H. W. FREESE.

HYDRAULIC JACK.

APPLICATION FILED NOV. 5, 1914.

1,212,757.

Patented Jan. 16, 1917.

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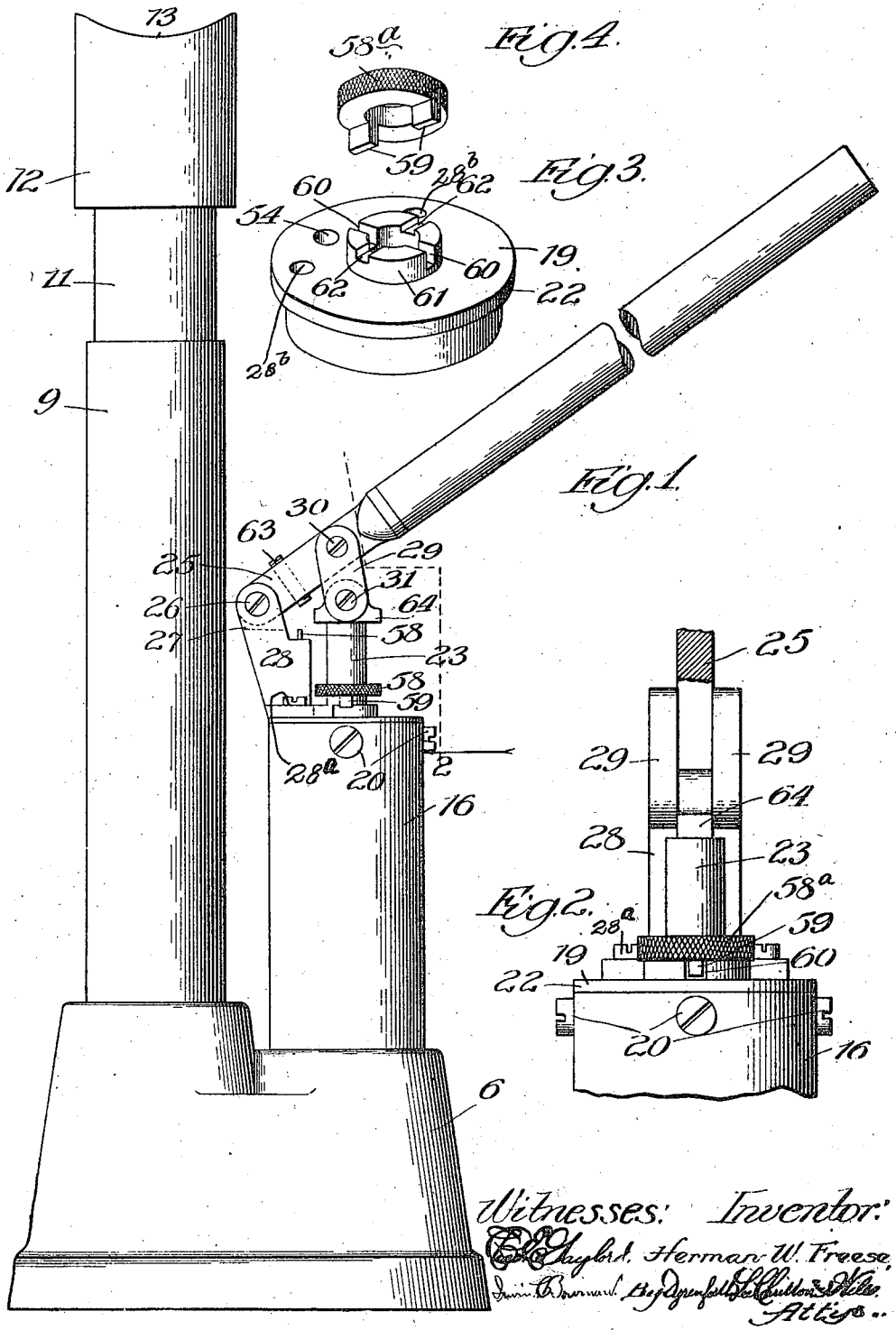


Fig. 4.

