

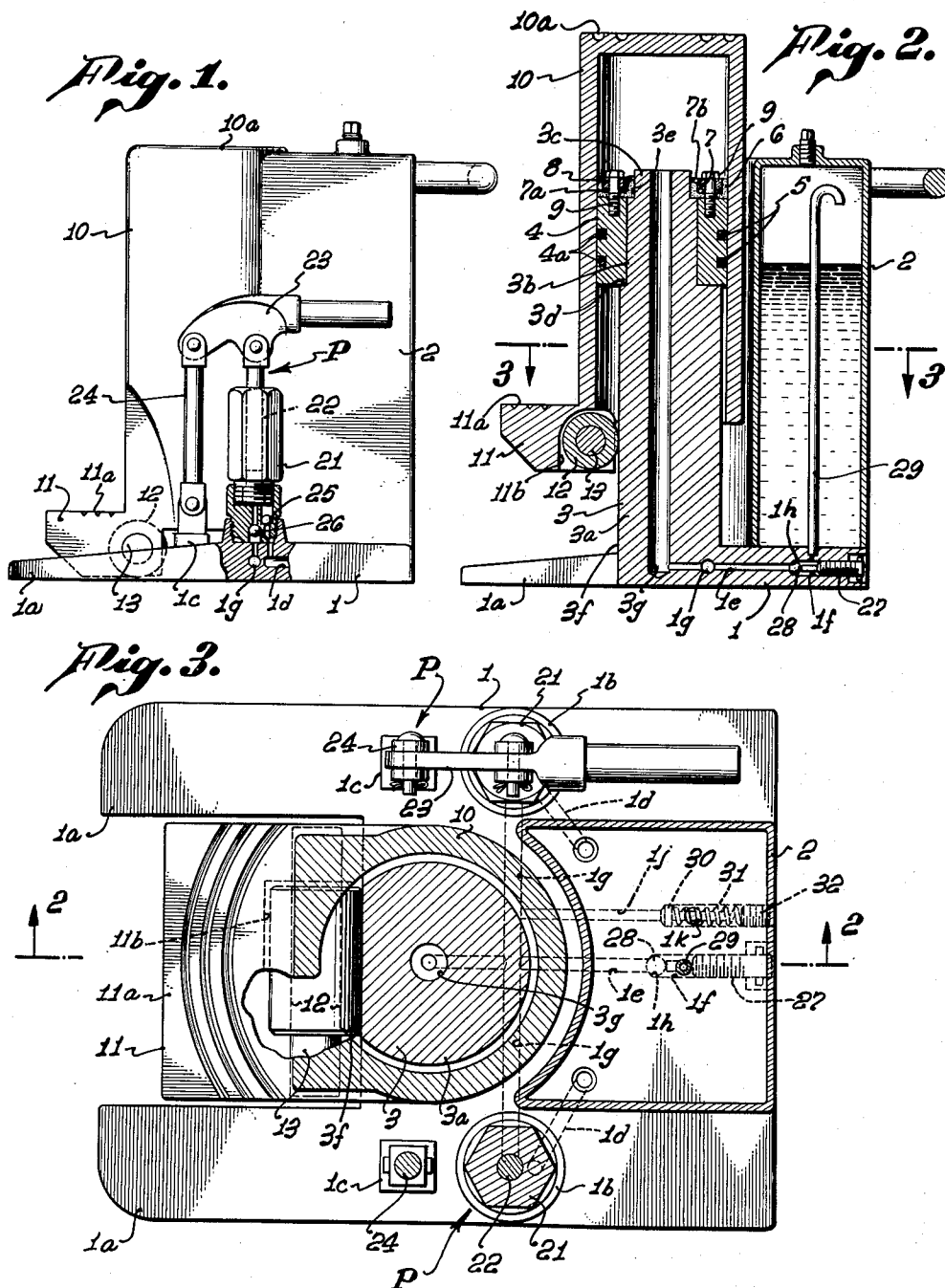
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HYDRAULIC JACK

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HYDRAULIC JACK

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My present invention relates to hydraulic jacks. One of the principal objects of this invention is to provide a jack of this class in which the moving or raising member comprises a cylinder reciprocally mounted over a stationary arm, post, or piston, and in which the cylinder is moved outwardly or raised by fluid pressure supplied through the arm, post, or piston.

Another important object of this invention is to provide a jack of this class having a moving or raising cylinder having an open end fitting over and reciprocally mounted on a stationary arm, post, or piston, and in which the cylinder is provided on the outer side of its open end portion with a lifting foot.

An important object also of this invention is to provide a jack of this type in which the cylinder is provided on the inner side near its open end portion with a thrust and anti-friction means which may ride against the side of the arm or post corresponding to the side of the cylinder having the lifting foot.

