No. 833,457. PATENTED OCT. 16, 1906.

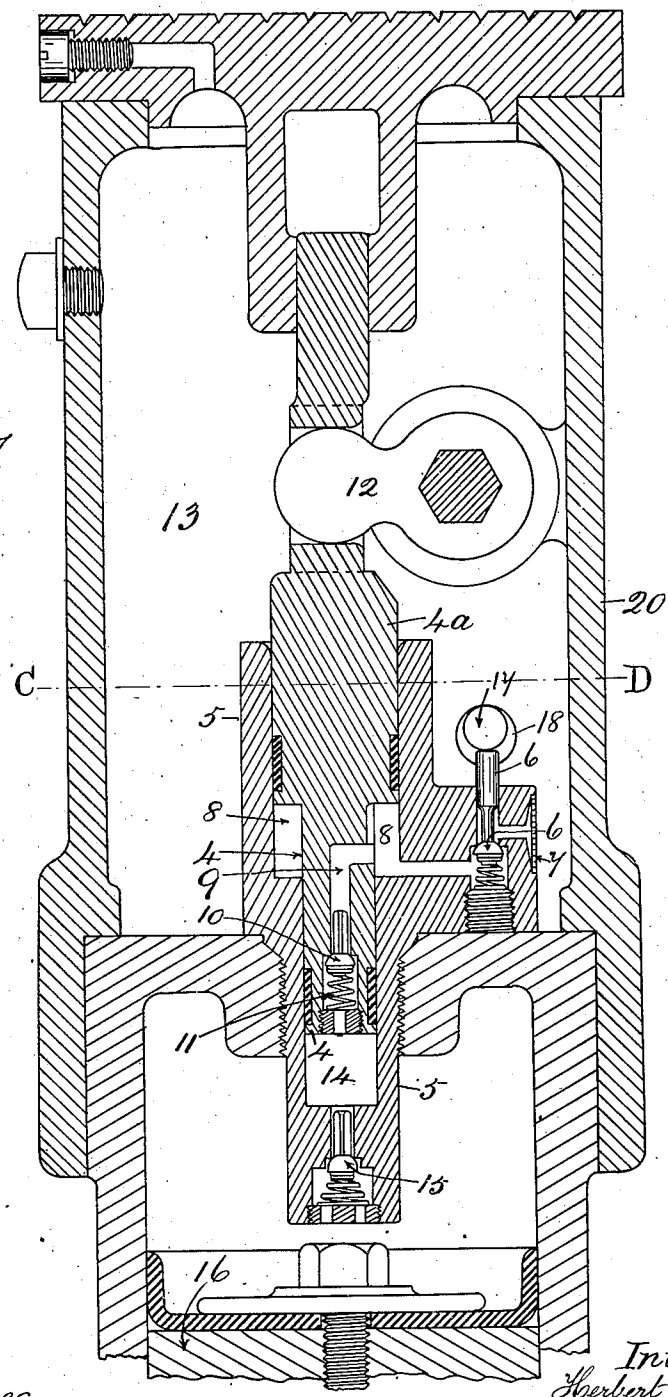
H. HAMMOND.

PUMP FOR HYDRAULIC JACKS AND OTHER PURPOSES.

APPLICATION FILED AUG. 11, 1903.

2 SHEETS—SHEET 1.

Fig 1



Witnesses.
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2 SHEETS—SHEET 2.

Fig 2

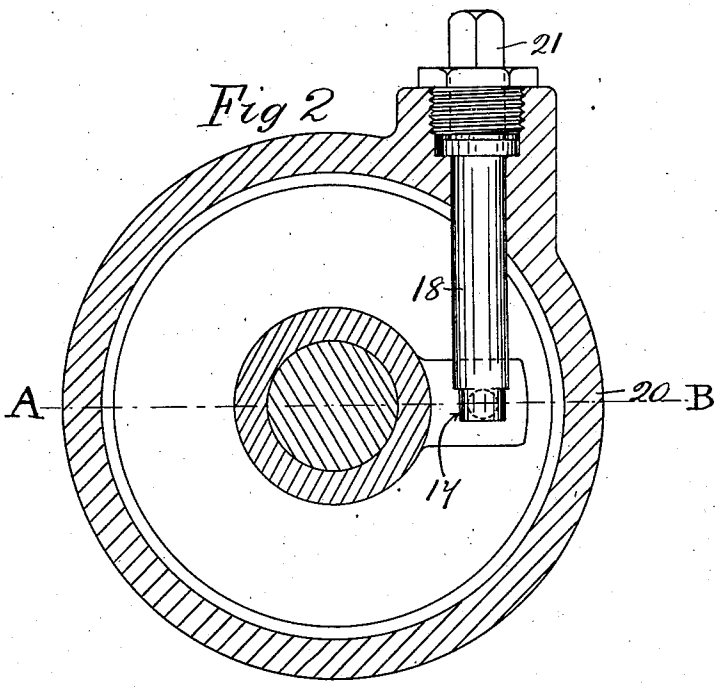
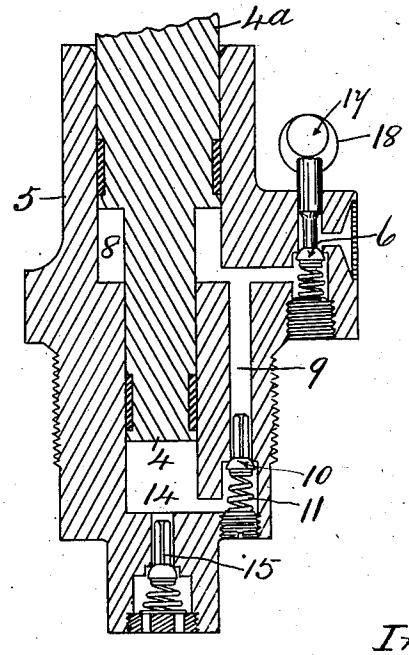


