

J. D. ALVORD.
PUMP PISTON.

No. 109,994.

Patented Dec. 13, 1870.

Fig. 1.

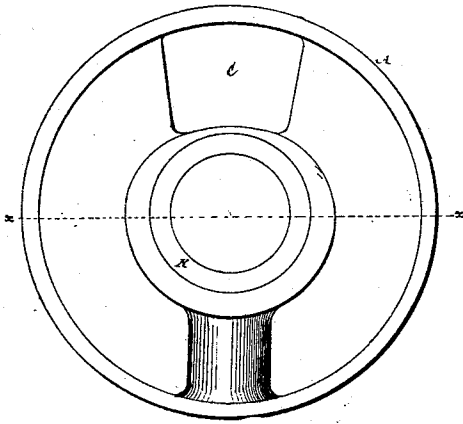


Fig. 2.

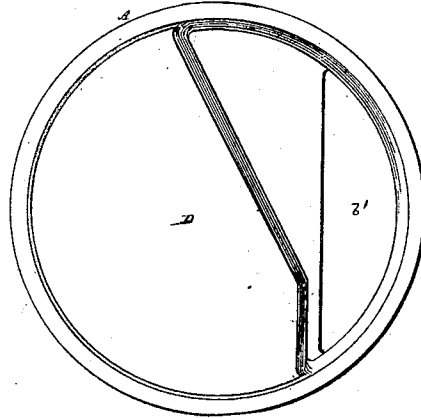


Fig. 3.

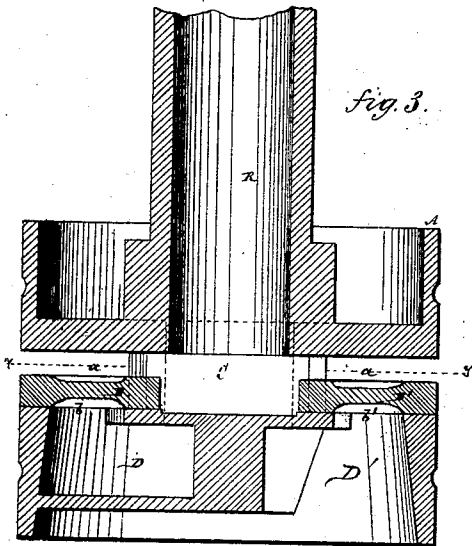
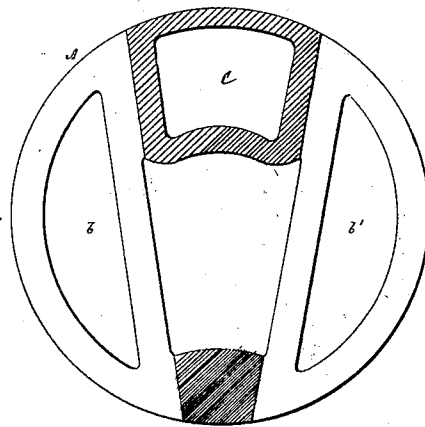


Fig. 4.



Witnesses

Geo M Beer
A A Chopin

J. D. Alvord

United States Patent Office.

JOSEPH D. ALVORD, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO JAMES WILSON, OF SAME PLACE.

Letters Patent No. 109,994, dated December 13, 1870.

IMPROVEMENT IN PUMP-PISTONS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, JOSEPH D. ALVORD, of Bridgeport, in the county of Fairfield and State of Connecticut, have invented a new and useful Improvement in Pistons for Double-acting Pumps; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing forming part of this specification, and in which—

Figure 1 represents an upper or front face view of a piston constructed in accordance with my invention;

Figure 2, a bottom or opposite face view of the same;

Figure 3, a longitudinal section, taken as indicated by the line *x x* in fig. 1; and

Figure 4, a transverse section, taken as denoted by the line *y y* in fig. 3.

Similar letters of reference indicate corresponding parts.

My invention has reference to hollow pistons for double-acting pumps, and in which the fluid is discharged through the rod of the piston by the action of valves contained within the piston.

In this class of pumps, when the same are arranged to occupy a vertical position, a difficulty has arisen by reason of the valves in the piston only closing, by their weight, against certain of their ports, and being dependent upon the pressure of the fluid to close them against the other ports, so that in a slow working of the pump it is possible for no pumping action to take place during the one stroke, or only a partial action is produced, owing to the absence of the requisite pressure in the pump to lift the valve or valves at the commencement of the stroke.

My invention obviates this difficulty, and consists in a novel construction of the hollow piston and arrangement of its ports and passages, whereby, among other advantages, all of the piston ports are closed by the weight of its valves, except when forced from their respective seats during the upward or downward stroke.

This insures a prompt closing action of the valves, irrespectively of the pressure of the fluid, so that in a slow working of the pump there is no lost motion or effect.

The same construction and arrangement of the piston and its ports or passages is applicable to pumps arranged to work in a horizontal position, but it will suffice here to generally describe the invention as applied to a pump occupying a vertical position.

Referring to the accompanying drawing—

A represents the piston of a double-acting pump, and

R, its hollow rod, which communicates with the

interior of the piston between side passages *a a*, that serve to contain the valves B B'.

These valves, which control ports *b b'*, are alternately opened and closed during the reciprocating action of the pump, the valve B closing in the down-stroke, and the valve B' in the up-stroke of the piston, but both closing by their gravity, irrespectively of the pressure of the fluid, by reason of the arrangement of the ports *b b'*, on the under sides or faces of the valves, and the arrangement of the passages or openings, and a chamber within the piston, as hereinafter described.

Opening from the upper or front face of the piston are one or more passages, C, arranged to extend longitudinally within the piston-head, and terminating in a chamber, D, on the lower or opposite face of the piston, and with which the port *b* is made to communicate.

The other port *b'* is in direct communication with the space below the piston.

In the down-stroke of the pump the valve B' is lifted, and fluid passes direct from below the piston to and up the hollow rod R, the valve B closing, by its gravity, and suction taking place on the upper side of the piston.

In the reverse action or up-stroke of the pump the valve B' closes by its gravity, and the valve B is lifted, the fluid entering, by the passage C, into the chamber D, and through the port *b* to and up the hollow rod R, suction being simultaneously produced below the piston.

The fluid being discharged under pressure, of course readily effects the alternate lifting of the valves, which, however, do not necessarily depend upon the pressure of the fluid to close them; but so soon as the fluid is diverted from lifting either valve, by reversal in the stroke of the piston or otherwise, either valve B B' closes by its own gravity; thus a prompt action is secured for the valves independently of pressure, and a perfect working of the pump insured at or under all velocities.

When the pump is arranged to work in a horizontal position, then the upper face of the piston may be denominated its front, and the lower face of the piston its back.

What is here claimed, and desired to be secured by Letters Patent, is—

A double-acting pump-piston, provided with valves B B' and passages C, D, and D', so arranged that the said valves are caused to open alternately in the same direction regardless of the direction in which the piston may be traveling, substantially as specified.

Witnesses:

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