F. R. SUNDERMAN.

JACK.

APPLICATION FILED FEB. 25, 1920.

1,427,241. Patented Aug. 29, 1922.

Fig. 1.

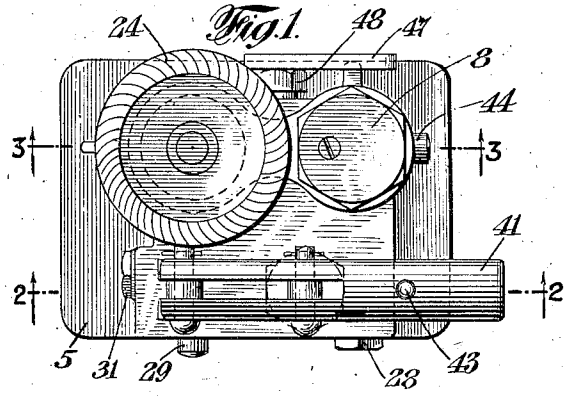


Fig. 4.

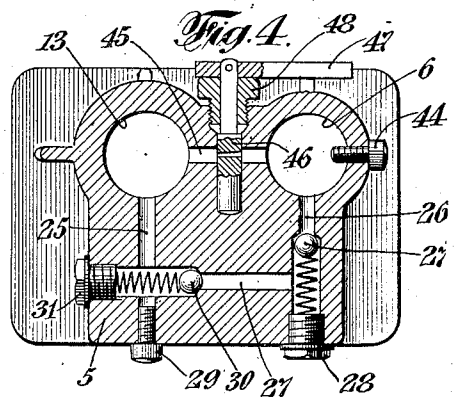


Fig. 2.

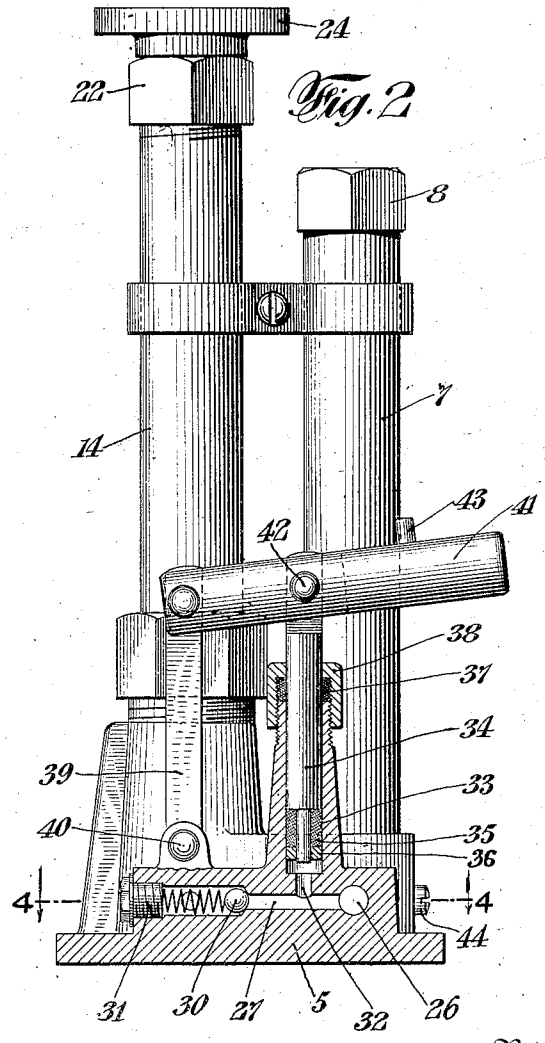
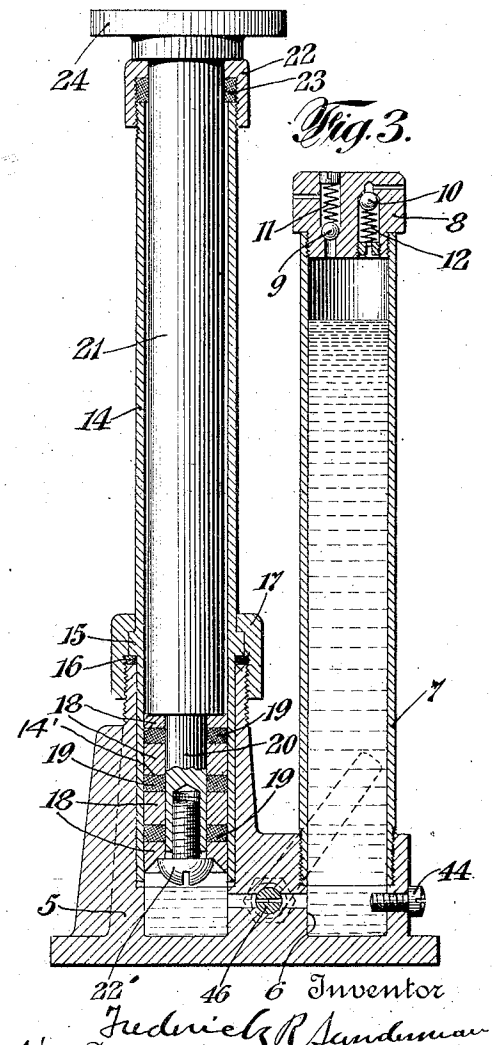


Fig. 3.



