Sept. 17, 1929. A. C. SPITZNAGEL 1,728,452

HYDRAULIC LIFT DEVICE

Filed Dec. 11, 1926

Fig. 1.

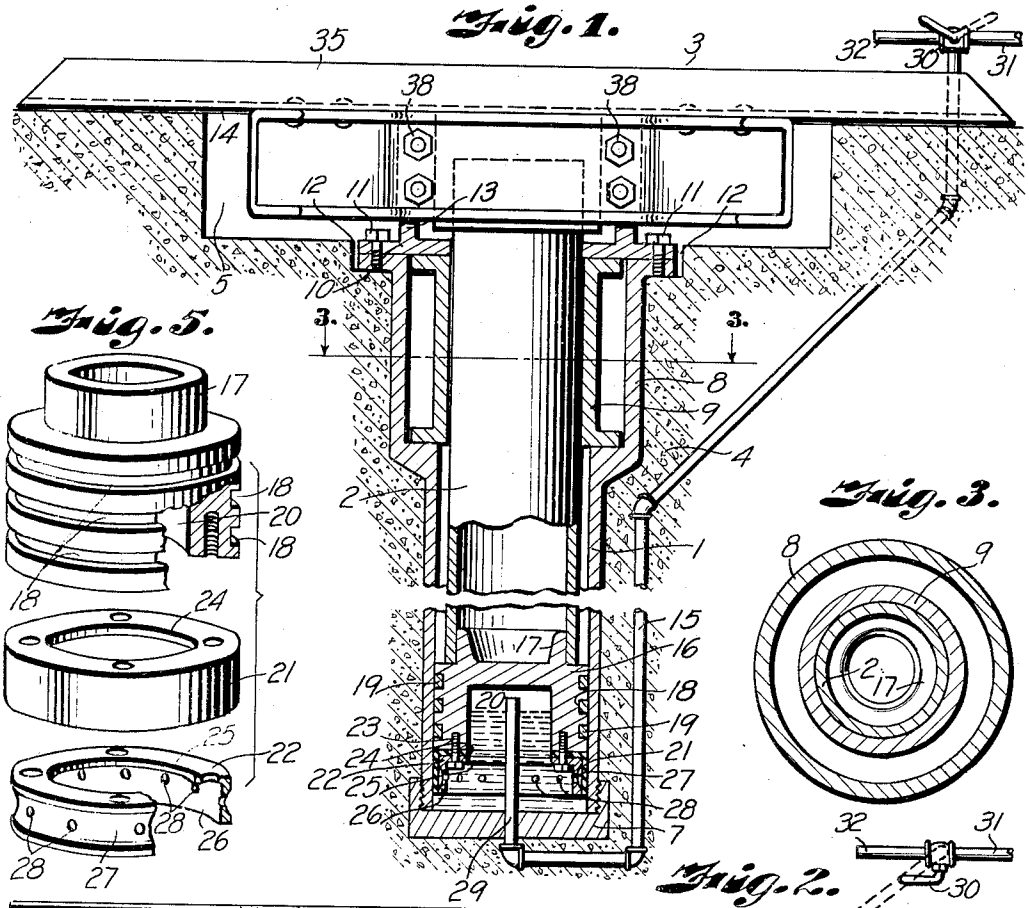


Fig. 5.

Fig. 3.

Fig. 2.

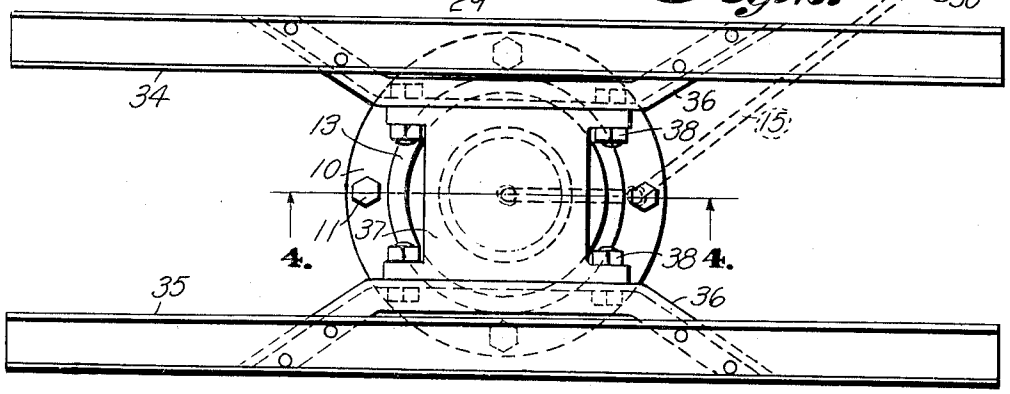
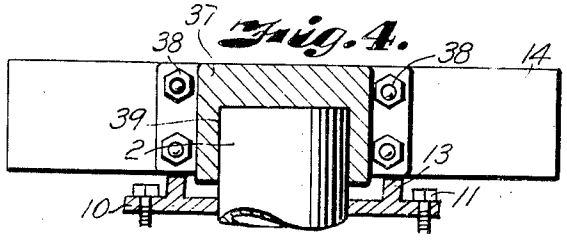


