall of the jack cylinder 8. The upper end of the plunger 27 is provided with a head or pad 29 for engaging under the axle or other part of the car. This head is provided with a pair of ears 30 receiving an ear 31 forming a part of a head extension 32 which is adapted to be swung above the head 29 for increasing the height of the jack and to be swung backward out of the way to decrease the height of the jack.

The pump cylinder 11 receives a pump plunger 33 extending upward through a stuffing box structure 34 and provided with an eye 35 at its upper end engaging a pin 36 extending between the ears 37 forming a part of a pump lever 38, which has a rearwardly extending portion pivoted at 39 to a link 40 pivoted at 41 to the combined base and reservoir 1. This lever is provided with an outwardly extending arm 42 having an upwardly ex-

tending pin 43 adapted to engage in a slot 44 extending longitudinally inward from the end of the hollow handle 45. This slot is provided with a lateral extension 46 which permits the locking of the handle to the lever arm 43. This handle is also provided with another diametrically opposed, recess 47 which permits the handle to be engaged with the pin 26 of the relief valve stem 24, as shown in dotted lines in Fig. 1. In this instance, the slot 47 is less in length than the slot 44 so that the pin 26 never engages the slot portion 46. A stop 40a is provided to limit the upper movement of the pump plunger 33.

In order to limit the upward movement of the plunger 27, the cylinder 8 is provided with a lateral port 48, Figs. 2 and 5, extending out through the side wall and establishing communication between the jack cylinder and the reservoir 2.

In use, the operator seats the valve stem 24 in the port 25 and prevents any discharge from the lower portion of the jack cylinder 8 to the reservoir chamber 2. He then applies the handle to the lever arm 42 and proceeds to manipulate the oil pump with the head 29 below the part to be elevated. By this operation the oil is drawn in through the port 14 past the check 19 into the pump cylinder and on the downward stroke of the pump forced past the check 17 through the port 13 and below the jack plunger, thus elevating the latter. As the plunger approaches the limit of its stroke, it finally uncovers the port 48 when any further liquid toward the jack cylinder 8 will be discharged back into the reservoir and no further lifting action will be effected. To release the jack, the operator removes the handle from the arm 42 and engages its slotted end with the pin 26 of the valve stem 24. Rotation of this valve to release position will, of course, permit the oil under the jack plunger 27 to pass back into the reservoir.

When the jack is assembled, the jack plunger is at the top of its stroke and the cylinder 8 is filled with oil and an oil level is maintained at the height of the plug 49, as shown in Fig. 2, the valve stem 24 being seated. This valve is then opened and the plunger forced down when there is a slight compression of the air in the reservoir above the oil, the reservoir being completely sealed to the atmosphere.

What I claim is:

1. A hydraulic jack, comprising: a reservoir casing, having a base and side walls; a ram cylinder, disposed within said reservoir casing, having its lower end fixed to said base, and having its upper end fixed to said side walls by a connection apertured to afford communication between an auxiliary chamber disposed above said connection and the reservoir chamber therebelow; readily removable closure means for the upper end of said jack, disposed above said connection, enclosing said auxiliary space, overlying the upper end of said cylinder, and provided opposite said cylinder with an opening for the passage of a ram therethrough; the parts being formed to provide a communication between the upper end of the cylinder space and said auxiliary chamber; a ram, disposed within said cylinder, and extending through said opening; and packing means, sealing said opening about said ram.

2. A hydraulic jack, comprising: a reservoir casing, having a base and side walls; a ram cylinder, disposed within said reservoir casing, having its lower end fixed to said base, and having its upper end fixed to said side walls by a con-

nection apertured to afford communication between an auxiliary chamber disposed above said connection and the reservoir chamber therebelow; readily removable closure means for the upper end of said jack, mounted independent of said cylinder, enclosing said auxiliary space, overlying the upper end of said cylinder, and provided opposite said cylinder with an opening for the passage of a ram therethrough; the parts being formed to provide a communication between the upper end of the cylinder space and said auxiliary chamber; a ram, disposed within said cylinder, and extending through said opening; and packing means, sealing said opening about said ram.

3. A hydraulic jack, comprising: a reservoir casing, having a base and side walls; a ram cylinder, disposed within said reservoir casing, having its lower end fixed to said base, and having its upper end fixed to said side walls by a connection apertured to afford communication between an auxiliary chamber disposed above said connection and the reservoir chamber therebelow; readily removable closure means for the upper end of said jack, mounted on said side walls independent of said cylinder, enclosing said auxiliary space, overlying the upper end of said cylinder, and provided opposite said cylinder with an opening for the passage of a ram therethrough; the parts being formed to provide a communication between the upper end of the cylinder space and said auxiliary chamber; a ram, disposed within said cylinder, and extending through said opening; and packing means, sealing said opening about said ram.

4. A hydraulic jack, comprising: a reservoir casing, having a base and side walls; a ram cylinder, disposed within said reservoir casing, having its lower end fixed to said base, and having its upper end fixed to said side walls by a connection apertured to afford communication between an auxiliary chamber disposed above said connection and the reservoir chamber therebelow; closure means for the upper end of said jack, mounted independent of said cylinder, enclosing said auxiliary space, overlying the upper end of said cylinder, and provided opposite said cylinder with an opening for the passage of a ram therethrough; the parts being formed to provide a communication between the upper end of the cylinder space and said auxiliary chamber; a ram, disposed within said cylinder, and extending through said opening; and packing means, sealing said opening about said ram; said side walls sloping inwardly toward said cylinder adjacent said connection.

