

No. 868,395.

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A. W. BAIRD.
PUMP.

APPLICATION FILED OCT. 17, 1905.

Fig. 1.

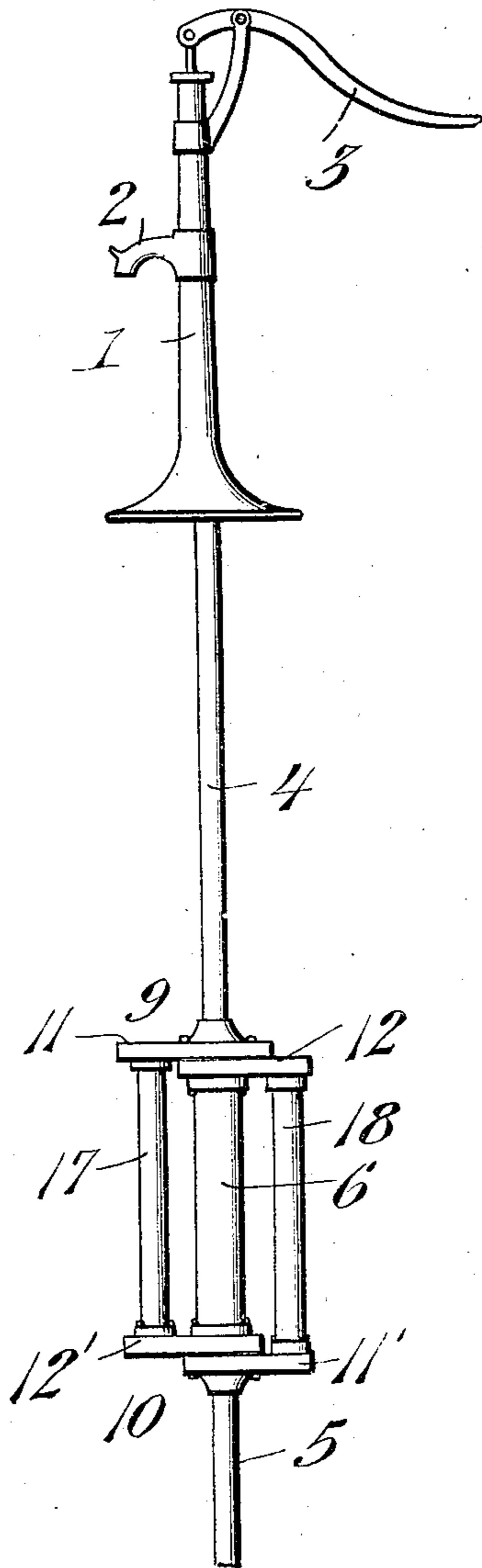
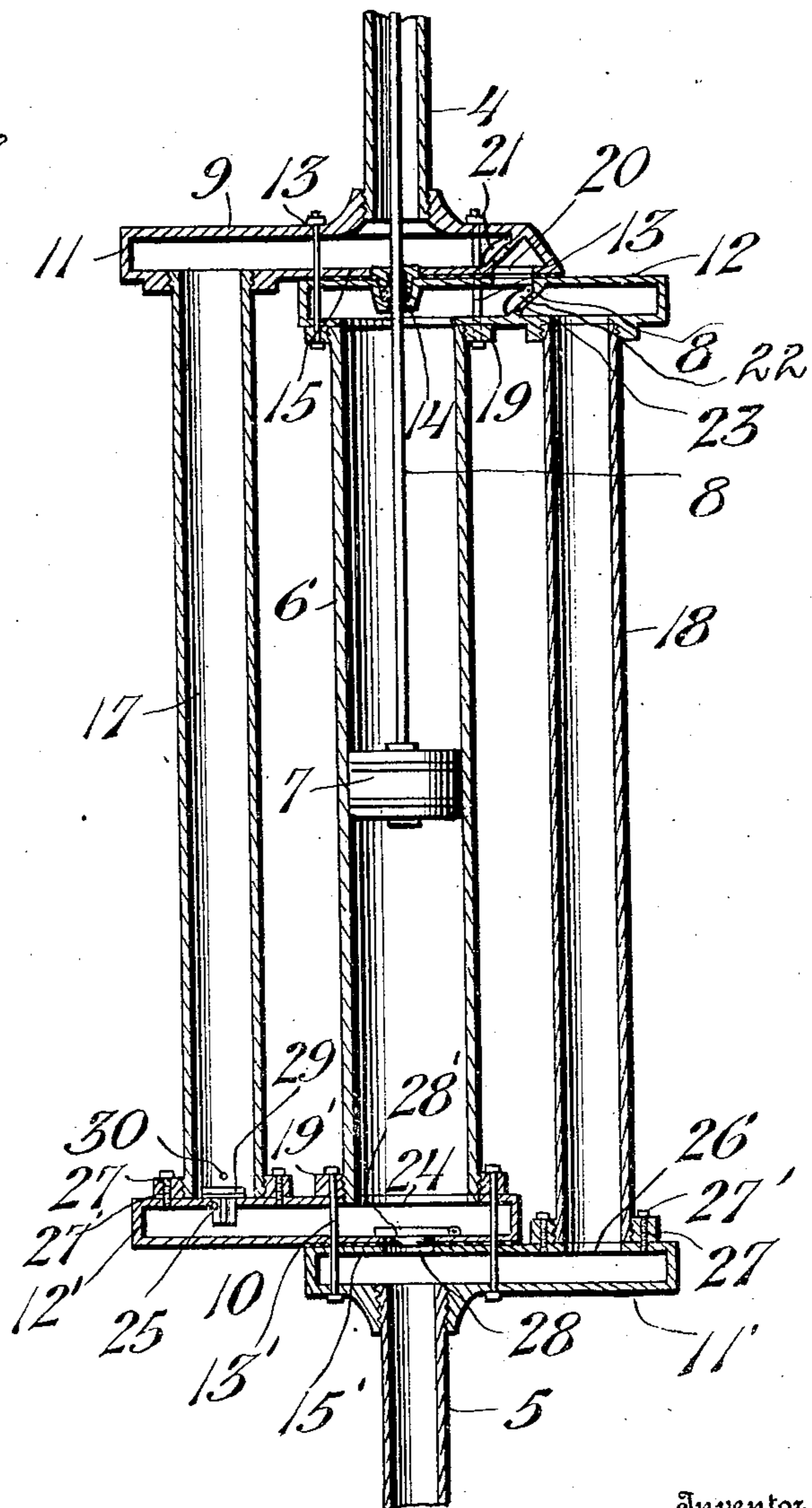


