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LIFTING ELEMENT FOR HYDRAULIC JACKS

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Fig. 1.

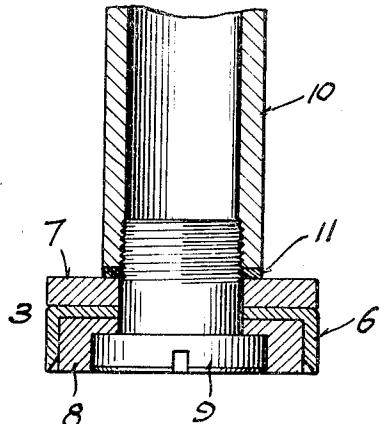


Fig. 2.

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LIFTING ELEMENT FOR HYDRAULIC JACKS

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Serial No. 321,161

1 Claim. (Cl. 254—93)

This invention relates to an improvement in hydraulic jacks of the type especially designed and adapted for use with a motor vehicle although also adaptable for various other uses 5 and applications.

The present application is a continuation in part of the co-pending application of Harry W. Bolens, for Hydraulic jacks, filed July 20, 1927, Serial No. 207,129 and issued April 16, 1929, as

10 Patent 1,709,000.

It is well known that heavy pressures are built up in the hydraulic jack and especially beneath the piston in the lifting cylinder thereof when the jack is being utilized to raise a heavy load. 15 In an attempt to prevent the escape of this heavy pressure past the piston, many types of packing have been proposed but none have been found to completely prevent the seepage of the oil or other liquid past the piston and frequently through the piston to the exterior. This difficulty is especially troublesome in hydraulic jacks which utilize a hollow piston rod in which an extension member is fitted as such construction usually necessitates a detachable piston assembly at the lower end of the rod and as notwithstanding all prior expedients designed to prevent leakage of the oil through the piston, some leakage has been found to occur in this type. Where these jacks are used in connection 20 with automobiles, they are stored in a tool box or beneath the seat of the automobile and leakage of the oil is particularly annoying and undesirable.

One of the principal objects of the present 35 invention is to provide a hydraulic jack construction having a lifting piston assembly so constructed and organized as to prevent the escape or loss of the oil or other liquid used. While having this advantage, the piston construction is such as to permit of the use of an 40 extension member to increase the range of action of the jack.

A further object of the invention resides in the provision of a jack having these advantages 45 and capacities and which is of simple and durable construction, reliable and effective in operation and easy and comparatively inexpensive to manufacture.

Another object is to provide a novel piston 50 structure permitting variation of the lifting range of the pair while retaining the features of strength and rigidity.

Other objects and advantages reside in certain novel features of the construction, arrangement and combination of parts which will be

hereinafter more fully described and particularly pointed out in the appended claim, reference being had to the accompanying drawing forming a part of this specification, and in which:

Figure 1 is a view partly in side elevation and partly in longitudinal central vertical section showing a hydraulic jack embodying the present invention; and

Figure 2 is a fragmentary sectional view taken 65 in the same plane as the parts shown in section of Figure 1 and illustrating on an enlarged scale the novel piston construction embodying the present invention.

In the drawing, the invention is shown embodied in one type of jack for the sake of illustration, but it is to be understood that the novel piston construction embodying this invention may be employed in the various types of jacks 70 to equal advantage.

As shown in the drawing, the jack comprises a base 1 carrying an upwardly extending jack cylinder 2 in which a lifting piston designated generally at 3 is fitted. In this type of jack the space 2^a above the piston constitutes the reservoir of the liquid and for the purpose of transferring the liquid from this reservoir space 2^a to the space beneath the piston 3 and thereby elevating the piston 3, a manually operable pump designated generally at 4 is provided and is swiveled to the base. This pump has valve controlled communication with the spaces of the cylinder 2 above and below the piston 3, as more fully shown and described in the co-pending 80 application of Harry W. Bolens, for Hydraulic jack, filed July 20, 1927, Serial No. 207,129, now Patent No. 1,709,000 to which reference is had for a full disclosure of these features.

The present invention is concerned more particularly with the construction of the lifting piston 3 which prevents escape or leakage of the oil and which insures efficient jack operation.