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UNITED STATES PATENT OFFICE.

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JACK.

1,427,241. Specification of Letters Patent. Patented Aug. 29, 1922.

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To all whom it may concern:

Be it known that I, FREDERICK R. SUNDERMAN, a citizen of the United States, and a resident of Newburgh, in the county of Orange and State of New York, have invented certain new and useful Improvements in Jacks, of which the following is a specification.

My invention relates to improvements in jacks and more particularly to jacks in which oil or other fluid medium is used to transmit power in the operation of the jack.

The main object of the invention is to provide a jack of the character described which is durable, simple and easily constructed and may be easily inspected and repaired; and one which is capable of sustaining heavy loads for several hours without "settling" or lowering the same.

A further object of the invention is to provide a jack which is relatively light in weight but still strong and capable of raising relatively heavy loads.

Further and more specific objects, features and advantages will more clearly appear from the detail description given below, taken in connection with the accompanying sheet of drawings, which forms a part of this specification.

In the drawings, Fig. 1 is a plan view of a jack embodying my improvements in a preferred form thereof;

Fig. 2 is a vertical section of the same taken substantially on the line 2—2 of Fig. 1;

Fig. 3 is a vertical section of the same taken on the line 3—3 of Fig. 1; and

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

Referring to the drawings, 5 represents a base of metal such as brass suitably bored as will more clearly appear hereinafter. Screwed into the bore 6 is a hollow cylindrical oil reservoir 7 made of iron or steel pipe and normally closed to the outside atmosphere by having screwed into its upper end a plug 8 provided with two ball valves 9 and 10 pressed against their seats by springs 11 and 12, respectively, so that when oil is pumped out of the reservoir 7 air may be permitted to pass thereinto by the ball valve 10, and when the oil is allowed to flow back into the reservoir 7 the air at the top thereof may flow out at the top by the ball valve 9.

Snugly fitting within another bore 13 within an upward projection of the base 5 is a steel jack cylinder 14 provided with a circumferential boss 15 between which and the top of the base 5 around the bore 13 lies a lead gasket 16. The lower end 14′ of the steel cylinder is snugly fitted into the bore in the upward projection of the base and extends into the bore, or the bore extends up on the cylinder, for a substantial distance in order to firmly secure the cylinder in the base against shearing strains. By having the lower part of the cylinder fit snugly into the bore for a substantial distance as shown, the shearing strain tending to shear the cylinder off from the base is so distributed by this construction as to practically prevent damage from this cause. When these jacks are used for lifting heavy loads, such as heavily loaded trucks, the angular position of the truck or the position in which the jack itself is placed, is such that there is often a very severe shearing strain tending to shear or rip the cylinder from the base, and this construction avoids such shearing. A nut 17 screw-threaded onto the base 5 and operating against the boss 15, pulls the parts firmly together and holds the cylinder 14 screwed to the base 5. By this arrangement the cylinder may be held down to the base by relatively few threads, and these threads are largely protected from the heavy shearing strains.

Operating within the jack cylinder 14 is a jack piston comprising a plurality of metal washers 18 having a close sliding fit within the jack cylinder 14 and compressible packing washers or rings 19, preferably of felt, interposed between said metallic washers 18. All of the washers are arranged to have a sliding fit on a stem 20 secured to piston rod 21, and they are held from falling off the stem 20 by screw 22′. By providing this arrangement of a series of alternate rigid washers having a sliding fit and packing between the same, I find that when pressure is exerted, as in the raising of heavy loads, and said parts are forced together under the pressure in the cylinder on the underneath side of the piston, that the metallic washers compress the packings 19 causing the same to be squeezed tightly against the sides of the cylinder 14 and thus prevent leakage of oil about the piston. For use in hydraulic jacks this arrangement is

of especial advantage over cup-shaped washers, for while the cup-shaped washers will sustain a momentary thrust such as in pumping, and will hold a load at substantially a given height for a very brief period, they will not sustain a heavy load such as a heavily loaded truck for any length of time without "settling" due apparently either to the gradual leakage of the oil past the cup washers, or to the cup washers assuming a gradual change in form under the sustained pressure which permits "settling" of the jack piston; and the cupped washers are not as durable. The lead gasket arrangement at 16 also causes a tight joint to be formed thereat, so that the tendency of oil to leak out between the cylinder 14 and the base 5 is reduced to a minimum under such heavy pressure.

At the upper portion of the cylinder 14 it is provided with a cap nut 22 enclosing a packing ring 23 through which slides the piston rod 21 to the upper end of which piston rod is secured the bearing plate 24.