Fig. 2.



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PUMP.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ANDREW W. BAIRD, a citizen of the United States of America, residing at Marne, in the county of Cass and State of Iowa, have invented new and useful Improvements in Pumps, of which the following is a specification.

This invention relates to a single-cylinder double-acting suction and force pump, the object of the invention being to provide a pump of this character which is simple of construction, durable and efficient in use, comparatively inexpensive of production, and adapted to discharge water upon each stroke of the piston thereof, and one wherein the parts are readily accessible for renewal and repairs and the cylinder and flow pipe are so relatively arranged and mounted as to secure a perfect balancing action and prevent excessive side strain upon the suction and delivery pipes.

With the above and other objects in view, the invention consists of the features of construction and combination of parts hereinafter fully described and claimed, reference being had to the accompanying drawings, in which:—

Figure 1 is a side elevation of a pump constructed in accordance with my invention. Fig. 2 is a central vertical section on an enlarged scale through the cylinder and allied parts.

Referring now more particularly to the drawings, the numeral 1 designates the stock of the pump, which is provided with a discharge nozzle 2 and piston-operating hand lever 3, although any preferred means for operating the piston may be employed.

4 is the water discharge pipe which communicates at its upper end with the stock, and 5 the suction pipe.

The cylinder 6 is arranged between and disposed in alinement with the pipes 4 and 5, and operating therein is a piston 7, attached to the lower end of the rod 8 which extends upwardly through the discharge pipe and stock and is connected with the lever 3.

9 and 10 are heads, respectively, connecting the upper and lower ends of the cylinder and flow pipes with the pipes 4 and 5. The head 9 comprises two hollowed or chambered castings 11 and 12 having their inner ends overlapping and joined by bolts 13. The meeting walls of these castings are suitably constructed to form a stuffing box 14 through which the piston rod extends, and packing 15 is arranged between the same to form a water tight joint. The outer ends of these castings are formed in their lower walls with threaded openings for the reception of the upper ends of flow pipes 17 and 18 arranged parallel with and on opposite sides of the cylinder 6, while the inner end of the bottom casting 12 is formed with an opening to communicate with the upper end of the cylinder, which is secured thereto by a threaded coupling ring 19 secured in position by the bolt 13. The castings are in communication at one side of the cylinder

through a port 20 controlled by an upwardly opening check valve 21. In the casting 12 is a ported partition 22 disposed below the port 20 and between the points of communication of the upper end of the cylinder and upper end of the pipe 18 with the interior of the casting 12. This partition supports the pivoted check valve 23 which controls the port therein and is adapted when open to close the port 20. The head 10 comprises similar hollow castings 11' and 12' united by the bolts 13' and arranged in lapping relation, packing 15' being disposed between the abutting walls of said castings to form a tight joint. The upper walls of these castings are formed with ports communicating with the cylinder and flow pipe, the ports 24 and 25 in the casting 12' communicating with the cylinder and flow pipe 17, while the port 26 in the casting 11' communicates with the flow pipe 18. These pipes are detachably connected with the castings by threaded coupling rings 19' and 27, secured, respectively, by the bolts 13' and screws or analogous fastenings 27'. The lapping walls of the castings are provided in line with the cylinder and suction pipe with a port 28 controlled by an upwardly opening check valve 28', while the port 25 communicating with the pipe 17 is controlled by an upwardly opening winged check valve 29 limited in its upward movement by a stop 30. The upper and lower walls of the respective castings 11 and 11' are threaded for the reception of the discharge and suction pipes, which lie in longitudinal alinement with the interposed cylinder. This construction of the heads facilitates their manufacture and permits of their ready application and removal for renewal and repairs, and by the described arrangement of the parts it will be seen that the weight of the flow pipes is equally distributed on opposite sides of the cylinder and the objectionable side strain of these parts in pumps of that character in which the pipes are arranged upon the side of the cylinder, discharge pipe or stock is effectually prevented.

For convenience of description, and for better reference generically to the novel features of the invention in the claims, I will term in the following description of the operation the chambers 11' and 12' of the lower head 10 suction and discharge chambers, and will similarly term the chambers 12 and 11 of the upper head 9. It will be understood in practice that the specific construction set forth is not essential to the operation of the device, as each head may consist of a single casting partitioned to form suction and discharge chambers.

Upon the upward movement of the piston 7, water from the suction pipe 5 will be drawn directly into the flow pipe 18 and indirectly through the check valved port 28 into the lower end of the cylinder 6. That portion of the water drawn into the pipe 18 will flow