A further important object of this invention is to provide a hydraulic jack of this class which is relatively simple and economical of construction proportionate to its functions, and which will not readily deteriorate or get out of order.

With these and other objects in view, as will appear hereinafter, I have devised a hydraulic jack having certain novel features of construction, combination, and arrangement of parts and portions, as will be hereinafter described in detail, and particularly set forth in the appended claims, reference being had to the accompanying drawings and to the characters of reference thereon, which form a part of this application, in which:

Fig. 1 is a side elevational view of my new hydraulic jack in a preferred form, portions of the pump being broken away and in section to facilitate the illustration;

Fig. 2 is a sectional elevational view thereof, with the lifting member in a partly raised position, the section being taken on the line 2—2 of Fig. 3; and,

Fig. 3 is a transverse sectional view thereof in plan, taken through 3—3 of Fig. 2.

My hydraulic jack, as shown in the drawings, is supported on a flat base 1 carrying an upright reservoir 2 at one end and a pair of spaced feet 1^a at its opposite end, the feet being directed away from the reservoir.

Intermediate the ends of the base and substantially at the middle portion thereof is an upright arm or post 3 having a large diameter portion 3^a

extending a considerable distance upwardly from the base and adapted to support the principal load adapted to be carried by the jack. Extending axially upwardly from the main portion 3^a is a reduced cylindrical portion 3^b, and above the latter is another cylindrical portion 3^c which extends axially upwardly from the portion 3^b.

Over the reduced portion 3^b is pressed a stationary piston 4 which rests on a shoulder 3^d at the lower end of the reduced portion 3^b.

This piston may have a pair of annular grooves 4^a in which are positioned O-rings 5.

At the upper end of the piston 4 is a cup leather 6 which is of U-shaped cross-section. This cup leather covers the upper end of the piston as well as a shoulder 3^e at the bottom of the cylindrical portion 3^c. In the annular channel at the upper side of the cup leather is a sealing member 7 which is of Z-shaped cross-section, the lower flange 7^a of the sealing member being positioned in the bottom of the channel and the upper flange 7^b of the Z-shaped cross-section engaging the cylindrical wall of the portion 3^c. Against the upper side of the flange 7^a of the Z-shaped sealing member 7 is an annular ring 8 which is secured by means of screws 9 to the piston 4, thus securing the sealing member and the cup leather in position against the upper face of the piston and the upper end of the post.

Over the post 3 is reciprocally mounted the cylinder 10, the upper end of the cylinder having a head 10^a while the lower end of the cylinder is open. The walls of the cylinder fit tightly but slide readily over the piston 4, the O-rings 5 and the outer flange of the cup leather 6 sealing the space between the wall of the cylinder and the piston. The portion of the cylinder which extends below the piston is of larger diameter than the post and is therefore spaced slightly therefrom. The reservoir 2 has a vertical channel into which a portion of the cylinder extends but is spaced therefrom so as to provide free vertical movement.

The upper face of the head 10^a is constructed and arranged to move objects or loads upwardly or with respect to the base.

At the lower end of the cylinder 10 is also provided a load-lifting foot 11 which extends laterally from the wall of the cylinder, and in its lower position, that is, when the lower end of the cylinder rests upon the base, as shown in Fig. 2, is located between the feet 1^a of the base. When in its lowest position, the upper face 11^a

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of the lifting foot is positioned above the feet of the base, as shown in Figs. 1 and 2.

On the lower end of the cylinder, and immediately at the inner end of the lifting foot, but below the upper surface 11^a thereof, is a roller 12, the same being mounted upon a pin 13 supported at its ends in the wall of the cylinder. The roller 12 is located in a recess 11^b at the inner end of the foot. The inner side of the roller rides upon a flat surface 3^f alongside the post 3, which flat surface extends from the bottom of the base to the piston 4. As a load is lifted on the foot 11 of the cylinder, the lower end of the cylinder is forced towards the post, but the horizontal component of the load is borne between the roller and the flat surface 3^f of the post, providing anti-friction means between the lower end of the cylinder and the post and allowing the cylinder to be raised readily. As will be apparent, engagement of the roller with the flat surface 3^f prevents rotation of the cylinder on the post, the roller thus serving as a key. Said roller also prevents unintentional removal of the cylinder from the post by engagement of the roller with the lower side of the piston.

At both sides of the jack are provided pumps P for transferring the liquid in the reservoir 2 to the space between the piston and the upper end of the cylinder. This operating liquid is forced into the space through an axial post 3^e extending from the base to the upper end of the post, as shown in Fig. 2. Each pump comprises primarily a cylinder 21 which is screwed with its lower end into a boss 1^b in the base, a plunger 22 reciprocable longitudinally in the cylinder, and a pump-operating lever 23 which is pivotally connected at its end by means of a link 24 to a lug 1^c on the base, the lever being connected intermediate its ends but near its pivotally supported end, to the upper end of the plunger 22.

