Feb. 25, 1958 R. W. SEBENICK 2,824,424

PORTABLE HYDRAULICALLY ACTUATED MECHANISM

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Fig. 1.

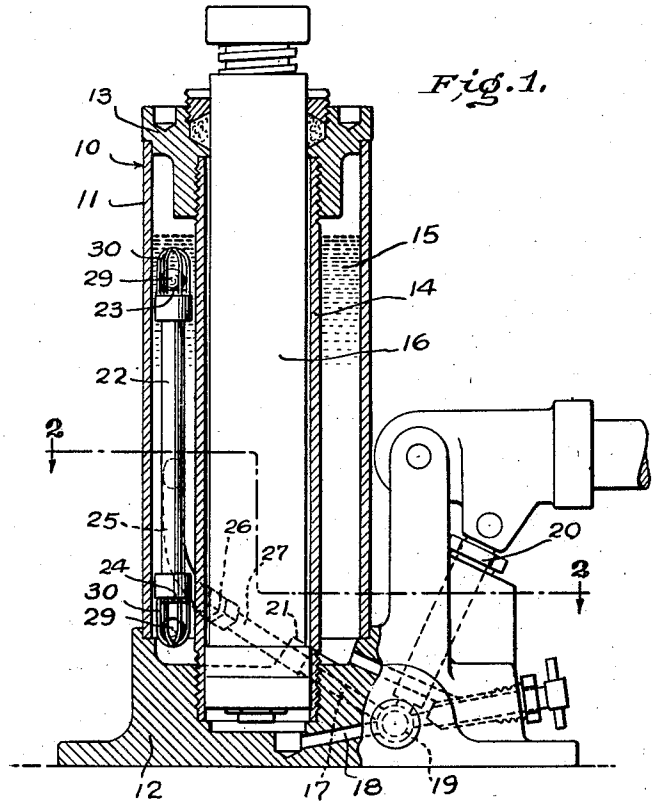


Fig. 3.

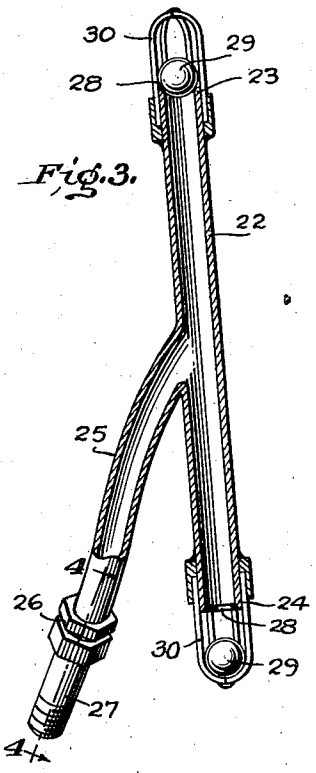


Fig. 2.

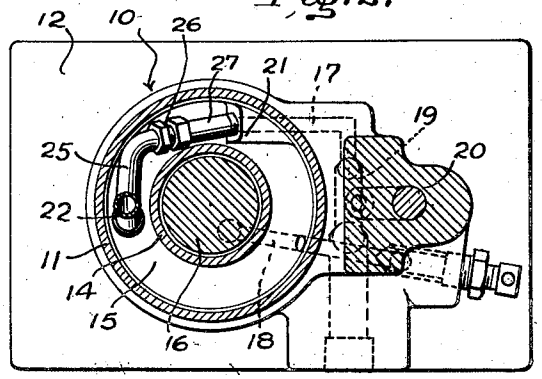
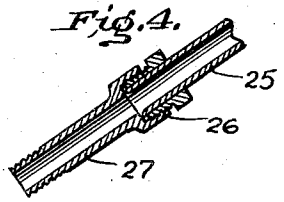


Fig. 4.



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Fig. 5.

