

Jan. 29, 1924.

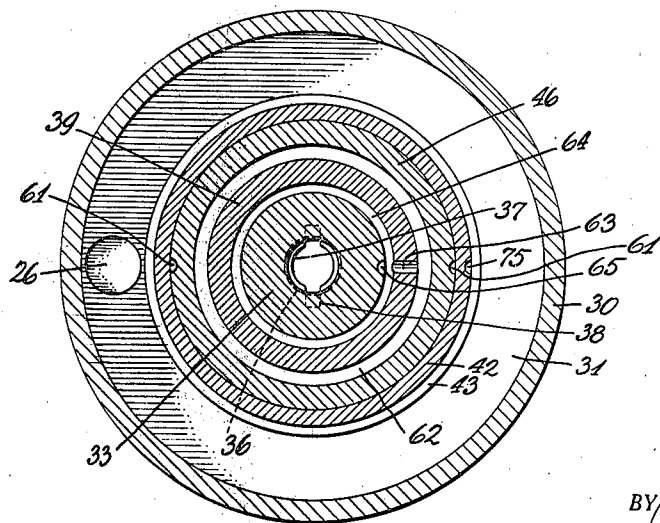
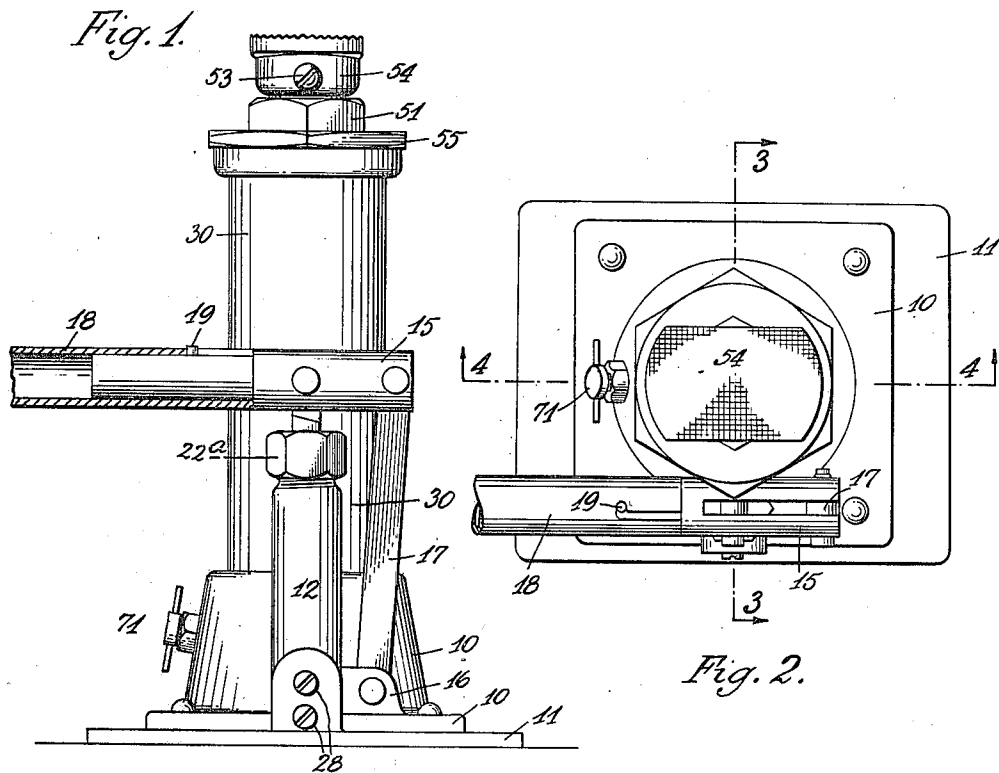
1,482,256

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TELESCOPIC HYDRAULIC JACK

Filed Dec. 29, 1922

2 Sheets-Sheet 1



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Fig. 4.