The base is provided with passages 1^d which connect the lower end of the reservoir 2 with the inner ends of the pump cylinders 21, check valves 25 being provided in such passages to allow the fluid to pass into the pump cylinders and prevent the return of the fluid to the reservoir. The base is provided with a longitudinal passage 1^e which connects the lower end of the axial passage 3^e of the bore with an enlarged passage 1^f in the base immediately below the reservoir, as will be described hereinafter. The passage 1^e is intercepted by transverse passages 1^g which are connected to the lower ends of the pump cylinders 21. In these passages 1^g are provided other check valves 26 which permit the fluid under pressure to be forced from the pump cylinders into the axial passage 3^e in the post for raising the lifting cylinder 10 of the jack.

The aforementioned passage 1^f extends to the rear end of the base, as shown in Figs. 2 and 3. In this passage is screwably mounted a pressure-release valve member 27. At the end of the passage 1^e, opposite the axial passage 3^e of the post, is a seat 1^h against which a pressure-release ball valve 28 is forced by the inner end of the member 27 when the pumps are operated for moving the lifting cylinder 10. The outer end of the member 27 is provided with a handle for manually operating the same when seating or unseating the ball valve 28.

The inner end of the passage 1^f has an outlet to the reservoir 2, but this outlet is provided with a tube 29 so that the fluid from the space above the piston is discharged into the upper end of the reservoir, the upper end of the tube 29 being

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positioned at substantially the elevation of the upper end of the post 3, as shown in Fig. 2.

A safety valve is also provided for the jack. This valve may consist of a valve member 30 pressed by a spring 31 against the end of a passage 1^j, which connects one of the passages 1^g with a small port 1^k in the base at the bottom of the reservoir. The tension of the spring may be controlled by a plug 32 at the rear end of the base.

I wish it to be understood that I do not desire to be limited to the exact details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

I claim:

1. A hydraulic jack comprising a base, a post extending upwardly from said base, a cylinder closed at the top and open at the bottom slidably mounted on said post with its open lower end surrounding said post, said post being provided at its upper end with a fluid tight slidable seal with the interior of said cylinder, means to force a fluid into the space between said post and the upper end of said cylinder for moving said cylinder upwardly on said post, a foot projecting from said cylinder at the bottom thereof for supporting a load thereon, said post being provided with a flat upwardly extending surface normal to the radius of said cylinder within the circular outline of the cylinder adjacent the foot, means on the cylinder extending transversely thereof and normal to the radius thereof and engageable with said flat surface of said post for preventing relative rotation of said cylinder and said post and for taking the lateral force resulting from a load supported from said foot said seal being engageable with said means on the cylinder for preventing removal of the cylinder from the post.

2. A hydraulic jack comprising a post provided with a piston at one end, a cylinder closed at one end and open at the other end telescopically mounted over the said one end of said post with a fluid tight sliding contact with said piston, said post having a flattened side extending from said base to said piston, said flattened side being within the periphery of said cylinder and terminating on the side of said piston closest to the other end of said post, a roller mounted on said cylinder adjacent the open end thereof engaging said flattened surface of the post whereby said cylinder will be prevented from removal from said post while the roller is in position, said roller having continuous rolling contact with said flattened surface over substantially the entire width thereof.

3. A hydraulic jack comprising a base, a post extending from said base and provided with a piston at its free end, a cylinder closed at one end and open at the other telescopically mounted on said post with a fluid tight sliding contact with said piston, said post having a side portion extending from said base to said piston, said side portion being within the outline of said piston and being of a shape different from the periphery of said piston and within the projected outline of said piston within the periphery of said cylinder and terminating on the side of said piston closest to said base, a roller mounted on said cylinder adjacent the open end thereof engaging said side portion of the post for rolling contact therewith whereby said cylinder cannot rotate relative to said post and said cylinder will be prevented from removal from said post while the roller is in position.

4. A hydraulic jack comprising a base, a post extending from said base and provided with a

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piston at its free end, a cylinder closed at one end and open at the other telescopically mounted on said post with a fluid tight sliding contact with said piston, said post having a side portion extending from said base to said piston, said side 5 portion being within the outline of said piston and being of a shape different from the periphery of said piston and within the projected outline of said piston within the periphery of said cylinder and terminating on the side of said piston closest 10 to said base, a roller mounted on said cylinder adjacent the open end thereof engaging said side portion of the post for rolling contact therewith whereby said cylinder cannot rotate relative to 15 said post and said cylinder will be prevented from removal from said post while the roller is in position, and a laterally extending foot projecting

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outwardly from said cylinder substantially normal to and adjacent the roller for supporting a load thereon.

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