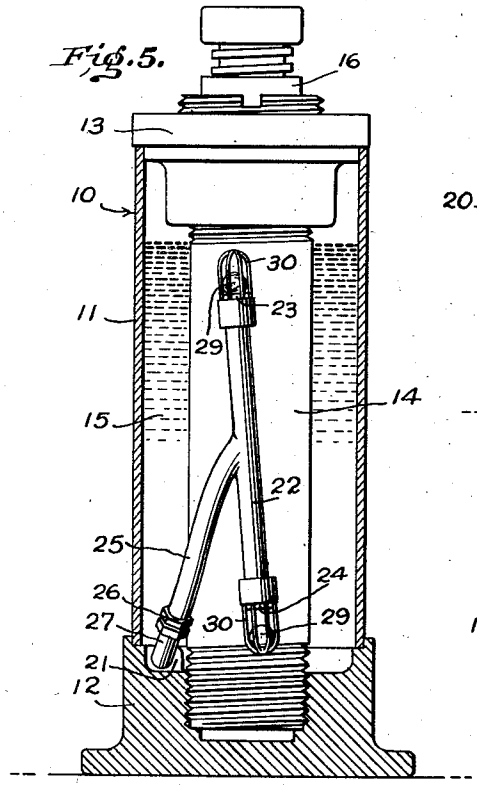


Fig. 6.

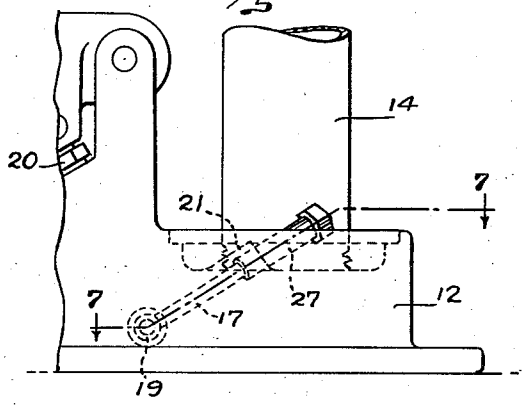


Fig. 7.

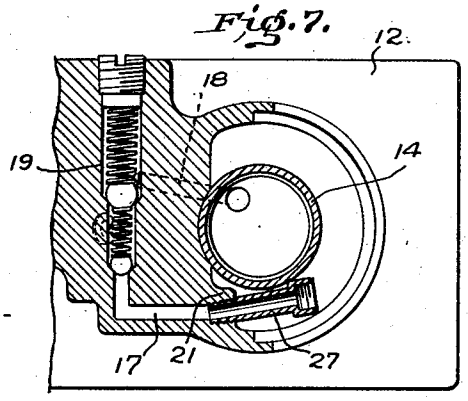
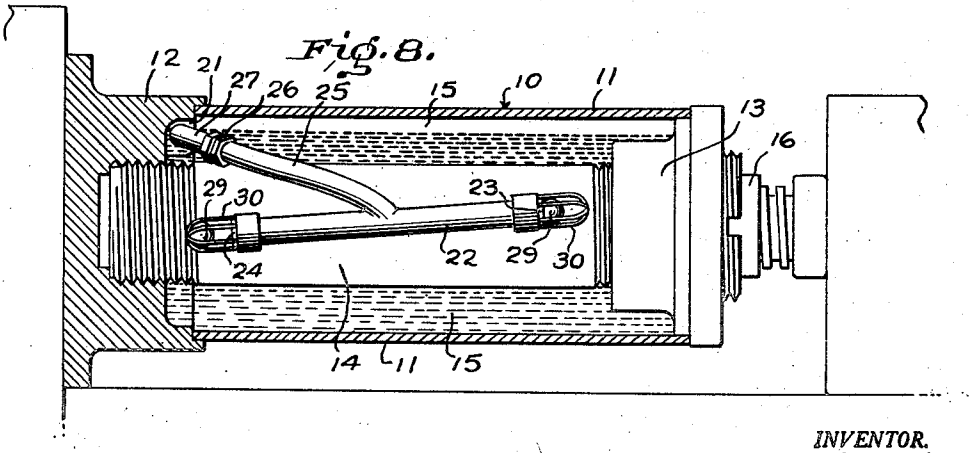


Fig. 8.



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United States Patent Office 2,824,424 Patented Feb. 25, 1958

2,824,424

PORTABLE HYDRAULICALLY ACTUATED MECHANISM

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Application June 21, 1956, Serial No. 592,792

2 Claims. (Cl. 60—52)

The present invention relates to hydraulically actuated mechanisms and, more particularly, to portable hydraulic tools in the nature of jacks which, besides being used in upright positions for lifting heavy loads, are used in other various positions for exerting great pressures.