Fig. 3.

Fig. 1.

Fig. 2.

Witnesses:

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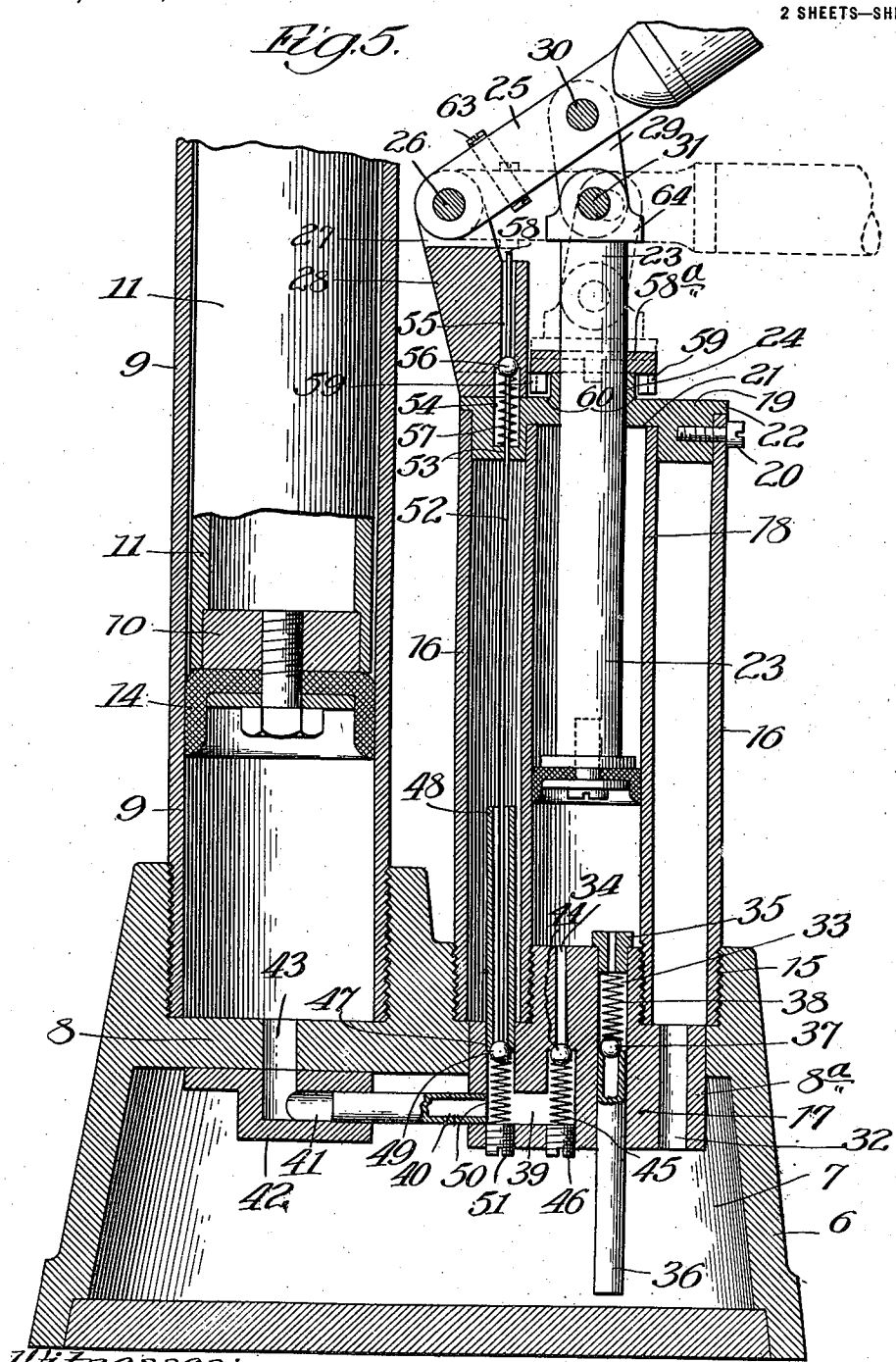
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2 SHEETS—SHEET 2.