Fig 3



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UNITED STATES PATENT OFFICE.

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PUMP FOR HYDRAULIC JACKS AND OTHER PURPOSES.

No. 833,457. Specification of Letters Patent. Patented Oct. 16, 1906.

Application filed August 11, 1903. Serial No. 169,152.

To all whom it may concern:

Be it known that I, HERBERT HAMMOND, a subject of the King of Great Britain, and a resident of Greenfield House, Cradley Heath, in the county of Stafford, England, have invented certain new and useful Improvements in Pumps for Hydraulic Jacks and other Purposes, of which the following is a specification.

My invention relates to improvements in hydraulic pumps, such as are used for testing pressures, hoisting machinery, presses, lifting-jacks, and the like purposes.

The pump involves a piston having portions of different diameters, a casing for the piston of different internal diameters, check-valves arranged to directly coöperate with the respective portions of the piston, and an additional check-valve arranged to coöperate directly with the larger portion of the piston, means being provided for putting the last-mentioned check-valve into an inoperative position whereby I can secure the advantages hereinafter described.

In the drawings, Figure 1 is a sectional elevation of my invention on line A B, Fig. 2. Fig. 2 is a sectional plan of the invention on line C D, Fig. 1. Fig. 3 shows a modified position of the valve through which the water passes to the under side of the lower plunger.

Similar reference-numbers refer throughout the views to the same thing or part.

I have illustrated this my invention as applied to a hydraulic lifting-jack as an example; but it will be readily seen that it may equally be applied to similar apparatus for other purposes.

The plunger is made of two diameters—that is to say, the lower plunger 4 is an extension from the upper larger plunger 4^a. The cylinder 5 is made to agree with the two diameters of the plungers. A general inlet-valve 6 is provided, which admits the water through the gauze covering 7 to the chamber 8 beneath the larger plunger 4^a. A water-passage 9 is made leading from the chamber 8 to the non-return valve 10, which said valve is held to its seating by spring 11. Hence, when the plungers are raised by means of the lever 12 or other device the water is drawn from the reservoir 13 through the valve 6 into the chamber 8 and also down the passage 9 into the chamber 14 below the bottom plunger 4.

From the chamber 14 the outlet is provided with the non-return valve 15, through which the water is forced to the pressure-chamber above the ram 16.

It will be noted that the passage 9 serves the double purpose of providing a means of supply to the chamber 14 and a means of delivery from the chamber 8 through the chamber 14 to the pressure-chamber.

I may, if desired, not put the valve 10 in the plunger, as shown in Fig. 1, but place it in the cylinder at the side of the plunger, with suitable passages leading from the chamber 8 to the chamber 14. (See Fig. 3.)

17 is a cam formed on the end of the spindle 18, which latter is suitably carried in the frame 20 of the machine and capable of rotation by the square formation 21 or other means. The purpose of this spindle and cam is that when the cam is placed at its highest position, as shown in Fig. 1, the valve 6 is free to open and close in the ordinary manner; but when the said spindle is turned through half a revolution the valve is pushed and held downward from off its seat. Consequently, as the plungers descend the water which lies above the valve 10 is forced back through the now open valve 6, and therefore the water only below the valve 10 is forced through the valve 15 to the ram 16, and by reason of the comparative diminuation of area of the plunger 4 to that of the plunger 4^a so the force is increased. Hence when the lower power is required the valve 6 is left free to open and close under the action of the water by the plungers; but when the greater power is required the valve 6 is tripped or held open by the cam 17, when the large plunger 4^a ceases to force water to the ram-chamber and the small plunger 4 only operates for this purpose.

It will be readily seen that the means for tripping the valve may be modified in detail, the object being to trip the valve when required.

By these means various operations may be performed much quicker than by present apparatus, such as the preliminary filling of vessels to be tested or bringing up the pressure to near the final stage, while in other

cases it affords practically two sizes of lifting-jack or the like tackle in one machine, and its compactness permits its applicability to replace much apparatus now in use, as it requires practically no more space.

While in the foregoing specification I have referred to water as the fluid employed, it is obvious that any other substantially non-compressible fluid would answer the same purpose.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of a piston having portions of different diameters, a casing for the piston, of different internal diameters, two check-valves arranged to directly coöperate with the respective portions of the piston, an additional check-valve arranged to coöperate directly with the larger portion of the piston, and means for putting the last-mentioned check-valve into an inoperative position.