Fig. 4.



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Patented Sept. 17, 1929 1,728,452

UNITED STATES PATENT OFFICE

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HYDRAULIC LIFT DEVICE

Application filed December 11, 1926. Serial No. 154,142.

The invention relates to lifting devices and particularly to devices of this character which are of the fluid actuated type and is herein shown as applied to a device for lifting machines such as, for instance, automobiles, so that access to the underside thereof may be readily had.

It is one of the principal objects of the invention to reduce the frictional resistance between the lifting element and the casing in which this element operates and to particularly reduce this resistance at the location at which the pressure is applied.

It is a further object of the invention to provide for the lubrication of the lifting element when in lowered position preparatory to a lifting operation. In adidtion to the above it is a further object to provide for cushioning the plunger against sudden jar as it assumes its extreme lowered position and also to provide for an effective seal between the plunger and the casing in which the plunger is operable.

The invention has as a further object the provision of an arrangement whereby the plunger may be readily removed from the casing and from the head when this is found necessary or desirable.

It is a further feature to provide a packing element between the head of the plunger and the casing in which the plunger operates, which packing is forced against the wall of the casing by the pressure of the fluid thereon and which is also properly lubricated so as to increase its period of use.

In accomplishing these objects I have provided improved details of structure, the preferred forms of which are illustrated in the accompanying drawings wherein:

Fig. 1 is a side view of the device partly in section and partly in elevation for the purpose of better illustration.

Fig. 2 is a top plan view of the device.

Fig. 3 is a section on the line 3—3 of Fig. 1.

Fig. 4 is a section on the line 4—4 of Fig. 2,

Fig. 5 is a perspective view of the plunger sealing members.

In the embodiment of the invention illustrated the use of a casing 1, plunger or lifting element 2 and platform 3 is contemplated. The casing is preferably embedded in a concrete foundation 4 which is formed to provide the depression 5 provided for the reception of certain elements connected to the plunger and to which the platform is secured. The casing 1 is sealed at its lower end by means of the cap 7 and has its upper end enlarged as at 8 to receive the removable sleeve 9 which provides a guide for the plunger at this end of the casing during its movement within the casing.

A collar 10 is arranged at the upper extremity of the plunger and is secured through the medium of the screws 11 to the flange 12 of the casing and said collar is further provided with the annular upwardly extending flange 13 against which the underframe 14 of the platform abuts when the plunger and its associated devices reach their lowermost position. This collar provides the additional function of providing a means for maintaining the lower end of the plunger a certain prescribed distance from the end of the casing when said plunger is in its lowered position, to thereby prevent the oil confined at this last mentioned end of the casing from being forced through the fluid pressure passage 15 during the lowering operation of the plunger. The plunger 2 has a head generally designated 16 associated therewith for operation within the casing and said head is provided with the extension 17 which in the present instance is fitted into the open end of the plunger. The head 16 is of a somewhat larger diameter than the remainder of the plunger and is thus formed to reduce the contacting area of the plunger and casing and provides a space between the plunger and the casing which space extends

between the head and the sleeve 9 and materially reduces the contacting area of the plunger and casing and correspondingly reduces the frictional resistance between the plunger and the casing and also reduces the pressure necessary to accomplish the lifting of the plunger and the weight applied thereto.

