

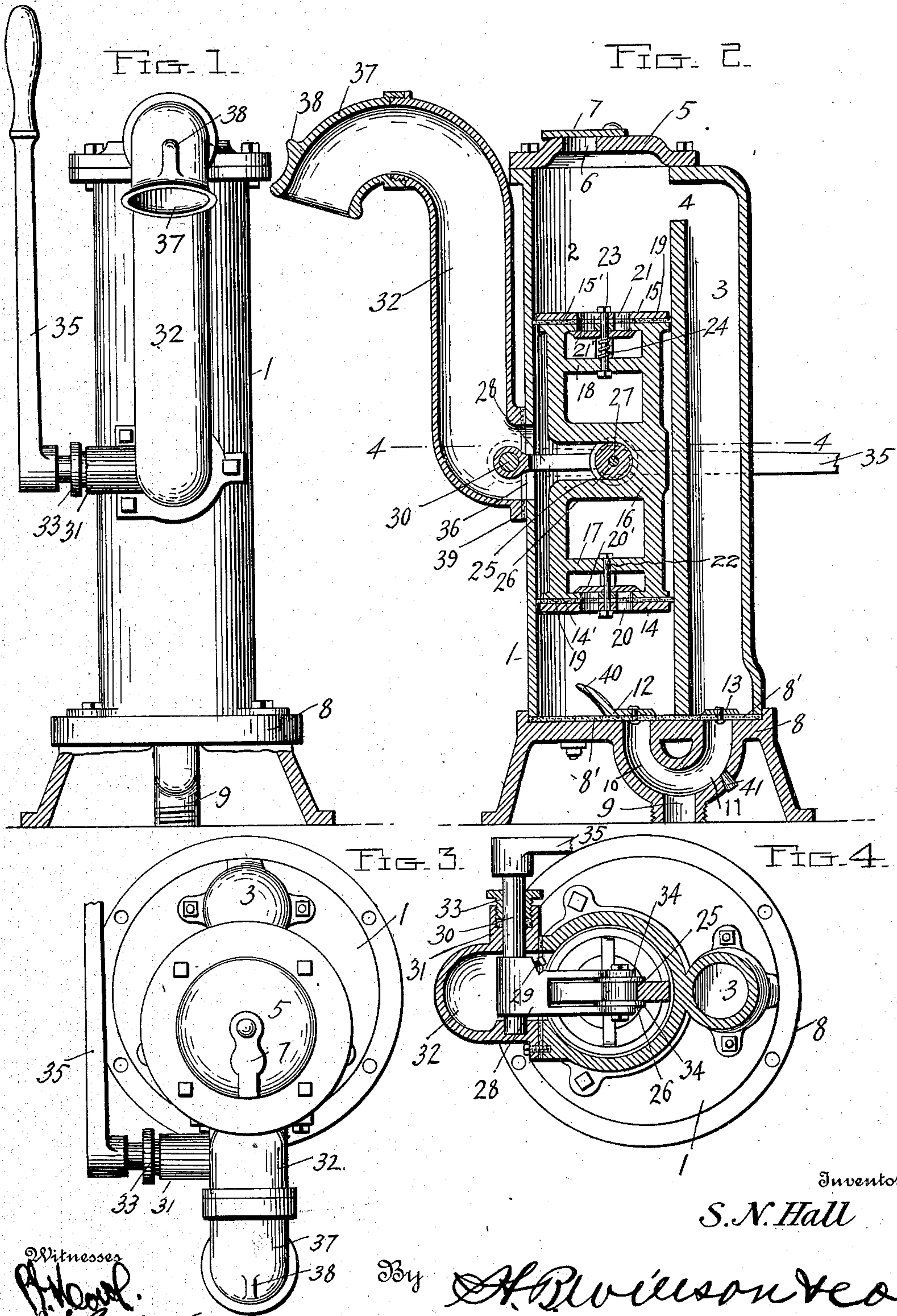
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PATENTED JUNE 23, 1903.

S. N. HALL.
PUMP.

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NO MODEL.



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PUMP.

SPECIFICATION forming part of Letters Patent No. 731,892, dated June 23, 1903.

Application filed September 16, 1901. Serial No. 75,474. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL N. HALL, a citizen of the United States, residing at Hollygrove, in the county of Monroe and State of Arkansas, have invented certain new and useful Improvements in Pumps; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in pumps; and its object is to provide a pump which is simple of construction, comparatively inexpensive of production, and adapted to operate smoothly and in an efficient manner.

To this end the invention consists of certain novel features of construction, combination, and arrangement of parts, as will be hereinafter more fully described, and particularly pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a front elevation of a pump embodying my invention. Fig. 2 is a central vertical section of the same. Fig. 3 is a top plan view, and Fig. 4 is a horizontal section on the line 4 4 of Fig. 2.