The base 5 is provided with a lateral bore 25 leading out from the bottom of the bore 13 and a lateral bore 26 leading out from the bottom of the bore 6. Arranged in the outer portion of the bore 6 is a spring-pressed ball valve 27′ permitting oil to be withdrawn from the reservoir 7 past the ball 27′, but holding such oil from flowing back past the ball 27′ to the reservoir. A screw plug 29 closes the outer end of the cross bore 25 and a screw plug 28 closes the outer end of bore 26. Connecting the two bores 25 and 26 is a transverse bore 27 provided with an enlarged portion adjacent the bore 25 in which is arranged a spring-pressed ball valve 30 permitting oil to pass thereby into the bore 13 and cylinder 14 and preventing oil from flowing back out of the cylinder 14 past the ball valve 30. The outer end of the bore 27 is closed by screw plug 31. Connecting with the bore 27 is a vertical bore 32 leading to pump cylinder 33 in which operates pump piston 34 provided with packing 35 at its lower end held thereto by nut 36. At its upper end the pump cylinder is provided with packing 37 held in place by cap nut 38. 39 represents a link pivoted at 40 to the base 5 and having pivoted to its upper end handle lever member 41 which is also pivoted at 42 to the pump piston 34. The handle lever member 41 is arranged to have any suitable handle extension placed thereon in order to get the desired leverage for operating the pump and to this end is provided with a lug 43 for engagement with such extension member. The bore 6 is provided with a lateral opening normally closed by a screw plug 44, which opening may be utilized in the cleaning and filling of the apparatus.

The base 5 is also provided with a cross bore 45 connecting the lower parts of the bores 6 and 13, and within the bore 45 is arranged a valve 46 adapted to be turned by a handle member 47, the valve being held in place by nut 48.

In operation, the cylinder 7 is substantially filled with oil at a time when the jack piston is at the bottom of the jack cylinder 14, a suitable handle piece may then be placed over or secured to the handle member 41, and then after the jack is placed in suitable position where the bearing member 24 will engage the part to be raised, the handle is operated to operate the pump whereby oil will be forced from the reservoir 7 through the passageways 26, 27 and 25 into the bore 13 beneath the jack piston. The ball valves 27′ and 30 prevent any back flow of oil into the reservoir 7. The pressure exerted on the bottom of the lower metallic washer 18 causes the washers 18 to compress and squeeze outward the fibrous packing rings 19 so that the greater the load the tighter will the packings fit the cylinder 14 and prevent leakage of oil about the piston, and the washers will not cut the fibrous packing rings or otherwise injure them as might be the case if cup-shaped packing rings were used and the washers did not have a close sliding fit with the walls of the cylinder. During the pumping operation the ball valve 10 will automatically permit air to enter the reservoir 3 to take up the space made by reason of the pumping of oil therefrom into the cylinder 14 below the jack piston. When it is desired to lower the jack the handle 47 is thrown to open the valve 46 whereby the oil may flow out from under the jack piston through the passageway 45 and back into the reservoir 7. During this operation ball valve 9 will operate to permit air to escape from the top of the reservoir 7. The reservoir and jack cylinder are cylindrical in form whereby they may be made of piping and conveniently assembled with the other parts, and these together with the pump are so independently connected with the base that they are easily removable for repair and the jack piston and cylinder in the reservoir are easily removable independently of one another and without interference with the pump and at the same time the parts are strong and relatively light in weight, the steel jack cylinder 14 extending for a substantial distance down into the bore 13 in the base whereby the bore in the base is reinforced by the cylinder against oil pressure, and the cylinder held firmly and strengthened against shearing strains.

While I have described my improvements in great detail and with respect to one particular embodiment of the invention, I do not desire to be limited to such details and modifications, since many changes and modifications may be made and the invention

embodied in widely different forms without departing from the spirit and scope thereof in its broader aspects.

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

1. A jack having in combination a base member, an oil reservoir, a jack cylinder seated on said base member and provided with a circumferential boss, a nut and lead packing for holding the cylinder tightly seated on said base and a pump for forcing oil from the reservoir to said cylinder through said base.

2. A jack having in combination a base, an oil reservoir screwed to the base and removable therefrom, a jack cylinder removably secured to the base independently of said reservoir, a pump independently carried by the base, said base being provided with valved passageways whereby the pump may force oil from the reservoir to the cylinder to raise the piston, and means for permitting the return of oil from the cylinder to the reservoir.

3. A jack having in combination a base, an oil reservoir screwed to the base and removable therefrom, a jack cylinder removably secured to the base independently and at one side of said reservoir, a pump independently carried by the base, the cylinder of which is integral with the base, said base being provided with valved passageways whereby the pump may force oil from the reservoir to the cylinder to raise the piston, and means for permitting the return of oil from the cylinder to the reservoir through said base.

4. A jack having in combination, a base, a jack cylinder having its lower end fitting and extending a substantial distance within a bore in said base, means for rigidly securing the cylinder within said bore, said means comprising a screw-threaded collar engaging a boss on the cylinder, a jack piston in said cylinder, a fluid reservoir and means for pumping fluid from said reservoir into said cylinder beneath said piston to raise the piston.

In testimony whereof, I have signed my name to this specification.

FREDERICK R. SUNDERMAN.