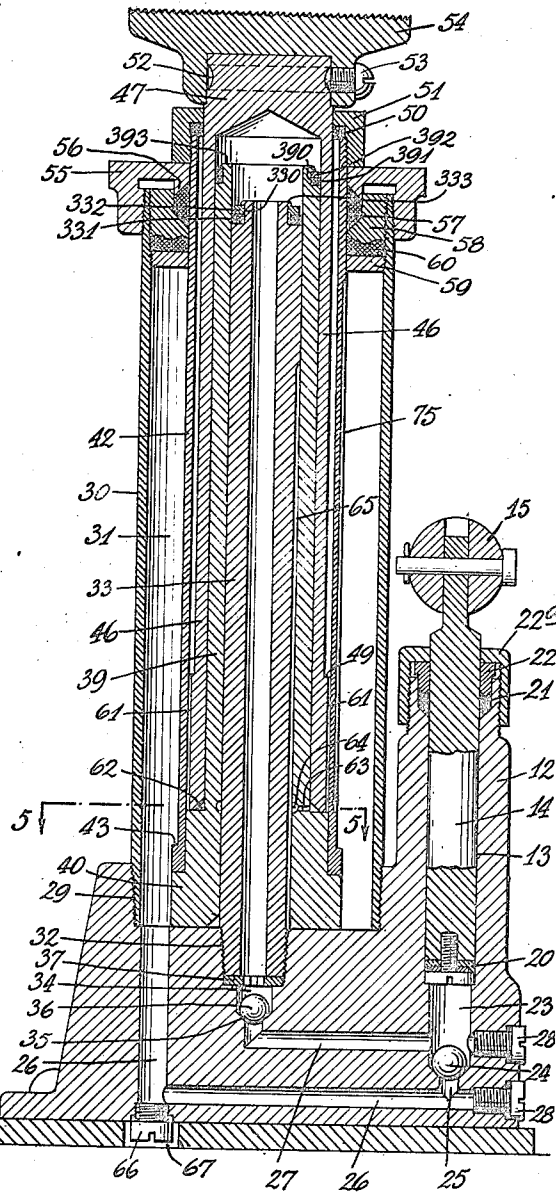
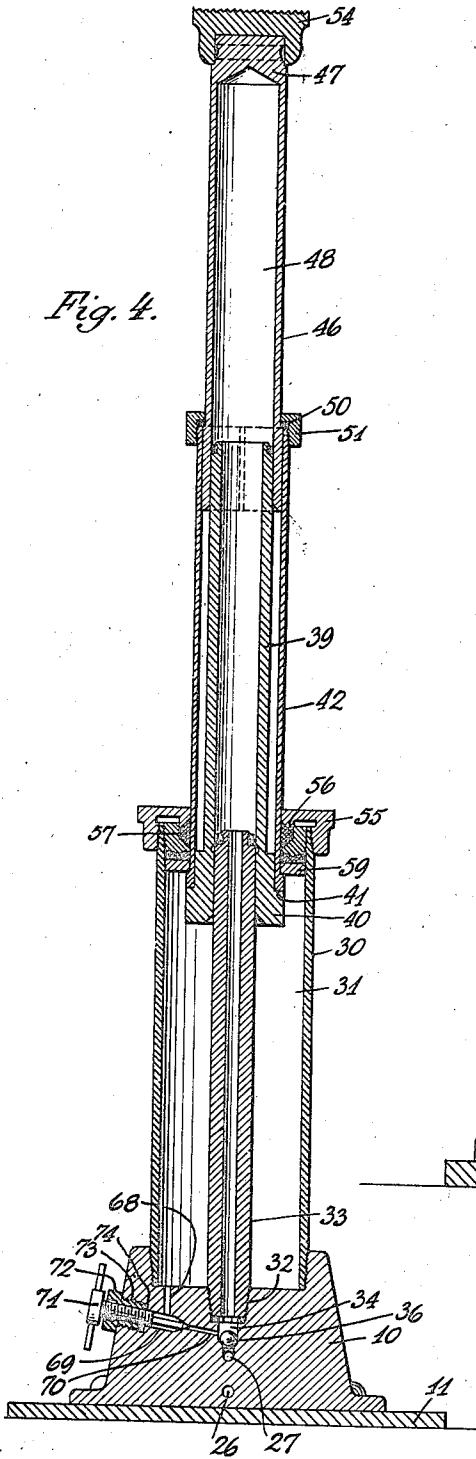


Fig. 3.

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UNITED STATES PATENT OFFICE.

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TELESCOPIC HYDRAULIC JACK.

Application filed December 29, 1922. Serial No. 609,559.

To all whom it may concern:

Be it known that I, GUSTAV PRALL, a citizen of the United States, residing at New York, county of New York, and State of New York, have invented certain new and useful Improvements in Telescopic Hydraulic Jacks, of which the following is a specification.