An object of the invention is to provide a novel and improved hydraulically actuated mechanism having means embodied therein whereby said mechanism may be used in any position from upright to inverted without affecting operation of its hydraulic medium.

Another object of the invention is to provide a tool of the character indicated having ports of conduits at different locations in a hydraulic fluid reservoir of said tool and said conduits communicating said reservoir with a pump mechanism also of said tool so as to maintain at least one of said ports below the level of fluid in the reservoir independent of the position of the tool.

A further object of the invention is to provide, in a tool as above set forth, a gravity-actuated valve at each port arranged for automatically opening a port submerged below the level of the fluid in the reservoir and for automatically closing a port above said level of fluid.

A still further object of the invention is to provide a tool as outlined above wherein said conduits with gravity-actuated valves thereon are in the form of an attachment at the normal reservoir opening of a passageway leading to the pump chamber of a conventional hydraulic jack.

It is also an object of the invention to provide a device as set forth in the preceding objects which is simple and substantial in construction, economical to manufacture, and thoroughly efficient and practical in use.

These, together with various auxiliary features and objects of the invention which will later become apparent as the following description proceeds, are attained by the present invention, a preferred embodiment of which has been illustrated by way of example only in the accompanying drawings, wherein:

Figure 1 is a vertical, longitudinal, sectional view through a conventional hydraulic jack showing the same in upright position and showing the present invention attached and in elevation;

Figure 2 is a horizontal cross section of same, taken on line 2—2 of Figure 1;

Figure 3 is a sectional view showing the improved attachment removed from the jack and with a portion of the attachment in elevation;

Figure 4 is a fragmentary section taken on line 4—4 of Figure 3;

Figure 5 is also a vertical, longitudinal, sectional and elevational view of the conventional jack with the improvement attached, but is taken substantially at ninety degrees from that shown in Figure 1;

Figure 6 is a fragmentary elevation of the lower portion of the jack with the sleeve of the housing of the jack removed and showing the manner of attaching the present invention to the jack;

Figure 7 is a sectional view taken on line 7—7 of Figure 6; and

Figure 8 is a view similar to Figure 5, but showing the jack positioned horizontally instead of vertically.

Referring now more specifically to the accompanying drawings wherein like numerals designate similar parts throughout the various views, there is indicated generally by the numeral 10 a portable hydraulically actuated mechanism in the form of a jack and including an outer sleeve 11 clamped at its opposite ends between a base member 12 and a head 13 by an inner sleeve 14 threadably engaging said base and head at its opposite ends. In the space between the inner and outer sleeves 11 and 14, the base 12, and the head 13, there is provided an annular hydraulic fluid chamber or reservoir 15, while in the inner sleeve 14 and the head 13, there is slidably mounted a plunger 16 that protrudes upwardly through and beyond said head. Passageways 17 and 18 in the base member 12 communicate a laterally extending check valve chamber 19 of a pump mechanism 20 rearwardly positioned on said base member, with the reservoir 15 and the interior of the inner sleeve or cylinder 14, respectively.

The passageway 17, which is angled upwardly as it extends forwardly, normally opens into the lower end of the reservoir 15 and at one side of the cylinder 14 through a slightly raised boss 21, and it is this location of communication of said passageway with the reservoir that is altered by the present invention. Without applicant's improvements, it can readily be seen that when the jack 10 is in an inverted position or is positioned horizontally, as shown in Figure 8, and a portion of the hydraulic fluid has been pumped into the cylinder 14, the passageway 17 will communicate with the reservoir 15 above the level of hydraulic fluid, and by so doing, renders the jack inoperative for further use.

The improvements forming the subject matter of the present invention consist mainly of also extending the hydraulic fluid passageway 17 to a location adjacent the opposite or upper end of the reservoir 15 and thereby providing a fluid entry opening at each end of the reservoir and to automatically close off either of said fluid entry openings that is elevated above the level of fluid in the reservoir.