Fig. 5.



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HERMAN W. FREESE, OF CHICAGO, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO CARL A. WALDRON, TRUSTEE, OF CHICAGO, ILLINOIS.

HYDRAULIC JACK.

1,212,757. Specification of Letters Patent. Patented Jan. 16, 1917.

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To all whom it may concern:

Be it known that I, HERMAN W. FREESE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Hydraulic Jacks, of which the following is a specification.

My invention relates more particularly to hydraulic jacks for use in connection with vehicles to lift the vehicle and temporarily hold it in raised position.

My object is to provide a novel and simple construction of hydraulic jack which may be economically manufactured, shall be adapted for lifting relatively heavy loads, and from which the contained operating fluid cannot escape regardless of the position occupied by the jack, this last referred to feature being of special importance in a jack for use in connection with automobiles as it may be placed in a tool-box in any position without danger of leakage.

Referring to the accompanying drawings:—Figure 1 is a view in side elevation of a hydraulic jack constructed in accordance with my invention, the parts being shown in the positions they assume during the actuation of the pump to supply fluid to the working cylinder. Fig. 2 is an enlarged broken section, taken at the irregular line 2 at Fig. 1, and viewed in the direction of the arrow. Fig. 3 is a perspective view of the head which closes the upper end of the pump-cylinder. Fig. 4 is a perspective view of an adjustable collar which coöperates with the head of Fig. 3; and Fig. 5 is an enlarged broken view in elevation of the device shown in Fig. 1, the handle which operates the piston being shown by full lines in its uppermost position and in dotted lines in its lowermost position during the normal operation of the pump, the collar of Fig. 4 being shown in dotted lines in the position it assumes during the normal operation of the pump, and in full lines the position it assumes before permitting said handle to be depressed for operating certain valve mechanism for permitting the fluid to flow back from the cylinder containing the piston on which the load is to be supported to the reservoir.

In the particular construction illustrated, the device is formed with the base 6 containing a chamber, or reservoir, 7 for the fluid, which may be oil or any other suitable fluid, through the medium of which the piston for supporting the load to be lifted and hereinafter described, is operated. Screwed into a socket in the upper wall 8 of the base 6 is an upright cylinder 9 containing a piston 10 formed of a sleeve 11 terminating at its upper end in a head 12, preferably concave at its upper end, as represented at 13, to adapt it to fit against the underside of the axle of the vehicle to be raised, the lower end of the piston being provided with a cup-leather 14, as is usual in the case of pistons. Screwed into an opening 15 in the top of the base 6 is a cylinder 16 and arranged concentric with the cylinder 16 and screwed at its lower end upon a boss 17 formed on the top of a member 8^a, closely fitting the opening 15 in the top 8 of the base and depending below the underside of the latter, as represented, is a cylinder 18, the latter forming the cylinder of a pump. The upper ends of the cylinders 16 and 18 are closed by a cap 19 secured to the cylinder 16, as by a screw 20, the cylinder extending at its upper end into a recess 21 in the underside of the cap 19, and the cylinder 16 fitting at its top against the underside of a flange 22 provided by the periphery of the head 19. The cylinder 18 contains a piston 23 which is guided in an opening 24 in the head 19. The upper end of the piston 23 is connected with an operating handle 25 fulcrumed at one end on a pin 26 secured in the arms 27 of a bifurcated extension 28 provided on the head 19, and secured thereto by screws 28^a passing through openings 28^b in the extension. The means shown for connecting the piston 23 to the operating lever 25 comprise a pair of links 29 which straddle the operating handle at their upper ends and are pivotally connected therewith by a pin 30 passing through the arms 29 and said lever, the lower ends of these links embracing the upper end of the piston 23 and pivotally connected therewith, as by a pin 31 passing through these links and the upper end of the piston, it being understood from the foregoing description that by rocking the lever 25 on its fulcrum 26 the piston 23 will be reciprocated in the cylinder 18. The interior of the cylinder 16 communicates with the reservoir 7 through the medium of a passage 32 in the member 8^a, for a purpose hereinafter described.