through the check valved partition 22 into the upper suction chamber 12 and thence into the upper end of the cylinder 6 and will be discharged through the port 20 and check valve 21 upon the ensuing up stroke of the piston. On such movement of the piston, the valve 23 will rise to open the port in partition 22 for the passage of the water to the upper end of the cylinder, and will close the port 20 to prevent any retarding or checking action in the flow of the water caused by its tendency to slosh through said port. This movement of the valve 23 into port 20 also permits the valve to move upwardly flush with the upper wall of the head 12 to open the port for the free and unobstructed flow of water from the pipe 18 to the cylinder. If any water should be left remaining in the cylinder above the piston, the valve 23 will close the port in the partition 22 on the upward movement of the piston under the pressure of the water, while the valve 21 will open and allow the water to discharge into the suction chamber 9. Upon the down stroke of the piston the water previously taken into the lower end of the cylinder and lower discharge chamber 12' will be forced through the port 25, flow pipe 17 and upper discharge chamber 11 into the discharge pipe 4, the valve 29 in this operation opening under the pressure of the water and then closing to prevent its return. The action of the check valve 28' will be readily understood, as will also the action of the check valve 21, and it will be seen that by means of the improved organization of parts herein disclosed water will be discharged through the pipe 4 upon each up and down stroke of the piston, thus increasing the working capacity of the pump.

Having thus described the invention, what is claimed as new, is:—

1. A double-acting pump comprising suction and discharge pipes, a cylinder interposed between said pipes and in alinement therewith, flow pipes arranged on opposite sides of the cylinder, a lower head connecting the suction pipe with the lower ends of the cylinder and flow pipes, said head comprising two independent detachably coupled sections arranged in lapping relation and forming suction and discharge chambers, respectively communicating with one of the flow pipes and the cylinder and other flow pipe, an upper head connecting the discharge pipe with the upper ends of the cylinder and flow pipes and comprising two independent sections overlapping and detachably coupled at their inner ends and forming suction and discharge chambers communicating respectively with one of the flow pipes and the cylinder and the other flow pipe and discharge pipe, said chambers also having a communicating check valved port, suitable check valves controlling the flow of water between the pipes and heads, whereby

water will be alternately discharged through the flow pipes upon the suction and force strokes of the piston, the construction described permitting of the ready connection and disconnection of the sections of the head, a piston operating in the cylinder, a rod connected with the piston and extending upwardly through the upper head and discharge pipe, and operating means connected with said rod, substantially as described.

2. A single-cylinder double-acting suction and force pump, comprising suction and discharge pipes, a cylinder interposed between said pipes and in alinement therewith, flow pipes arranged on opposite sides of the cylinder, a lower head comprising top and bottom chambers provided with an intercommunicating check-valved port below the cylinder and above the suction pipe, the lower chamber being in communication at its outer end with one of the flow pipes and at its inner end with the suction pipe and the upper chamber in communication at its inner end with the cylinder and at its outer end through a port with the other flow pipe, said port being controlled by an upwardly opening check-valve, an upper head comprising top and bottom chambers having a communicating port, said chambers being in communication at their outer ends with the flow pipes respectively connecting with the top and bottom chambers of the lower head and at their inner ends with the discharge pipe and cylinder, ported partitions arranged respectively in the bottom and top chambers of the said upper head on lines between their intercommunicating ports, the flow pipe connected with the bottom chamber and the discharge pipe connected with the top chamber, upwardly-opening check-valves controlling the ports in said partitions, the check-valve in the bottom chamber being adapted when open to close the said intercommunicating port, a piston operating in the cylinder, a rod connected with the piston and extending upwardly through the upper head and discharge pipe, and operating means connected with said rod, substantially as described.

3. In a pump of the character described, a cylinder, suction and discharge pipes, flow pipes arranged on opposite sides of the cylinder, a bottom head having chambers, one connecting with the suction pipe and one of the flow pipes and the other directly with the cylinder and having check valved communication with the first-named chamber and the other flow pipe, and a top head having bottom and top chambers, the top chamber communicating directly with the latter-named flow pipe and the discharge pipe and the bottom chamber with the cylinder and other flow pipe, said chambers being in communication through a discharge passage, a ported partition in the bottom chamber between the cylinder and flow pipe and having a valve adapted to open upwardly under pressure from the latter into the port between the chambers, a second ported partition in the upper chamber between said port and the discharge pipe, and a check valve controlling the port in said partition.

In testimony whereof, I affix my signature in presence of two witnesses.

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Witnesses:

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