The numeral 1 in the drawings represents the vertical barrel of the pump, which is provided with a piston-chamber 2 and a vertical parallel water-passage 3, which passage is in communication at its upper end with said chamber through a lateral port or opening 4. The piston-chamber 2 is closed at its upper end by a cap or head 5, having an air-exhaust opening 6, normally closed by a hinged cover 7. This cover is adapted to be swung open to expose the opening to permit of the discharge of air therethrough from the pump-barrel when the apparatus is primed for operation, as hereinafter described. The pump-barrel is seated air-tight at its lower end upon a leather disk 8', interposed between it and a supporting-base 8, provided with or carrying a water-inlet 9, having branch passages 10 and 11 communicating, respectively, with the lower end of the piston-chamber 2 and the lower end of the water-passage 3. These branch passages are guarded by check-valves 12 and 13, which are adapted to open upwardly to allow water from the inlet to pass

into the piston-chamber and vertical water-passage and to close downwardly to prevent the return of the water to said inlet. These valves are attached to flexible flaps formed by slitting the disk 8', which flaps form hinges and packing-surfaces for said valves.

Reciprocating vertically within the piston-chamber is a duplex piston comprising the lower and upper pistons 14 and 15. The body 16 of the piston consists of a skeleton plate allowing a space on either side for the passage of water to the discharge-pipe, hereinafter described, and is provided at each end with an open circular cage or chamber 17 and 18, communicating with said space and closed at their outer ends by the piston-heads 14' and 15'. Packing 19, of leather or other material, is interposed between each cage and piston-head. Formed in each of the piston-heads 14' and 15' is a port 20 and 21, which communicates with the circular cage. The port 20 in the lower piston is guarded by a check-valve 20', carried by a stem 22, on which the valve is slidably mounted, said valve being adapted to close by gravity against its seat to prevent the downward passage of water through said port 20. The corresponding port 21 in the upper piston-head 15' is guarded by a valve 21', slidable on a stem 23, mounted in the cage 18 and encompassed by a spring 24, which bears against the said valve 21' to normally hold it seated to prevent the downward passage of water through the port 21. The piston-body is provided between the heads with a recess or socket 25, which receives a friction-roller 26, mounted upon a bolt 27, passing through the inner ends of the arms of a bifurcated crank-arm 28, which is secured at its outer end by a set-screw 29 to a shaft 30, journaled in bearing 31, formed in the lower end of a discharge-pipe 32, which pipe is provided with an adjustable stuffing-box 33 to prevent waste of water by leakage through said bearing. Washers 34 of greater diameter than the roller are placed upon the bolt 27 between the arms of the crank 28 and said roller to hold the latter seated in said recess or socket 25. To the outer end of the shaft 30 is connected a hand-lever 35, which is adapted to be oscillated up and down to communicate reciprocatory motion to the duplex piston

through the instrumentality of the aforesaid crank and friction-roller.

The discharge-pipe 32 is bolted or otherwise secured at its lower end to a flange exteriorly surrounding a discharge-opening 36, formed in the front end of the pump-barrel, and is provided at its upper end with a downwardly-curved discharge-nozzle 37, threaded thereto, so as to be readily removable therefrom for the substitution of a hose-nozzle, if desired, said nozzle having shoulder 38, on which the bail of a bucket or like receptacle may be hung for suspending the bucket into position to receive water from the spout. A packing-washer 39, of leather or other suitable material, forms a water-tight joint between the nozzle and pump-barrel.

The duplex piston is adapted to be applied to and removed from the piston-chamber 2 through the upper open end of said piston-chamber closed by the head or cap 5, while the crank-arm 29 and the friction-roller 26 attached thereto are adapted to be inserted and withdrawn through the discharge-opening 36 when the discharge-pipe 32 is removed. By this construction it will be seen that ready access is afforded to the interior parts of the pump for connecting them up and for removing them for repairs or other purposes.

In priming the pump for operation the cover 7 is swung outward to expose the air-discharge opening 6, the handle 33 rapidly operated up and down to reciprocate the duplex piston, and a suitable form of implement, such as a rod, inserted down through the opening 6 to hold the valve 21' off its seat, by which the air contained within the pump-barrel is caused to discharge and water to be drawn upwardly through the branch passage 10 to take the place of the expelled air, this operation being continued until the barrel is filled with water and all the air has been discharged, when the cover 7 is again closed to seal the opening 6. By the use of the opening 6 and its closure 7 I am enabled to employ a duplex piston and have both piston members operate to draw in and expel water.

Heretofore, so far as I am aware, it has been found impracticable to employ vertical pumps of this character, for the reason that a column of air at all times occupies the upper portion of the piston-chamber and cannot be expelled by the upper piston member on account of the resistance by the water drawn in by the lower piston member to the discharge of the air through the discharge-pipe, and, further, because of the fact that immediately upon the cessation of the downward movement of the upper piston member the air drawn down by it being lighter than the water below will again rise to the upper portion of the piston-chamber and form an air-cushion or seal therein, thus preventing water from flowing into the upper portion of the piston-chamber through the passage communicating therewith, so that the pump when

operated will expel no more water than an ordinary single-acting pump, one of the piston members (the upper one) being rendered practically dead or useless by the aforementioned air-cushion. My construction obviates this difficulty, as the opening 6 affords a means whereby the air may pass out from the top of the piston-chamber under the pressure of the inflowing water and a means by which a tool may be inserted to hold the valve of the upper piston member open, so that water drawn in by the lower member will completely fill the piston-chamber and expel the air, whereupon by closing the cover 7 the pump may be kept primed for use and both piston members will operate to draw in and expel water.

