

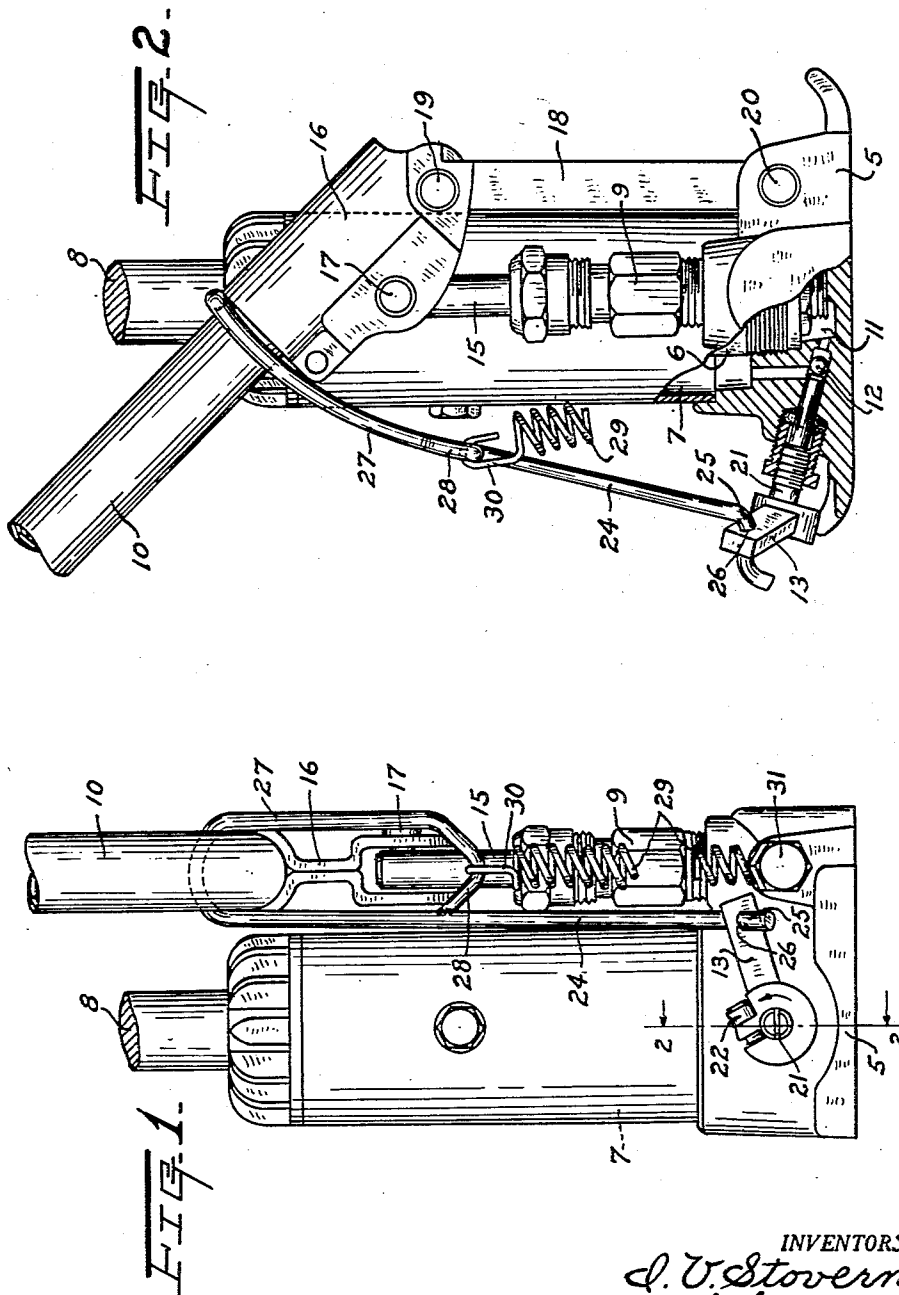
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HYDRAULIC JACK RELEASE-VALVE ACTUATOR

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HYDRAULIC JACK RELEASE VALVE ACTUATOR

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1 Claim. (Cl. 60—52)

The present invention relates generally to improvements in load lifting and lowering mechanisms, and relates more specifically to improvements in the construction and operation of release valve actuators especially applicable to hydraulic jacks.

The primary object of this invention is to provide an improved hydraulic jack release valve actuator which is simple in construction and highly effective in operation.