This invention relates to hydraulic jacks being especially designed for use as a portable jack intended as an automobile accessory where a light weight, compact but powerful jack is required.

The principal object of this invention is therefore to provide a jack which will fulfill the above requirements, which will be of a sturdy construction to enable it to withstand rough usage and which may be manufactured at a reasonable cost.

A further object is to provide a jack having its lifting plunger constructed of a plurality of telescopic elements, thereby enabling the size of the jack to be considerably restricted without necessitating a corresponding limitation of the lifting travel of the plunger.

Another object is to provide a new and improved means for allowing the escape of air when the jack is lowered.

And further objects are to improve upon the means for preventing the escape of the working fluid contained within the jack and the construction and arrangement of the valve means which control the admission of the fluid to the main pressure or working chamber of the jack.

For the accomplishment of these and such further objects as will hereinafter be apparent to those skilled in the art to which this appertains, the invention consists in the construction, combination and arrangement of parts herein specifically described and illustrated in the accompanying drawings, wherein is shown a preferred embodiment of the invention, but it is to be understood that changes, variations and modifications may be resorted to which fall within the scope of the claims hereunto appended.

In the drawings forming a portion of this specification:

Fig. 1 is a side elevation of a jack embodying my invention showing the plunger completely depressed, the operating handle being shown in cross section.

Fig. 2 is a top or plan view.

Fig. 3 is a section on the line 3—3 of Fig. 2 showing the plunger completely depressed.

Fig. 4 is a section on the line 4—4 of Fig. 2 at right angles to the showing of Fig. 3 and showing the plunger completely extended and

Fig. 5 is a section on the line 5—5 of Fig. 3.

As shown in the drawings, the numeral 10 indicates the base of the jack to the lower face of which is preferably secured a plate 11 to give a larger bearing surface or support for the jack when placed upon the ground. The base 10 is preferably formed as a casting of steel, iron or other suitable material, and has an upwardly projecting boss 12, which is suitably bored to provide a pump chamber 13 in which is slidably received the piston 14. The upper outwardly projecting end of piston 14 has pivotally secured thereto a short actuating rod 15 which has one end anchored to a lug 16 of the base through the intermediary of a connecting link 17, the other end of rod 15 being reduced in diameter to receive the actuating handle 18 and is provided with a pin 19 which engages with a suitable slot formed in the handle 18.

The lower end of piston 14 has a suitable packing 20 secured thereto to provide a fluid tight fit and packing 21 provided at the top of the pump chamber is held in place by means of gland 22 and stuffing box 22^a. The lower end of pump chamber communicates with a valve chamber 23 which terminates in a valve seat upon which a ball valve 24 is mounted to close a conduit 25 extending from the lower end of the valve chamber and communicating with the conduit 26, leading to the fluid supply reservoir. A conduit 27 extending parallel to conduit 26 furnishes communication to the pressure chamber to be later described. For convenience of manufacture, the horizontal branches of the conduits 26 and 27 are drilled into the base 10 and the openings thereof sealed by the screws 28.

The upper face of the base 10 is counter-bored and threaded as at 29 to receive the outer jacket 30, the interior of which defines the fluid supply reservoir 31, and concentrically of the counterbore 29 a smaller bore 32 is drilled and threaded to receive a stationary guide tube 33. A valve chamber

34 is formed by drilling a smaller hole in axial alignment with the bore 32 and terminates in a valve seat 35 upon which the ball valve 36 is seated. Confined between the lower end of guide tube 33 and the base of bore 32 is a ball retaining washer 37, which is provided with a diametrically located elongated slot 38 (see Fig. 5) to permit the passage of the fluid when the valve 36 is raised off its seat by the incoming fluid through the conduit 27.