In drawing water the handle 35 is moved up and down in the manner stated, and on the downward movement of the piston the valve 20' opens to allow the water previously drawn in through the branch passage 10 to pass through the port 20 and cage 17 into the space surrounding the piston, so as to be discharged through the discharge-pipe upon the upward movement of the piston. When the piston moves downwardly, as above described, the valve 21' of the upper piston member is held closed by the spring 24 and the valve 13 opens to allow water from the branch pipe 11 to flow upward into the passage 3. Upon the upward movement of the duplex piston the valve 21' opens to allow the water drawn into the pipe 3 and into the upper end of the piston-chamber to pass through the port 21 and the cage 18 in the upper piston member to flow into the space between said piston member and wall of the chamber 2 for exit through the discharge-pipe 32. On each up-and-down movement of the pistons the water taken in by one is discharged by the other through pipe 32 in an obvious manner. It will thus be seen that as the duplex piston is reciprocated up and down in its chamber the piston members will alternately act to draw water into the lower end of the piston-chamber and into the lower end of the vertical passage 3, the valves alternately opening and closing to provide for the proper flow of water. Thus, for instance, upon the downward movement of the duplex piston the check-valve 12 closes to prevent the return to the branch pipe 10 of the water contained in the lower end of the piston-chamber 2 and the piston-valve 20' opens to allow said water to flow upward for discharge, while the check-valve 13 opens to allow water from the branch pipe 11 to flow into the passage 3 and the piston-valve 21' is held closed by the spring 24 to prevent the water taken into the passage 3 from flowing down beneath the valve into the piston-chamber. The reverse operation takes place upon the upward movement of the duplex piston, so that one piston acts to take in water while the other piston is discharging the water drawn in upon its previous movement.

The valve 12 may be provided with a contact-piece 40 to be engaged by the piston 14 on its downward movement to tilt and open said valve to allow the water in the lower end of the piston-chamber to discharge to prevent it from freezing in said chamber in cold weather. The wall of the passage 10 may also be formed in its side with an opening closed by a plug 41, which may be removed to permit of the insertion of a tool or wire to open the valve 13 to allow water to discharge from the passage 3 for the same purpose. By thus forming the opening in the side of said passage out of the direct line of the flow of the discharging water the valve may be held open without the icy water coming in contact with the hand of the operator.

From the foregoing description, taken in connection with the accompanying drawings, the construction, mode of operation, and advantages of the pump will be readily understood, and it will be seen that the invention provides a double-acting pump which is easily operated, in which the pistons are accurately balanced to insure a smoothness of operation, and in which the interior parts are freely accessible for cleaning and repairs.

Changes in the form, proportion, and minor details of construction may be made within the scope of the invention without departing from the spirit or sacrificing any of the advantages thereof.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a pump, the combination of a barrel provided with a piston-chamber, and a water-passage in communication with the upper end of said chamber, check-valved water-inlets communicating with the lower ends of said chamber and passage, the inlet communicating with the passage being provided in its side with an opening for the insertion of an implement to force open the coacting check-valve to allow the water in the passage to flow back through the inlet, said opening being thus located out of the direct line of flow of the discharging water, means for closing said opening, a valved duplex piston mount-

ed to reciprocate in the piston-chamber, and means whereby the check-valve controlling the inlet communicating with the piston-chamber may be opened to allow the water contained in said chamber to drain back into said inlet, substantially as described.

2. In a pump, the combination of a barrel having a piston-chamber, water-inlets communicating with the opposite ends of the chamber, a duplex piston mounted for operation in the chamber, an air-vent arranged to permit the escape of air from the barrel to allow water to completely fill the barrel and prime the pump for operation, and means for sealing said vent.

3. In a pump, the combination of a barrel having a piston-chamber, water-inlets communicating with the opposite ends of the chamber, a duplex piston mounted for operation in the chamber, an air-vent aperture arranged to permit the escape of air from the barrel to allow water to completely fill the barrel and prime the pump for operation, and a movable cover for closing said vent, substantially as described.

4. In a pump, the combination of a vertical barrel provided with check-valved water-inlets communicating with its opposite ends and having a head at its upper end formed with an air-vent aperture, a reciprocatory duplex piston working in the barrel, and a pivoted cover on the head for closing said air-vent aperture, substantially as described.

5. In a pump, the combination of a vertical barrel having a piston-chamber and provided with an air-vent at its upper end, water-inlets communicating with the opposite ends of the chamber, a duplex piston operating in the chamber, means for operating the piston, and means for sealing the air-vent, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

SAM. N. HALL.

Witnesses:

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