W. N. STARR.

FORCE-PUMP.

No. 188,977. Patented March 27, 1877.

Fig. 1.

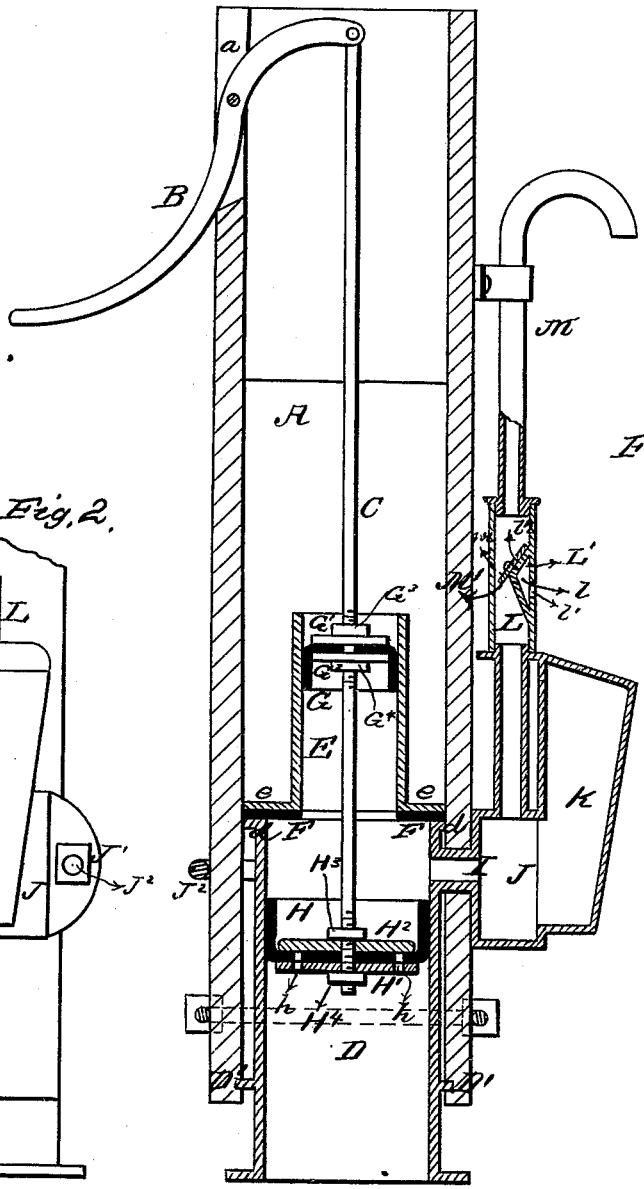
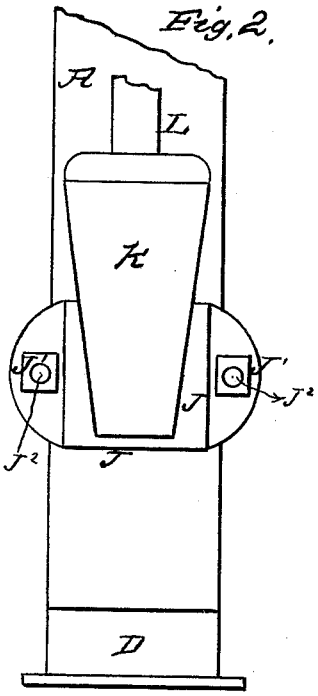


Fig. 2.



WITNESSES

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WILLIAM N. STARR, OF ASHLAND, OHIO.

IMPROVEMENT IN FORCE-PUMPS.

Specification forming part of Letters Patent No. **188,977**, dated March 27, 1877; application filed February 24, 1877.

To all whom it may concern:

Be it known that I, WILLIAM N. STARR, of Ashland, in the county of Ashland and State of Ohio, have invented a new and valuable Improvement in Force-Pumps; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a central vertical section of my force pump; and Fig. 2 is a side elevation of the same.

This invention relates to force-pumps.

The nature of said invention consists in certain improvements in pumps, as will be hereinafter more fully set forth.

In the accompanying drawings, A designates the hollow upper casing or pump-post of a force-pump; and B designates an operating-lever or pump-handle, pivoted in a slot, *a*, at the top of said casing. The inner end of said lever or handle B gives vertical reciprocating motion to a piston-rod, C, within said casing or hollow pump-post A. The lower part of said piston-rod works in a pump-cylinder, consisting of a larger lower cylinder, D, and a smaller upper cylinder, E. The contiguous ends of said parts D and E are provided with annular flanges *d* and *e*, between which sets a packing-ring, F, of leather, rubber, or other suitable material.

