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My present invention relates to hydraulic pressure-generating devices, such as hydraulic jacks. Conventional hydraulic jacks have a work-lifting piston and a pumping piston for generating the hydraulic pressure. Heretofore the pumping pistons have extended from the pumping cylinder, where they are connected to the actuating levers. This construction has presented certain objections. For instance, the protruding end of the pumping piston, upon receiving a blow from any heavy object, often becomes bent and inoperative. Moreover, it is relatively easy for dirt, water and other foreign elements to work into the pumping mechanism past the packing, where it scores or otherwise damages the piston cylinder. Also in such conventionally constructed jacks, if any high pressure leak should develop past the packing, valuable hydraulic fluid is lost, requiring frequent refilling of the fluid reservoir and the escaping oil tends to collect on the exposed parts and collect dust.

An object of my invention is to provide a hydraulic jack which eliminates those difficulties by placing the pump-operating mechanism and pumping piston within a closed chamber or within the fluid reservoir itself so that they are not exposed and so that any fluid which might escape under pressure from the pumping cylinder merely returns to the reservoir and is not lost.

Another of the principal objects of my invention is to provide a pump-actuating means which may be optionally operated to provide double action for establishing quick contact of the lifting piston with the work to be lifted.

My invention has still other subordinate advantages and features of novelty which those familiar with the art will readily understand from the following detailed description of one embodiment which I have chosen for explanatory purposes, it being understood, of course, that within the broader scope of the invention as defined by the appended claims, the invention may be embodied in other physical forms. For purposes of the following description I shall refer to the accompanying drawings, in which:

Fig. 1 is a plan section;
Fig. 2 is a section on line 2—2 of Fig. 1;
Fig. 3 is a section on line 3—3 of Fig. 1;
Fig. 4 is a section on line 4—4 of Fig. 1; and
Fig. 5 is a view taken on line 5—5 of Fig. 1.

Referring to the drawings, I show a body 5 providing a fluid reservoir R and a pair of cylinders 6, 7 of relatively different diameters. A tubular member or cylinder 10 is threaded at its bottom end in a recess 11 in the body, and a cylindrical wall 12 around the cylinder 10 provides an annular auxiliary reservoir R' which communicates with the main reservoir R through a port 14.

Pistons 15, 16, respectively, are reciprocally mounted in cylinders 6, 7, being urged outwardly of the respective cylinders by compression springs 17, 18. Pressure chambers 19, 20, respectively, are provided between the inner ends of the pistons 15, 16 and their respective cylinders.

A work-engaging piston 25 is reciprocally mounted in cylinder 10, its inner end providing, with the bottom of the recess 11, a pressure chamber 25.

Valve chambers 30, 31 are provided in the body, there being a ball check valve 33 seating toward the reservoir in chamber 31 to control the inlet from the reservoir, the valve being urged seated by a spring 34. A ball check valve 35, urged seated toward chamber 31 by a spring 36, controls flow of fluid between chamber 31 and chamber 26 through a port 38. A screw plug closes the outer end of valve chamber 30.

Valve chamber 31 communicates with chambers 19, 20 through connecting ports 39, 43. To release fluid from chamber 26, as is necessary when it is desired to lower the jack, I provide a needle valve 42 threaded through an opening 43 in the body and cooperating with one end of port 38.

For actuating the pistons 15, 16 I provide a transverse shaft 50 which is journaled at its ends in the body and has secured thereon two collars 51, 52. Collar 51 presents a single lobe cam 53 and collar 52 presents a double lobe cam 54.

To the outer end of shaft 50 I secure a socket member 60 presenting oppositely opening sockets 61, 62 and a crank-receiving socket 63. An actuating lever may be inserted in either of the sockets 61 or 62, or, for rotation, a crank may be inserted in socket 63.

It will be observed that on each suction stroke of the pistons 15, 16, or either of them, fluid is drawn from the reservoir past check valve 33 and through ports 39, 40 into chambers 19 and 20, and on each pressure stroke the fluid is forced from the chambers 19 and 20 past check valve 35 and through passageway 39 into chamber 26 to raise the piston 25.

With the socket member 60 and shaft 50 in the position shown in the drawings, if the actuating lever is oscillated about the 90° are denoted by the arrow 70 in Fig. 5, only the top lobe of cam 54 will engage piston 16 on each forward movement of the lever to move the piston inwardly.
of its cylinder, the piston being returned by its spring 18. However, if the actuating lever be oscillated about the 180° arc indicated by the arrows 18, 11, on each forward stroke the top lobe of cam 54 will operate piston 16 while on each backward stroke the bottom lobe of cam 54 will engage piston 16 and the single lobe of cam 53 will simultaneously engage piston 16. Or, upon full rotation of the shaft 59 all three cam lobes will engage and actuate the pistons. If the shaft 59 is rotated about 180° to reverse the relative positions of the sockets 61, 62 from the positions shown in the drawings, a movement of the actuating lever about the arc denoted by arrow 70 will cause cam lobe 53 to engage piston 16 and simultaneously will cause one lobe of cam 54 to engage piston 16.

Thus, for effecting relatively rapid protraction of the piston 25 the operation of the cams will be as last above described, or the shaft may be rotated about full revolutions. When the load is contacted or slower operation is desired, the shaft may be returned to the piston shown in the drawings and the actuating lever operated about the arc denoted by the line 70.

I claim:

1. In a hydraulic pressure-generating device, a body providing a closed compartment and a pair of parallel cylinders opening into the compartment, a pumping piston reciprocally mounted in each cylinder and having its outer end exposed to the compartment, the inner end of each piston forming with the inner end of its cylinder a pressure-generating chamber one of the cylinders and its corresponding piston being of larger diameter than the other cylinder and its corresponding piston, a pair of cam members in the compartment journalled in the body for rotative camming engagement with the outer ends of the pistons to move the same in their pressure strokes, means for actuating the cam members, spring means cooperating with each of the pistons to move the same in its suction stroke, first valve controlled means for admitting fluid to the pressure-generating chamber upon each suction stroke of the respective pistons, and second valve controlled means passing fluid under pressure from the pressure-generating chambers upon each pressure stroke of the respective pistons.

2. The device of claim 1 wherein one of the cam members is disposed opposite the other cam member.

3. In a hydraulic pressure-generating device, a body providing a closed compartment and a pair of parallel cylinders opening into the compartment, a pumping piston reciprocally mounted in each cylinder and having its outer end exposed to the compartment, the inner end of each piston forming with the inner end of its cylinder a pressure-generating chamber one of the cylinders and its corresponding piston being of larger diameter than the other cylinder and its corresponding piston, a shaft in the compartment, said shaft being journalled in the body for rotation about an axis normal to the longitudinal axis of the cylinder, a pair of cam members on the shaft positioned to have alternate camming engagement with the outer ends of the pistons upon rotation of the shaft to impart the pressure strokes to the pistons, means for rotating the shaft, spring means cooperating with each piston to impart the suction stroke thereto, first valve controlled means for admitting fluid to the pressure-generating chamber upon each suction stroke of the respective pistons, and second valve controlled means passing fluid under pressure from the pressure-generating chambers upon each pressure stroke of the respective pistons.
pressure from the pressure generating chambers upon each pressure stroke of the respective pistons.

HERBERT E. PAGE.

REFERENCES CITED

The following references are of record in the file of this patent:

<table>
<thead>
<tr>
<th>UNITED STATES PATENTS</th>
<th>FOREIGN PATENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
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<tr>
<td>1,018,662</td>
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