In most of the small portable hydraulic jacks universally used primarily for road vehicles, the jack assemblage comprises a base having an upright cylinder usually surrounded by a liquid reservoir both of which are mounted on the base, and a pump also mounted upon the common base and being operable by a lever to transfer liquid under pressure from the reservoir to the cylinder in order to elevate the load lifting plunger or piston which is reciprocable within the cylinder. In order to permit lowering of the piston a manually operable release valve for returning liquid from the piston displacement chamber of the cylinder to the reservoir is also provided near the base and remote from the pump actuating lever, and when the jack is being applied in relatively inaccessible places it is difficult and also dangerous for the operator to manipulate the release valve in order to lower the load.

It is therefore a more specific important object of the present invention to provide a release valve actuator for such portable hydraulic jack assemblages, which is conveniently and safely operable.

Another important object of this invention is to provide an improved release valve actuating attachment which is adapted to be readily associated with various portable hydraulic jack units of the above mentioned type so as to facilitate operation of the release valves thereof.

A further important object of the invention is to provide a simple but dependable hydraulic jack release valve actuating device which is operable by the same lever which actuates the pressure supply pump of the jack unit.

Still another important object of our invention is to provide means for quickly and effectively manipulating the release valve of a hydraulic jack from a locality remote from the valve confining base of the jack, in order to open and close the release valve.

These and other more specific objects and advantages of the invention will be apparent from the following detailed description from which it will be noted that the gist of the improvement is, the provision of an element connecting the pump operating member of an hydraulic jack with the pressure release valve through a lost motion connection which is formed to actuate the release valve only when the pump operating member is moved beyond its normal range, together with means for reversely actuating the release valve when the pump operating member is returned to its normal operating range of movement.

A clear conception of the features constituting the present improvement and of the construction and operation of a typical hydraulic jack and release valve actuator

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embodying the invention, may be had by referring to the drawing accompanying and forming a part of this specification in which like reference characters designate the same or similar parts in the various views.

5 Fig. 1 is a front elevation of a portable hydraulic jack and pump assemblage, having portions of the load lifting piston, pump manipulating hand lever, and of the release valve return spring broken away; and

10 Fig. 2 is a part sectional side view of the jack shown in Fig. 1, the section having been taken along the line 2-2.

While the invention has been illustrated and described herein as having been applied to a particular type of portable hydraulic jack having the liquid supply reservoir surrounding the piston confining cylinder, it is not the intent to restrict the improvement to such an assemblage; and it is also contemplated that specific descriptive terms be given the broadest possible interpretation consistent with the actual disclosure.

Referring to the drawing, the typical portable hydraulic jack shown therein by way of illustration comprises in general, a base 5 having an upright cylinder 6 and a liquid supply reservoir 7 mounted thereon; a load lifting member or piston 8 movable upwardly within the cylinder 6 by a pump 9 also carried by the base 5 and which is operable by a hand lever 10 to transfer liquid from the reservoir 7 to a pressure chamber 11 formed in the base beneath the piston; and a ball type pressure release valve 12 confined within the base 5 and being operable by an oscillatory handle or arm 13 to permit liquid from the chamber 11 to flow freely from the chamber 11 into the reservoir 7 in order to permit the piston 8 to descend; all in a well known manner.

The pump 9 has a reciprocable plunger 15 connected to a fitting 16 at the fulcrum end of the lever 10 by means of a pivot 17, and the end of this fitting 16 remote from the lever 10 is swingably attached to the upper end of a link 18 by a pivot pin 19 while the lower end of the link 18 is swingably attached to the base 5 by another pivot pin 20. The ball release valve 12 is normally held in closed position by a threaded spindle 21 to the outer end of which the actuating arm 13 is adjustably secured by a clamping screw 22. This clamping screw enables the arm 13 to be adjusted to various positions about the axis of the spindle 21, but in the prior jacks of this type a handle of any other type was applied to the spindle 21 in place of this oscillatory arm. The screw threads on the spindle 21 are of the quick pitch type whereby slight rotation thereof will produce considerable axial displacement.