In the smaller upper cylinder E works a rubber piston, G, having the form of an inverted flat-bottomed cup, the bottom thereof being braced by upper and lower metal strengthening-plates G^1 G^2. Said piston is held in place by upper and lower nuts G^3 G^4, which engage with screw-threads formed on said piston-rod C.

H designates a similar but larger cup-shaped piston, facing the one above described, and provided with a metal stiffening base-plate, H^1, and with a flexible valve-disk, H^2. Said parts H H^1 H^2 are held in place by nuts H^3 H^4, which work on screw-threads formed in piston-rod C at or near its lower end. The bottom of piston H is provided with perforations *h*, which are extended through plate H^1.

It will be observed that, by the above-described construction, the cup-shaped pistons G and H can be adjusted on the piston-rod, so that they may be made to approach or recede from each other, thereby varying the amount of water raised.

Cylinders D and E are held together by small bolts passing through flanges *d* and *e*. Cylinder D is also provided with a flange, D^1, which sets into grooves or recesses on the inside of casing A, and serves to hold the said parts D and A together. This object is further secured by an outlet-tube, I, which extends from the upper part of the cylinder D outward through said casing A. Said outlet-tube leads to a small reservoir, J, one side of which opens into an air-chamber, K. From the top of said reservoir J a vertical tube leads to a valve-chamber, L, the top of which is provided with a raised bent discharge-pipe, M.

In the outer side of cylindrical valve-chamber L is formed an inwardly-extending **V**-shaped valve-seat, L′, inclosing a triangular space, *l*. The outer wall of said valve-chamber has a perforation, l^1, communicating with space *l*, and the upper incline of said valve-seat L′ is provided with a similar perforation, l^2, which is adapted to be be closed by an inclined drip-valve, M′. Said valve is pivoted to the upper part of said **V**-shaped valve-seat, and provided with a short extension, *m*, which overhangs the ridge or vertex thereof.

The casing of chamber or reservoir J is provided with side plates or lugs J^1 J^1, which form, with a bent rod, J^2, screw-threaded at each end and suitable nuts, a clip for holding said reservoir and its attachments to casing A. Discharge-pipe M is held to said casing, and braced by a bent fastening-plate, M^2. Additional clips may be used, if desired, to hold the various parts of the apparatus together.

The operation of the above-described devices is as follows: When rod C descends, water is forced up through piston H (raising valve H^2) into the space between pistons G and H, while at the same time the said piston G operates to force water out of said space through tube I. On raising rod C valve H^2 closes and the water in the said space is raised by piston H and partly forced thereby through said tube I, The pump is thus double-acting.

While the upward flow continues the drip-valve M^1 is kept closed by the pressure of the

water against the under side of extension *m*. But when the said flow ceases the said valve opens, by the pressure of the downward-flowing water on the top of said extension and by its own weight, and it allows the water remaining above it to drip down through perforations l^1 l^2, and thus escape from the pump. This prevents all injury arising from freezing, and especially keeps the discharge-tube of the pump unclogged by ice in winter-time.

By constructing my pistons G and H of rubber I insure a fit between them and the cylinders in which they work, irrespective of atmospheric changes, which so often impair the usefulness of wooden pistons. I may, however, substitute leather or other flexible material for rubber in said pistons. I may also curve their bottoms instead of making them flat, as shown, in which case the metal stiffening-plates must be curved also. Various other changes of form and arrangement may be made without departing from the spirit of my invention.

What I claim as new, and desire to obtain by Letters Patent, is—

1. The flexible cup-shaped piston G, provided with metallic plates G^1 G^2 and nuts G^3 G^4, in combination with the flexible cup-shaped piston H, provided with the perforated metal plate H^1, valve-disk H^2, nuts H^3 H^4, and screw-threaded piston-rod C, whereby the pistons can be adjusted on the rod relatively to each other, substantially as described.

2. Drip-valve M^1, provided with extension *m*, in combination with valve-seat L′ and valve-chamber L perforated at l^1, substantially as and for the purpose set forth.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

WILLIAM N. STARR.

Witnesses:
WILLIAM OSBORN,
P. S. GROSSCUT.