5. A hydraulic jack, comprising: a reservoir casing, having integral base and side walls; a ram cylinder, disposed within said reservoir casing, integral with said reservoir, having its lower end integrally connected to said base, and having its upper end integrally connected to said side walls by a connection apertured to afford communication between an auxiliary chamber disposed above said connection and the reservoir chamber therebelow; readily removable closure means for the upper end of said jack, disposed above said connection, enclosing said auxiliary space, overlying the upper end of said cylinder, and provided opposite said cylinder with an opening for the passage of a ram therethrough; the parts being formed to provide a communication between the upper end of the cylinder space and said auxiliary chamber; a ram, disposed within said cylinder, and extending through said opening; and packing means, sealing said opening about said ram.

6. A hydraulic jack, comprising: a reservoir casing, having integral base and side walls; a ram cylinder, disposed within said reservoir casing, integral with said reservoir, having its lower end integrally connected to said base, and having its upper end integrally connected to said side walls by a connection apertured to afford communication between an auxiliary chamber disposed above said connection and the reservoir chamber therebelow; readily removable closure means for the upper end of said jack, mounted independent of said cylinder, enclosing said auxiliary space, overlying the upper end of said cylinder, and provided opposite said cylinder with an opening for the passage of a ram therethrough; the parts being formed to provide a communication between the upper end of the cylinder space and said auxiliary chamber; a ram, disposed within said cylinder, and extending through said opening; and packing means, sealing said opening about said ram.

7. A hydraulic jack, comprising: a base; a vertical tubular shell, rising from said base, and having its lower end fixedly anchored to said base; a vertical ram cylinder, rising from said base, disposed within said shell and spaced from said shell, having its lower end fixedly anchored to said base, and defining with said shell a vertical annular reservoir between said cylinder and said shell; a ram, operatively disposed in said cylinder; a connection, extending laterally between the upper part of said cylinder and the upper part of said shell, acting to brace the upper part of said cylinder laterally from the upper part of said shell, and apertured, whereby said connection does not close said reservoir; a top, including an upper guide for said ram, carried by and extending laterally from the upper part of said shell above and spaced vertically from said connection, and acting as the closure for said reservoir; and means for forcing fluid from said reservoir into said cylinder below said ram to elevate said ram.

8. A hydraulic jack, comprising: a base; a vertical tubular shell, rising from said base, and having its lower end fixedly anchored to said base; a vertical ram cylinder, rising from said base, disposed within said shell spaced from said shell, having its lower end fixedly anchored to said base, and defining with said shell a vertical annular reservoir between said cylinder and said shell; a ram, operatively disposed in said cylinder; a connection, extending laterally between the upper part of said cylinder and the upper part of said shell, acting to brace the upper part of said cylinder laterally from the upper part of said shell, and apertured, whereby said connection does not close said reservoir; a top, including an upper guide for said ram, carried by and extending laterally from the upper part of said shell

above and spaced vertically from said connection, and acting as the closure for said reservoir; said cylinder stopping short of said top, whereby the part of said reservoir above said connection is in communication with the interior of said cylinder between the upper edge of said cylinder and said top; and means for forcing fluid from said reservoir into said cylinder below said ram to elevate said ram.

9. A hydraulic jack, comprising: a base; a vertical tubular shell, rising from said base, and having its lower end fixedly anchored to said base; a vertical ram cylinder, rising from said base, disposed within said shell spaced from said shell, having its lower end fixedly anchored to said base, and defining with said shell a vertical annular reservoir between said cylinder and said shell; a ram, operatively disposed in said cylinder; a connection, extending laterally between the upper part of said cylinder and the upper part of said shell, acting to brace the upper part of said cylinder laterally from the upper part of said shell, and apertured, whereby said connection does not close said reservoir; a top, including an upper guide for said ram, carried by and extending laterally from the upper part of said shell above and spaced vertically from said connection, and acting as the closure for said reservoir; said shell being of substantially greater diameter at its lower part than at its upper part, and converging, to transmit lateral thrust on the upper part of said shell to said base diagonally; and means for forcing fluid from said reservoir into said cylinder below said ram to elevate said ram.

10. A hydraulic jack, comprising: a base; a vertical tubular shell, rising from said base, and having its lower end fixedly anchored to said base; a unitary vertical ram cylinder, rising from said base, disposed within said shell spaced from said shell, having its lower end fixedly anchored to said base, and defining with said shell a vertical annular reservoir between said cylinder and said shell; a ram, operatively disposed in said cylinder; a connection, extending laterally between the upper part of said cylinder and the upper part of said shell, rigidly fixing the upper part of said shell to the upper part of said cylinder and acting to brace the upper part of said cylinder laterally from the upper part of said shell, and apertured, whereby said connection does not close said reservoir; a top, including an upper guide for said ram, carried by and extending laterally from the upper part of said shell above and spaced vertically from said connection, and acting as the closure for said reservoir; and means for forcing fluid from said reservoir into said cylinder below said ram to elevate said ram.

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