50 In accordance with the present invention, the swinging end of the release valve actuating arm 13 is connected with the pump actuating hand lever 10 by a connecting element or link 24 having a hook 25 at its lower end formed for insertion through an opening 26 in the swinging end of the arm 13, and provided at its upper portion with a loop 27 providing a lost motion connection surrounding the pump actuating lever 10 adjacent to the fitting 16. The link element 24 may be formed of sturdy rod stock and the lower end 28 of the loop is preferably of V-formation as shown in Fig. 1. A helical tension spring 29 has a hook 30 at its upper end engaging the V-shaped lower end 28 of the loop 27, while its lower end is clamped to the base 5 in any suitable manner, as by means of one of the closure plugs 31 for the pump valves, and the spring 29 constantly urges the link 24 and the arm 13 downwardly toward closed position of the valve 12.

During normal use and operation of the improved hydraulic jack assemblage, the base may be positioned with the piston 8 lowered so as to bring the latter in proper vertical alinement with the load which is to be lifted, and with the release valve 12 closed, the hand

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lever 10 may be oscillated in the lower portion of the loop 27 to cause the pump 9 to withdraw liquid from the reservoir 7 and to inject this liquid under pressure into the displacement chamber 11 beneath the piston 8. The piston 8 will then rise and eventually engage and lift the load, and while the hand lever 10 is being thus manipulated the spring 29 and the release valve actuating arm 13 should be so set that the release valve 12 will not open and that the lever 10 will not engage the upper end of the loop 27. In other words, the adjustment of the arm 13 and the tension of the spring 29 should be such that the range of normal movement of the lever 10 will be less than the length of the interior of the loop 27 and will be confined to the lower portion of this loop.

After a load has been thus elevated, it may either be held while releasing the hand lever 10, or it may be lowered by swinging this lever upwardly beyond its normal range of movement into the position illustrated in Fig. 2. Here the lever 10 has engaged the upper extremity of the loop 27 and has lifted the link 24 sufficiently to cause the arm 13 to retract the spindle 21 by virtue of its quick pitch threads, sufficiently to permit the ball valve 12 to open and to allow liquid to flow freely from the piston displacement chamber 11 into the receiver 7. The piston 8 will then drop due to the load resting thereon and by gravity, until it either reaches its lowermost position, or until the lever 10 is lowered to release the link 24 whereupon the spring 29 will promptly function to effect closing of the release valve 12 and will thereby trap some liquid within the chamber 11 so as to hold the load in a lower position.

From the foregoing detailed description it should be apparent that the present invention in fact provides simple but highly effective means for safely actuating the release valve 12 with the aid of the pump operating member or lever 10 without in any manner interfering with the normal functioning of this lever. The release valve may be thus actuated from a remote locality without requiring the operator to crawl under the load, and it may also be quickly manipulated to either partially or completely lower the jack piston 8. The entire assemblage is simple and compact, and the improved release valve controlling mechanism may be readily applied as an accessory to existing hydraulic jacks of the same general type at but slight additional cost. This release valve actuator is also applicable to jacks permanently, semi-permanently, or temporarily mounted on, in, or under, connected with, or to, or used as a component of, or an attachment to,

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another device, machine, implement or assembly. The invention has gone into highly satisfactory and successful use, and may obviously be applied to hydraulic jacks of various styles and capacities.

It should be understood that it is not desired to limit this invention to the exact details of construction or to the precise mode of operation herein specifically shown and described, for various modifications within the scope of the appended claims may occur to persons skilled in the art.

We claim:

In combination, a hydraulic jack having an upright cylinder and a liquid supply reservoir mounted upon a base, a load lifting piston reciprocable within said cylinder, a pump also mounted upon said base and having a plunger reciprocable to transfer liquid under pressure from said reservoir to said cylinder to elevate said piston, a hand lever having a pump plunger actuating fitting pivotally attached to the plunger and swingable about a fulcrum pivot carried by said base and also having a handle secured to said fitting and extending away from said pivot, a pressure release valve for said cylinder rotatable within said base and having an oscillatory actuating arm extending toward said pump, a link having its lower end pivotally attached to the swinging end of said arm and its upper end portion provided with an elongated loop arcuately curved about the axis of said fitting pivot, said link loop surrounding said handle and resting against said fitting and being operable by oscillatory movement of the handle upwardly beyond its normal range of travel when actuating said pump to swing said arm and open said release valve to effect lowering of said piston, and a helical tension spring connecting the lower end of said loop with said base and being operable to cause said link to close said release valve when said handle is returned to its normal pump actuating travel range.

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