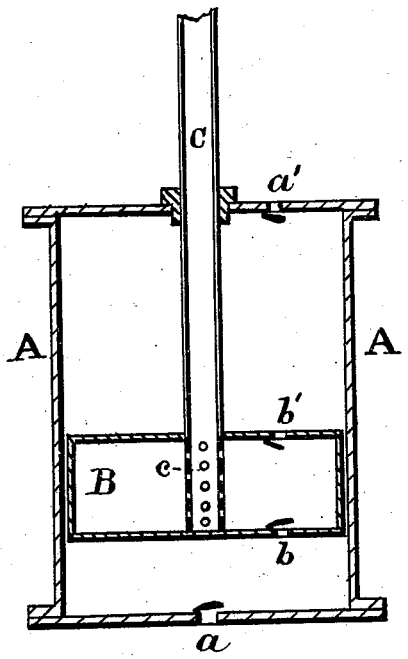
H. HULBERT, B. F. & H. W. NASH.

DOUBLE FORCE PUMP.

No. 183,500. Patented Oct. 24, 1876.



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UNITED STATES PATENT OFFICE.

HIRAM HULBERT, BENJAMIN F. NASH, AND HARVEY W. NASH, OF PLYMOUTH, WISCONSIN.

IMPROVEMENT IN DOUBLE FORCE-PUMPS.

Specification forming part of Letters Patent No. **183,500**, dated October 24, 1876; application filed July 11, 1876.

To all whom it may concern:

Be it known that we, HIRAM HULBERT, BENJ. F. NASH, and HARVEY W. NASH, all of the town of Plymouth, in the county of Sheboygan and State of Wisconsin, have invented certain Improvements in Double-Acting Force-Pumps, of which the following is a specification:

Our invention relates to any pumps where force is used to raise or inject air or water.

The invention consists in an outside perforated valved cylinder, into which a piston works, as shown. An inner cylinder or piston-head works within the outer or main cylinder, and it is operated by a piston-rod, connected to a steam-engine or other motive power. The inner cylinder is provided with suitable perforations, each governed by an independent valve opening inward. The piston-rod is hollow, and is perforated, more or less, within the chamber of the inner cylinder. These perforations may, as is obvious, be controlled by the exigencies of the purpose to which the invention may be diverted.

We are aware of the patent of H. M. Stoker, No. 48,219, of June 13, 1865, and also of the patent to C. A. Clarke, No. 32,048, April 16, 1861; and the present invention is an improvement thereon.

We have discovered that in many cases it is necessary to use a double-acting pump in places where the shallowness of the water will not admit of the reciprocation of a cylinder, whether it be large or comparatively small. We have also discovered that it is desirable to reduce the size of the cylinder as much as possible, in order to make the invention especially effective in shallow water without disturbing the walls of the cistern, well, &c., and without muddying the water from excessive irritation, agitation, &c.

We will now describe what we consider the best means of carrying out our invention.

The outer cylinder in our invention may be made as small as ten (10) inches in height. It is apparent that such a construction would be especially effective in certain cases.

The drawing represents a vertical section of our invention. Referring thereto, A is the cylinder, cast in one or more pieces, or made of boiler-iron, made water-tight in any suitable manner. The upper and lower surfaces are perforated at *a a'*, and opening inward from such perforations are valves, so hinged as to be susceptible to the action of the slightest pressure. B is an inner cylinder or piston-head, having a chamber inside, perforated in two or more places, *b b'*, upon both upper and under surfaces thereof, each perforation of which is controlled by an independent valve opening inward. C is a hollow piston-rod, passing through suitable packing into the cylinder A, and into the inner cylinder B. It may extend entirely through the same into the lower plate thereof, and be perforated, as desired, between the upper and lower plates, or it may terminate at the upper plate, opening into the inner chamber. *c c* are the perforations, as shown.

The upper and lower plates of the inner cylinder approach nearly to the inner surface of the outer cylinder, and between these two suitable packing may be introduced.

It being understood that the entire outer cylinder is submerged, the operation of our invention is as follows: The descent of the piston-rod C creates a partial vacuum in the upper portion of the outer cylinder A, and consequently opens the valve at *a*, through which the water enters. The return movement of the piston-rod closes the valve at *a* and opens the valve *b'* in the inner cylinder B, from whence the water passes through *c* into the hollow piston-rod C, and is ejected, as desired. The operation thereafter is obvious.

We are aware that a reciprocating perforated valved cylinder has been before used in connection with a stationary hollow piston and a solid annular valve, but such a construction requires great depth of water, tends to muddy the water, and is inoperative in general low-water wells and cisterns.

Our invention is adapted for use in shallow water without material disturbance, and is constructed at little cost, and operates efficiently.

We are also aware that annular valves, made in one piece to cover several apertures, have been before used, but these fail in prac-

tice to operate efficiently, as the friction upon either side binds the annular valve, and allows some of the apertures to become inoperative.

We claim—

The stationary cylinder A, having the valves *a a'*, in combination with the reciprocating inner cylinder B, having inlet-apertures, each aperture being provided with a separate clack-valve, *b b'*, and with the hollow perforated piston-rod C *c*, as and for the purposes specified.

In testimony that we claim the foregoing as our own invention we affix our signatures in presence of two witnesses.

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