2. The combination of a piston having a portion of large diameter and a portion of small diameter, the latter constituting a prolongation of the former, a casing for the piston, of internal form, to agree with the external shape of the piston and having an inlet-passage in communication with the casing, two check-valves arranged to coöperate directly with the large and small portions of the piston, and an additional check-valve located substantially at the entering end of said inlet-passage, arranged to directly and normally coöperate with the larger portion of the piston and to be moved into an inoperative position independently of the action of the piston.

3. The combination of a cylinder and a ram, a piston having portions of different diameters, a casing for the piston, of different internal diameters, said piston and its casing being operatively associated with the cylinder and ram, two check-valves arranged to directly coöperate with the respective portions of the piston, and an additional check-valve arranged to normally and directly cooperate with the larger portion of the piston and to be moved into an inoperative position independently of the action of the piston.

4. In a device of the class described, the combination with a cylinder and ram, of a pump-block comprising bores of different diameters, a check-valve for preventing the upward outflow from the larger bore, means for making said check-valve inoperative, a check-valve for controlling upward outflow from the smaller bore, said valve being rendered inoperative by a current of fluid from the larger bore, a check-valve controlling upward outflow from the space within the cylinder, and pistons in said bores, substantially as set forth.

5. In a device of the class described having a reservoir, a ram-chamber, two pumps and corresponding pump-chambers, the combination of a valved passage from reservoir to first pump-chamber, means for controlling operation of said valve, a valved passage connecting the two pump-chambers, and a valved passage between the last pump-chamber and the ram-chamber.

6. In a device of the class described having a reservoir, a ram-chamber, a double pump and corresponding pump-chambers, the combination of a fluid-passage from reservoir to ram-chamber with which both pump-chambers communicate, valves in said passage, one controlling inlet, one controlling outlet, and one controlling flow from one pump-chamber to the other, and means for holding the first-mentioned valve off its seat.

7. In a device of the class described, the combination, with a reservoir, a ram-chamber, a double pump and corresponding pump-chambers, of a fluid-passage from reservoir to ram-chamber which includes the last one of said pump-chambers, a valve controlling inlet from said reservoir, a valve controlling outlet to said ram-chamber and a valve controlling flow from one pump-chamber to the other, and means for controlling operation of said first-mentioned valve.

8. In a device of the class described, the combination, with a reservoir, a ram-chamber, a double pump and corresponding pump-chambers, of a fluid-passage from reservoir to first pump-chamber, a valve in said passage, means for controlling operation of said valve, a valved fluid-passage from said first pump-chamber to the second pump-chamber, and a valved fluid-passage from said second pump-chamber to the ram-chamber.

9. In a device of the class described, the combination, with a ram-chamber and a reservoir, of two communicating pump-chambers arranged tandem, one communicating with the reservoir and the other with the ram-chamber, a valve controlling communication between the two pump-chambers, a valve controlling the communication between the ram-chamber and the pump-chamber communicating with it, a valve controlling communication between the reservoir and the pump-chamber communicating with it, means for rendering the last-named valve inoperative, and pistons in the pump-chambers.

10. In a device of the character described, the combination, with a cylinder and ram and a reservoir, of two pump-chambers arranged tandem, one communicating with the reservoir and the other with the cylinder, connected pistons in said pump-chambers, said pistons having a passage to establish communication between the two pump-chambers, a valve in said passage, a valve controlling the communication between the

pump-chambers and said cylinder, a valve controlling communication between the reservoir and said chambers, and means for rendering the last-named valve inoperative.

11. In a device of the class described, the combination, with a ram-chamber and a reservoir, of two pump-chambers arranged tandem and one being of greater diameter than the other, a valved passage connecting the reservoir with the chamber of greatest diameter, means for rendering the valve inoperative, a valved passage between the two pump-chambers, a valved passage between the smaller pump-chamber and the ram-chamber, and pistons in said pump-chambers.

12. A device of the class described having two pump-pistons and corresponding pump-chambers, a supply-chamber, a pressure-chamber, and a passage from said supply-chamber to one pump-chamber a part of which also serves as a means of communication between the other pump-chamber and said pressure-chamber.

13. A device of the class described having a supply-chamber, a large pump-chamber, a small pump-chamber, a pressure-chamber, and a passage leading from said supply-chamber to said small pump-chamber with which said large pump-chamber communicates, all of said passages serving as a means of supply to the pump-chambers and a part thereof also serving as a pressure-passage from large pump-chamber to said pressure-chamber.

14. A device of the class described having a pressure-chamber, a larger pump-chamber, a smaller pump-chamber, means for supplying a liquid to the smaller pump-chamber which comprises a passage through a part of which the liquid is forced from the larger pump-chamber on its way to the pressure-chamber, and a valve arranged in said passage.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HERBERT HAMMOND.

Witnesses:
C. HAYWARD POWELL,
J. BERNARD HAYWARD