The plunger of the jack consists of a pair of telescoping members which for convenience will be designated as the upper and lower plungers. The lower plunger comprises an inner tubular member 39 slidably mounted on the guide tube 33 and turned down to provide an enlarged lower end 40 having a shoulder 41. Tightly pressed upon the end 40 and seated against the shoulder 41 is a sleeve 42, the outer circumference of which is turned down to provide a shoulder 43 for a purpose which will hereinafter appear. The upper inner ends of the guide tube 33 and the tubular member 39 are turned down as at 330 and 390 respectively to receive the packings 331 and 391 over which the washers 332 and 392 are placed after which the upper ends of the tube 33 and member 39 are riveted over the washers as indicated at 333 and 393 sufficiently to secure the washers and packings in place, but to provide a very slight longitudinal clearance of about two thousandths of an inch to permit expansion or swelling of the packings. The tubular member 39 and sleeve 42 form a chamber in which is slidably received the lower tubular portion 46 of the upper plunger member having its upper end closed by the pressure head 47. The upper plunger is preferably constructed integral, the tubular portion 46 being formed by boring or drilling out the plunger to a suitable depth to provide a pressure chamber 48 and to leave sufficient stock for the head 47 while its outer circumference is turned down to provide a shoulder 49 adjacent its lower end which is adapted to engage the packing 50, confined between the upper face of sleeve 42 and a packing nut 51 threaded onto sleeve 42, and thereby carry the lower plunger with it when the fluid is pumped into the working chamber. The outer circumference of the pressure head 47 is grooved as at 52 to receive the end of the screw 53 carried by the pressure cap 54. A packing nut 55 which is threaded on the outer upper end of the jacket 30 is provided with a depending flange 56 which acts as a gland to compress the packing 57 enclosed within the stuffing box 58 preferably threaded into the upper inner end of the jacket 30. A packing washer 59 is also secured within the jacket 30 a short distance below the stuffing box 58 and an additional

packing 60 is confined between the stuffing box 58 and washer 59.

To provide for the escape of air from the various chambers, the outer circumference of the enlarged lower end of the tubular portion 46 of the upper plunger is provided with a pair of longitudinally extending diametrically opposed grooves 61, while the lower inner end of the said tubular portion is chamfered to provide a small annular chamber 62. A small hole 63 furnishes communication between the annular chamber 62 and a second annular chamber 64 formed by cutting a groove in the inner wall of the tubular member 39. The outer surface of the guide tube 33 is provided with a longitudinally extending groove 65, the upper end of which terminates below the top of the tube a distance slightly greater than the length of the enlarged lower end of lower plunger, and the lower end of which extends to the top face of the counter-bore 29. A similar groove 75 is provided in the outer circumference of the sleeve 42, this groove terminating at its upper end just below the packing washer 59 when the jack is fully depressed as shown in Fig. 3. When the jack is raised it will be obvious that the arrangement of the grooves is such that the fluid under pressure is prevented from escaping through the grooves, as groove 65 is never in direct communication with the pressure chamber. The purpose of the annular chambers 62 and 64 is to insure communication of the hole 63 with the grooves 61 and 65 if the plungers are rotated upon their common axis out of the positions shown in Fig. 3. A removable filling plug 66 is provided at the base of the vertical portion of conduit 26, the plate 11 being provided with an aperture 67 of sufficient size to permit the removal of the plug when desired.

The upper face of the base has a small hole 68 drilled therein to provide an oil return conduit which communicates with a needle valve chamber 69 communicating by means of the small conduit 70, with the valve chamber 34, and an oil return valve 71, terminating in a reduced needle valve is threaded into a packing nut 72 between the inner end of which and the bore 73 a suitable packing 74 is compressed.

The operation of the device is as follows:

Assuming the jack to be in its lowered position with the parts in the position shown in Fig. 3, the handle 18 is placed upon the operating arm and actuated to pump the fluid into the pressure chamber 48, the upward stroke of the piston 14 producing a suction which causes the ball valve 24 to open and the ball valve 35 to close. The downward stroke of the piston 14 causes the ball valve 24 to close and pumps the fluid through conduit 27 raising ball valve 35

off valve seat 36. The upward movement of the ball is limited by the ball retaining washer 37, the elongated slot 38 permitting the free passage of the fluid past the ball and into the bore of guide tube 33. Continued operation of the pump fills the bore of tube 33, and pressure is produced against pressure head 47 in the well known manner causing the upper plunger to travel upwardly. When the shoulder 49 contacts with the packing 50, the lower plunger will then be carried along by the upper plunger until the shoulder 43 contacts with the packing washer 59 which will limit the upward or outward travel of the parts to the positions shown in Fig. 4.