In carrying out the invention, there is provided an upstanding tubular conduit 22 which is open at both its upper and lower ends, as at 23 and 24, respectively, and which is supported substantially lengthwise in the annular reservoir 15 by a branch tubular conduit 25 that has one of its ends joined to and communicating with the conduit 22 intermediate the ends of the conduit 22. The branch conduit 25 is generally directed downwardly and has its other or lower end threadably connected, as at 26, to and communicating with a tubular adapter 27 that in turn is threaded in the raised boss 21 and communicates with the passageway 17.

Both the upper and lower ends 23 and 24 of the tubular conduit 22 which are located adjacent the head 13 and base member 12, respectively, are ground so that each has a tapered valve seat 28 thereon that is engaged and disengaged by a weighted ball 29 according to the position of the tubular conduit. The weighted balls 29, which in reality are ball bearings, are retained in and guided in their movement toward and away from the seats 28 by elongated and closely fitted wire cages 30 secured to and axially aligned with the end portions of the tubular conduits. As shown in Figure 3, it can be seen that the end portion of the tubular conduit 22 that extends upwardly will have its weighted ball in engagement with its seat 30 and the other or opposite end portion that extends downwardly will have its weighted ball 29 out of engagement with its seat 30. This assures an end of the tubular conduit submerged beneath the level of hydraulic fluid in the reservoir being open when the

jack is in an upright position or when it is in an inverted position.

By referring to Figures 5 and 8, it will be noted that the tubular conduit **22** is not parallel with the outer and inner sleeves **11** and **14** of the jack, but instead is at a slight angle to same which will position one end portion of the tubular conduit below the other for proper actuation of the ball valves when the jack is in a horizontal position on either of its sides. It is apparent that no difficulty will be experienced if the jack is positioned horizontally with its forward side downwardly. This leaves only the horizontal position of the jack with its forward side upward and which, due to the slight angled arrangement of the tubular member, can be easily rectified by simply rotating the jack slightly in either direction.

The tubular adapter **27** is provided for the purpose of simplifying assembly of the present invention to conventional jacks now in use which is accomplished by first tapping threads in the open end of the passageway **17** at the raised boss **21** and then threading the lower end of said adapter into the tapped opening with the remainder of the improved attachment removed at the connection **26**, as shown in Figures 6 and 7. After the adapter **27** is rigidly secured in place, the lower end of the branch conduit **25** is then connected to its upper end and thus supports the conduit **22** in the angled position previously described.

In view of the foregoing description taken in conjunction with the accompanying drawings, it is believed that a clear understanding of the construction, operation, and advantages of the device will be quite apparent to those skilled in this art. A more detailed description is accordingly deemed unnecessary.

It is to be understood, however, that even though there is herein shown and described a preferred embodiment of the invention, various changes may be made without departing from the spirit and full intendment of the invention.

What is claimed is:

1. In combination with a portable hydraulic jack including a cylindrical housing, a cylinder in and supported by said housing and providing a fluid reservoir between same and said housing, a pump having separate passageways communicating the same with the cylinder and with the reservoir, and a plunger operating in and protruding from said cylinder; a tubular conduit in said reservoir and angled slightly lengthwise thereof and with its opposite ends terminating adjacent opposite ends of said reservoir, said conduit having its opposite ends open, a gravity-actuated valve on each open end of said conduit and having a path of movement along substantially the same plane as the angled position of the conduit for closing either open end that is elevated above a horizontal plane of said conduit, and a branch tubular conduit connected to and communicating with said first-mentioned conduit and with the passageway between the reservoir and the pump.

2. An attachment for a portable hydraulic jack including a cylindrical housing, a cylinder concentric in and supported by said housing and providing a fluid reservoir between same and said housing, a pump having separate passageways communicating the same with the cylinder and with the reservoir, and a plunger operating in and protruding from said cylinder, said attachment comprising a tubular conduit arranged substantially lengthwise in said reservoir and terminating adjacent opposite ends thereof, said conduit having its opposite ends open, a gravity-actuated valve on each open end of said conduit and having a path of movement at a slight angle to the center line of said housing and cylinder for closing either open end that is elevated above a horizontal plane of said conduit, a branch conduit connected at one of its ends to and communicating with said first-mentioned conduit intermediate the ends of said first-mentioned conduit, and connecting means at the opposite end of said branch conduit for connection with said housing and communicating said branch conduit with the passageway between the reservoir and the pump.

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