Opening into the bottom of the cylinder 18 are passages 33 and 34, which serve as

inlet and outlet passages, respectively, for the pump cylinder. The passage 33 contains in its upper end a nipple 35 containing an opening forming a continuation of the passage 33, and opening into the lower end of the passage 33 is a pipe 36 open at its lower end to communicate with the reservoir 7 and affording at its upper end a seat for a ball-check valve 37 backed up by a spring 38 confined between the ball and the inner end of the nipple 35. The passage 34 communicates with a passage 39 formed in the member 8^a and communicating with a pipe 40, the latter extending into one end of a passage 41 in a block 42 secured to the underside of the top 8 in any suitable manner, the upper end of the passage 41 communicating with a passage 43 in the top 8 opening into the bottom of the cylinder 9. The passage 34 is of reduced diameter compared with the passage 39 to afford a seat for a ball-valve 44 which is backed up by a spring 45 interposed between said ball and the screw-block 46 screwed into the member 8^a in line with the passage 34. The valves of which the balls 37 and 44 are parts, serve as inlet and outlet valves, respectively, for a pump, the ball 37 in the upward movement of the piston 23 unseating against the action of the spring 38 to permit fluid to be drawn from the reservoir into the lower end of the cylinder 18, the ball 44 in this operation remaining seated; and the ball 44 in the downward movement of the piston 33 unseating against the action of the spring 46 to permit the fluid, previously introduced into the cylinder 18, to be forced through passages 34, 39, 40, 41 and 43 into the lower end of the cylinder 9 for lifting the piston 10, the ball 37 remaining seated in this operation. As soon as the piston 23 of the pump finishes its downward movement, the ball 44 again seats and closes the passage 44, thus preventing the fluid pumped into the cylinder 9 from escaping therefrom.

The means for controlling the discharge of the fluid from the cylinder 9 when it is desired that the piston 10 be permitted to lower in the cylinder 9 comprise, in the preferred illustrated embodiment of my invention, the following mechanism: The member 8^a contains an opening 47 which communicates with the passages 40 and 39, the pipe 48, open at its opposite ends, being confined at its lower end in the upper end of the passage 47 and extending upwardly into the space between the cylinders 16 and 18. The lower end of the pipe 48 forms a seat for a ball 49 adapted to close the lower end of the opening through the pipe 48, when seated against the latter by the action of a spring 50 confined between the ball 49 and the block 51 screwed into and closing the end of the opening 47. A vertically movable rod 52 extends at its lower end into the tube 48 and rests upon the ball 49, the upper end of this rod being guided in a passage 53 in the head 19 and extending upwardly into an enlargement 54 of this passage. The enlargement 54 communicates with a passage 55 of reduced diameter, affording a seat at its lower end for a ball 56 normally held in seated position by the action of a spring 57 confined between the bottom of the enlargement 54 and the ball 56. The upper end of the rod 52 extends into close proximity to the ball 56, as shown in Fig. 5, but this rod is of such length that while both balls 49 and 56 may be seated at the same time, the unseating of the ball 56 by pressing it downwardly will operate through the medium of the rod 52 to unseat the ball 49, a rod 58 in the passage 55 bearing at its lower end on the ball 56 and extending at its upper end above the top of the passage 55 serving as means through the medium of which the balls 56, rod 52 and ball 49 may be depressed against the action of the springs 57 and 50, respectively. It will be understood from the foregoing that, assuming that the piston 10 has been raised by operating the pump, the fluid supporting the piston 10 may be released from the cylinder 9 by pressing down on the rod 58 which unseats the ball 49, as above stated, thus permitting the fluid to flow from the cylinder 9 through the passages 43, 41, 40, 47, pipe 48 into the space between the cylinders 16 and 18 and thence through the passage 32 back into the reservoir 7, the speed of downward movement of the piston 10 being regulated by the degree to which the ball 49 is unseated. Furthermore, it will be noted that the piston 10 may be stopped at any desired position in the cylinder 9 by discontinuing downward pressure on the rod 58 as the ball-valve 49 thereupon immediately closes shutting off communication between the cylinder 9 and the pipe 48.