The head 16 is formed to provide the grooves 18—18 for the reception of the packing rings 19—19 and is further provided with the chamber 20. A cup 21 and the retainer ring 22 are employed and attached by means of the screws 23—23 to the underside or end of the head 16 and project downwardly relatively to said end of the head and are held in spaced relation to the lower end of the casing when the plunger is in its lower position by means of the flange 13 of the collar 10. The cup 21 and retainer ring 22 are respectively provided with openings 24 and 25 which register with the opening of the chamber 20 to allow the introduction of the lubricant to said chamber when the plunger is lowered. The cup 21 is preferably formed of some suitable fibrous material and the depending flange 26 of the ring 22 is formed with an annular groove or recess 27 and said depending flange 26 is provided with a plurality of apertures 28 leading to the recess 27, which provide passages for the lubricant and fluid under pressure so that these may act upon the cup or packing ring 21 and force it against the wall of the casing. A pipe 29 leads to the interior of the casing and terminates in the chamber 20 above the liquid level in the chamber when the plunger is in its lowermost position.

This pipe 29 leads from the interior of the casing to a valve 30 which is of the two way type and is connected by means of the pipe extension 31 to a source of fluid pressure such as compressed air.

A blow off pipe connection 32 is also connected with the valve so that the valve may be operated to admit fluid under pressure to the casing below the plunger head to raise the plunger or allow the escape of pressure from the casing to permit the lowering of said plunger.

It is manifest that when the valve is arranged to admit pressure to the casing and the plunger is in its lowered position the pressure existing in the chamber 20 will be applied to the lubricant in the chamber and below the chamber and will simultaneously lift the plunger and force lubricant under pressure through the apertures 28 into the annular recess causing the packing ring 22 to be forced against the wall of the casing and thus provide a fluid tight connection between the wall and ring. It is further manifest that after the lower end of the head has been raised sufficiently out of the lubricant that the fluid pressure will then be transmitted to the ring through the apertures 28 and by virtue of the annular groove or recess 27 exert uniform pressure throughout the circumference of the packing ring. It is further evident that as the head of the plunger enters the lubricant during its downward travel, the lubricant combined with the pressure contained in the chamber of the head will act as a cushion and prevent the plunger from being brought to an abrupt stop and consequently will prevent jarring and possible injury to the lifting device or the machine carried thereby. The platform generally designated 3 and the underframe 14 consists of the parallel rails 34 and 35 which are respectively attached to the upper end of the plunger by means of the brackets 36—36 which are in turn connected to the cap 37 by means of the bolts 38—38. The cap 37 is recessed at 39 to receive the end of the plunger or lifting element.

From the foregoing description of the construction and operation of the device it is evident that a lifting device is provided in which the frictional resistance between the parts is reduced to a minimum and in which both the fluid pressure and the liquid or lubricant is applied equally to the packing ring throughout the entire circumference of the ring, and that the plunger is cushioned in its travel in a downward direction.

What I claim and desire to secure by Letters Patent is:

1. A device of the character described, comprising a tubular casing having a sealed lower end and an annular chamber in its upper end, a sleeve seated in said chamber and projecting inwardly beyond the wall of the casing, a plunger of substantially less diameter than the casing movable in guided contact with the said sleeve, a collar on said sleeve having an upstanding stop flange, a fluid tight head on the lower end of the plunger in sealed relation to the casing, a valved pressure medium conduit communicating with the casing below said head, and a platform on the plunger engageable with said collar flange to limit downward movement of the plunger.

2. A device of the character described including a tubular casing enlarged at its upper end to form an annular chamber, a sleeve of less diameter than the casing having end flanges located in said chamber, a collar attached to the upper end of the casing, confining the sleeve, a plunger slidable on the sleeve having a fluid tight head in sealed relation with the casing, means for conducting fluid to and from the casing beneath said head, and load bearing means on the upper end of the plunger.

3. A device of the character described including a tubular casing enlarged at its upper end to form an annular chamber, a

sleeve of less diameter than the casing having end flanges located in said chamber, a collar attached to the upper end of the casing, confining the sleeve, and having an upstanding flange, a plunger slidable on the sleeve having a fluid tight head in sealed relation with the casing, means for conducting fluid to and from the casing beneath said head, and load bearing means on the upper end of the plunger adapted for stop engagement with the collar flange to limit downward travel of the plunger.

In testimony whereof I affix my signature.

ALFRED C. SPITZNAGEL.