To release or depress the jack the oil return valve 71 is turned to withdraw the needle valve from its seat permitting the fluid under pressure within the bores of the guide tube and lower and upper plungers to pass through the conduits 68 and 70 and valve chamber 69 to the fluid reservoir 31. As the pressure within the pressure chambers of the jack is released the plungers descend, any air which may be confined within the space between the members 39 and 42 below the plungers will pass through the grooves 61 into the small space between the sleeve 42 and reduced portion of the tubular member 39 and as the lower plunger descends the air will pass around base of portion 46 through hole 63 annular chamber 64, groove 65 into the fluid reservoir 31, from which it will pass to the atmosphere through groove 75.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is—

1. A portable hydraulic jack comprising a base, an outer jacket and an inner guide tube concentrically mounted upon said base and spaced to provide a fluid reservoir, a plunger slidably mounted upon said guide tube and surrounded by said outer jacket, said plunger comprising an upper element and a lower element consisting of a pair of interconnected cylindrical hollow members arranged in spaced concentric parallel alignment, said upper element consisting of a hollow cylindrical member, slidably and telescopically mounted in the space between the members of said lower element, and provided at its outer end with a pressure head and means to force the fluid from said reservoir against said pressure head.

2. In a portable hydraulic jack, a base, a jacket secured to said base, and defining a fluid reservoir, an inner guide tube fixed to said base concentrically arranged within and extending upwardly into said reservoir, a lower plunger element slidably mounted upon said inner guide tube comprising an outer tubular member and an inner tubular member interconnected in spaced concentric

parallel alignment an upper plunger element telescopically mounted in the space between said inner and outer tubular members and slidable longitudinally thereof, means to force the fluid from said reservoir into said plungers and means to prevent said fluid from entering the space between said tubular members.

3. In a portable hydraulic jack, a base, a jacket secured to said base and defining a fluid reservoir, an inner guide tube fixed to said base concentrically arranged within and extending upwardly into said reservoir, a lower plunger element slidably mounted upon said inner guide tube comprising an outer tubular member and an inner tubular member interconnected in spaced concentric parallel alignment, an upper plunger element having its upper end closed to provide a pressure head and a tubular portion extending downwardly from said pressure head into the space between said tubular members, said tubular portion being slidably mounted on said inner tubular member, and means to force the fluid from said reservoir into said plungers.

4. In a portable hydraulic jack, a base, a jacket secured to said base and defining a fluid reservoir, an inner guide tube fixed to said base concentrically arranged within and extending upwardly into said reservoir, a lower plunger element slidably mounted upon said inner guide tube comprising an outer tubular member and an inner tubular member interconnected in spaced concentric parallel alignment, an upper plunger element having its upper end closed to provide a pressure head and a tubular portion extending downwardly from said pressure head into the space between said tubular members, said tubular portion being slidably mounted on said inner tubular member, means to force the fluid from said reservoir into said plungers, and means comprising longitudinally extending grooves in said plunger elements and guide tube to permit escape of air when said plungers are depressed.

5. In a portable hydraulic jack, a base, a jacket secured to said base, and defining a fluid reservoir, an inner guide tube fixed to said base concentrically arranged within and extending upwardly into said reservoir, a lower plunger element slidably mounted upon said inner guide tube comprising an outer tubular member and an inner tubular member interconnected in spaced concentric parallel alignment an upper plunger element having its upper end closed to provide a pressure head and a tubular portion extending downwardly from said pressure head into the space between said tubular members, said tubular portion being slidably mounted on said inner tubular member, means to force the fluid from said reservoir into said

plungers, and means to permit escape of air when said plungers are depressed, comprising longitudinally extending grooves in said plunger elements and guide tube, communicating with a pair of annular chambers provided adjacent the lower ends of said plunger elements.

6. In a portable hydraulic jack, a base, a jacket secured to said base and defining a fluid reservoir, an inner guide tube fixed to said base concentrically arranged within and extending upwardly into said reservoir, a lower plunger element slidably mounted upon said inner guide tube comprising an outer tubular member and an inner tubular member interconnected in spaced concentric parallel alignment, an upper plunger element having its upper end closed to provide a pressure head and a tubular portion ex-

tending downwardly from said pressure head into the space between said tubular members, said tubular portion being slidably mounted on said inner tubular member, means to force the fluid from said reservoir into said plungers, means to permit escape of air when said plungers are depressed comprising longitudinally extending grooves in said plunger elements and guide tube, communicating with a pair of annular chambers provided adjacent the lower ends of said plunger elements and said lower plunger element provided with an aperture to provided communication between said annular chambers.

In testimony whereof I have affixed my signature.

GUSTAV PRALL.