In the particular construction illustrated, the rod 58 is adapted to be depressed, for the purpose just stated, by engagement therewith of the pump handle 25. To prevent the operation of the rod 58 as stated, during the normal operation of the pump, I provide a sleeve 58^a which surrounds the piston 23 and is rotatable thereon, this collar being provided with diametrically opposed lugs 59 adapted to enter either deep diametrically opposed recesses 60, provided in the boss 61, extending on the top of the head 19, or relatively shallow recesses 62 in this boss. The recesses 62 are of such depth that when the sleeve 58^a extends at its lugs 59 into these shallow recesses, the lower end of a screw 63, screwed into the handle 25 and adjustable therein, will reach short of the upper end of the rod 58 when the handle 25 is depressed to a position in which stops 64, provided on the upper end of the

piston 23, abut against the top of the sleeve 58, as represented by dotted lines in Fig. 5, the sleeve in this figure being shown in the said position, by dotted lines. The recesses 60 are of such depth that when the lugs 59 on the sleeve 58ª register therewith, the sleeve 58ª will extend in such a plane below that at which it extends when in raised position, as above stated, as will permit the handle 25 to be lowered sufficiently far to cause the lower end of the screw 63 to engage the upper end of the rod 58 and depress the latter for unseating the ball 49 to permit of the discharge of the fluid from the cylinder 9.

It will be understood from the foregoing that the arrangement of the parts of the construction is such that even should the jack lie upon its side or in inverted position, the fluid through the medium of which the jack is operated, would not leak from the jack and thus the device is always ready to be used, and other manifest objections of leakage, are avoided.

What I claim as new and desire to secure by Letters Patent is—

1. A hydraulic-jack comprising, in combination, a cylinder, a piston movable in said cylinder, a reservoir for fluid, a reciprocating pump in communication with said reservoir and said cylinder, means for actuating said pump, a passage communicating with said cylinder and reservoir, a check-valve in said passage for controlling the latter, adjustable means extending into the path of movement of the pump-actuating means for limiting the movement of said pump-actuating means, and means operated by said pump-actuating means when said adjustable means are adjusted out of position for limiting the movement of said pump-operating means, for actuating said valve, for the purpose set forth.

2. A hydraulic-jack comprising, in combination, a cylinder, a piston movable in said cylinder, a reservoir for fluid, a pump-barrel, a piston movable therein having an operating handle, said pump-barrel being in communication with said reservoir and said cylinder, a passage through which the fluid introduced into said cylinder is returned to said reservoir, a valve in said passage, adjustable means extending into the path of movement of the pump-actuating means limiting the movement of said handle, and means operated by said handle when said adjustable means are adjusted to a position in which the movement of said handle is unobstructed thereby, for actuating said valve to open said passage.

3. A hydraulic-jack comprising, in combination, a cylinder, a piston movable therein, a receptacle for fluid, a pump for pumping fluid from said receptacle into said cylinder, an elongated chamber communicating with said cylinder and through an outlet with said receptacle, the only outlet of said chamber being between said valves, a check valve in the lower portion of said chamber normally closing the latter to said cylinder, a reciprocable rod in said chamber engaging said check-valve, a check-valve in the upper portion of said chamber and located above the liquid in said chamber when the device is in upright position and adapted when operated to actuate said rod and open said first-named check-valve, and means for actuating said second-named check-valve.