The piston 3 includes a cup shaped washer 6 confined between metal plates 7 and 8 and together with these plates 7 and 8 mounted on a stud 9. The plate 8 may, if desired, be flanged or otherwise suitably shaped to provide a filler which backs up and sustains the washer 6 at all times. This is an important feature as the buckling of the washer 6 which would occur in the absence of such a filler structure would defeat the operation of the jack. The stud 9 is threaded into or otherwise secured to the lower end of the hollow piston rod 10. Considerable 105 difficulty has been experienced in constructions of

this kind by reason of the oil or other fluid escaping past the piston, the undesirable escape of the fluid occurring not so much between the outer periphery of the washer 6 and the inner wall 5 of the cylinder as in between the cup shaped washer and the means utilized to mount it on the lower end of the hollow piston, and thence past the piston or through the hollow piston, to the exterior. The present invention entirely 10 overcomes this long standing difficulty by providing a washer 11, preferably of soft deformable metal, such as lead, between the upper metal plate 7 or other rigid part of the piston mounting and the lower end of the piston rod 15. The metal of this washer when subjected to the compression of the parts between which it is interposed is deformed into intimate fluid tight engagement with the stud 9, plate 7 and hollow piston rod 10. In this way the interstice 20 or crevice from the space beneath the piston 3 to above the piston or through the hollow piston rod 10 to the exterior is completely and effectively blocked.

As previously indicated, the piston rod 10 is 25 hollow to adapt it to receive an extension member 15 which may be in the form of a rod having a free sliding fit in the piston rod 10, and formed at its lower end with a smooth guiding portion 16. For the major portion of its extent, 30 the extension member 15 is provided with an external screw thread which meshes or interfits with the internal screw threads of a nut 17 provided at the upper end of the hollow piston rod 10. The nut 17 may be integrally formed 35 with the hollow piston rod 10 as hereinafter described or it may be separately formed and held in position by the external coil springs which operate to return the lifting element and its piston to lowered position as more fully set 40 forth in the application of Harry W. Bolens for hydraulic jacks executed under even date herewith. In either construction, the piston rod 10 is hollow to accommodate an extension member and due to its hollow formation provides a 45 path of escape for the oil which applicant has effectively blocked.

In the construction shown, the piston rod 10 comprises a cylindrical tube or sleeve of uniform internal diameter from its lower end to a 50 point adjacent to but spaced from its upper end, the upper end being internally enlarged and thickened and formed with internal screw threads to provide the nut 17. The portion 16 of the extension member not only provides a 55 guide and bearing for the extension member on the hollow piston rod 10 in all adjustments, but also limits the extent to which the extension member may be projected beyond the piston rod. A head 18 is threaded or otherwise suitably 60

fixed to the reduced upper end 15a of the extension member 15.

In assembling these parts, the extension member 15 is inserted up through the open lower end of the piston rod 10 prior to the attachment 80 of the piston assembly thereto, but after the extension member 10 is threaded through the nut 17, then the piston 3 is assembled with the rod 10 and the head 15 is attached.

With this construction the extension member 85 15 may be completely housed in the hollow piston rod to impart to the jack the small vertical dimension desirable in lifting objects which are positioned close to the ground and yet by extending the member 15 the jack may also be 90 used for raising relatively high objects. The member 15 is extended by grasping the head 18 and appropriately turning the threads of the extension member through the nut 17. But even when the extension member is full projected, it has a firm and rigid bearing on the piston rod due to the action of its guide and bearing 16 which supplements the action of the nut 17 and the screw threads of the piston rod.

It is also to be noted that a connecting plate 100 20 may be positioned between the head 18 and the upper end of the piston rod 10 to provide for the attachment of the coil springs which lower the piston rod and associated parts, all as fully set forth in the pending applications above referred to. The spring feature is not claimed in this application but it is well to note the adaptability of this piston or lifting element construction to coact with the spring return.

The piston rod 10 slides through a stuffing 110 box 21 provided at the upper end of the cylinder 2 and in the lowermost position of the piston, the upper end of the piston rod 10 is located just above the stuffing box 21.

The invention claimed is:

A jack having an upright support, a tubular lifting member slidably mounted in said support and extending into the same through its upper end, said lifting member having an integral internal enlargement at its upper end provided 115 with screw threads, the interior of said member below said threads being otherwise smooth throughout the length of the same, and an auxiliary lifting member extending into the tubular member through the upper end thereof and having screw threads cooperable with those of the internal enlargement, said auxiliary member also having at its lower end a smooth guide portion which has a snug fit in the smooth portion of the tubular member to guide the auxiliary member in its movements with respect to the tubular member.

HARRY W. BOLENS.