4. A hydraulic jack comprising, in combination, a cylinder, a piston movable in said cylinder, a reservoir for fluid, a reciprocating pump in communication with said reservoir and cylinder, means for actuating said pump, a passage communicating with said cylinder and reservoir, a check-valve in said passage for controlling the latter, a member mounted on said pump and adjustable rotatably, means serving to hold said member at one elevation when rotatably adjusted to a certain position, and to hold it in a lower elevation when adjusted to another position, said member coöperating with said pump-actuating means for limiting the movement of the latter, and means operated by said pump-actuating means, when said member is in its lowermost position for actuating said valve, for the purpose set forth.

5. A hydraulic jack comprising, in combination, a cylinder, a piston movable in said cylinder, a reservoir for fluid, a reciprocating pump in communication with said reservoir and cylinder, means for actuating said pump, a passage communicating with said cylinder and reservoir, a check-valve in said passage for controlling the latter, a rotatable member mounted on the upper end of said pump and provided with lugs, said pump being provided on its upper surface with stepped surfaces adapted to coöperate with said lugs whereby upon rotatably adjusting said member the latter may be caused to extend at different heights, said member being positioned to limit the movement of said pump-actuating means, and means operated by said pump-actuating means when said member is in lowermost position for actuating said valve, for the purpose set forth.

6. A hydraulic jack comprising, in combination, a cylinder, a piston movable in said cylinder, a reservoir for fluid, a reciprocating pump in communication with said reservoir and cylinder, means for actuating said pump, a passage communicating with said cylinder and reservoir, a check-valve in said passage for controlling the latter, the top of said pump being formed with sets of recesses of different depths, a sleeve surrounding the pump-actuating means and provided with lugs adapted to seat, upon

rotatably adjusting said sleeve, into either set of recesses to adjust it vertically, means connected with said pump-actuating means coöperating with said sleeve and serving to limit the movement of said pump-actuating means, and means operated by said pump-actuating means when said sleeve extends in the deepest recesses for actuating said valve.

7. A hydraulic jack comprising, in combination, a cylinder, a piston movable in said cylinder, a reservoir for fluid, a pump communicating with said reservoir and cylinder for pumping fluid from the reservoir into the cylinder to actuate said piston, a second cylinder surrounding said pump, said second cylinder opening into said reservoir and communicating with said first-named cylinder, a check-valve controlling communication between said first-named cylinder and said second cylinder, and means for actuating said check-valve.

8. A hydraulic jack comprising, in combination, a base containing a reservoir for fluid, a cylinder on said base, a piston movable in said cylinder, a second cylinder mounted on said base with passages leading therefrom communicating respectively with the interior of said receptacle and with the interior of said first-named cylinder, a piston operating in said second cylinder, check-valves controlling the passages leading from said second cylinder and operating to permit liquid to be drawn into said second cylinder from said reservoir in the movement of the piston therein in one direction and force it therefrom into said first-named cylinder in the opposite movement of said piston, a third cylinder mounted on said base and surrounding said second cylinder and spaced therefrom, a passage leading from said third cylinder into said reservoir and a passage communicating with said first-named cylinder, a check-valve between said third cylinder and said first-named cylinder, said third cylinder containing a passage opening through its top, a check-valve controlling said passage, means extending between the check-valves for said third cylinder operating when said last-named check-valve is operated to operate the other check-valve therein, means coöperating with the check-valve in the top of said third cylinder, for actuating the latter, means connected with said second-named piston for operating the latter, adjustable means extending into the path of movement of said pump-actuating means for limiting the movement of the latter, said adjustable means serving when in one position to prevent said pump-actuating means from moving to a position for actuating the check-valves for said third cylinder, but when adjusted to another position will permit said pump-actuating means to actuate said valves.

HERMAN W. FREESE.

In presence of—
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