H. T. DRAIN.

FORCE-PUMP.

No. 186,464. Patented Jan. 23, 1877.

Fig. 1.

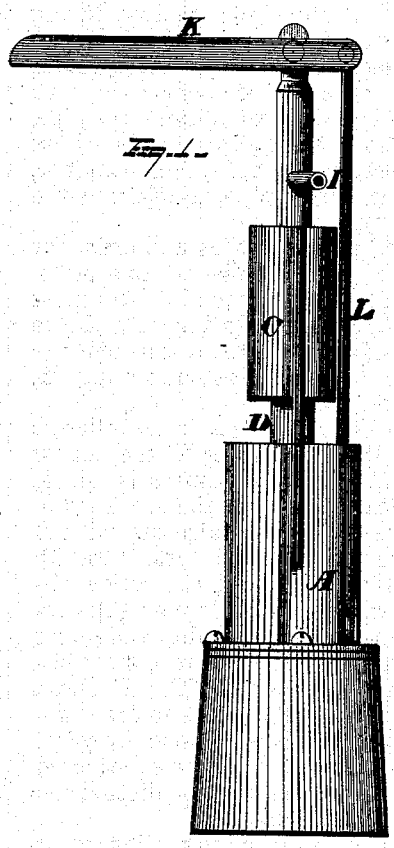
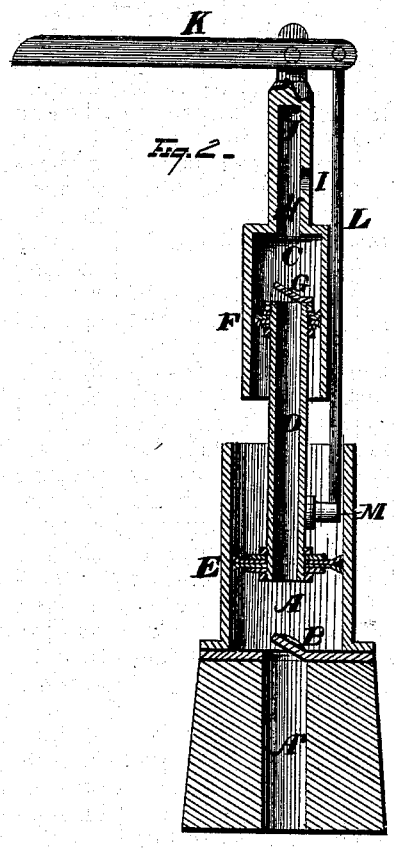


Fig. 2.



WITNESSES

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HENRY T. DRAIN, OF TAMA CITY, IOWA.

IMPROVEMENT IN FORCE-PUMPS.

Specification forming part of Letters Patent No. **186,464**, dated January 23, 1877; application filed June 30, 1876.

To all whom it may concern:

Be it known that I, HENRY T. DRAIN, of Tama City, in the county of Tama and State of Iowa, have invented certain new and useful Improvements in Force-Pumps; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to an improved double-acting force-pump.

Figure 1 is a side elevation of my improved pump, and Fig. 2 is a vertical section of the same.

My invention consists, first, in a double-acting force-pump, in the combination, with independent cylinders of unequal diameters, of a hollow piston-rod, provided at each end with pistons fitting the cylinders within which they operate; second, in the combination, with the lower cylinder, provided with a receiving-valve, of a hollow piston-rod and suitable pistons attached thereto, the upper end of said piston-rod having a discharge-valve attached thereto; third, in the combination, with the upper cylinder and hollow double piston-rod of a double-acting force-pump, of a superposed cylinder and a discharge-pipe located below the upper end of said pipe, whereby an air-chamber is formed above said discharge-pipe; fourth, in certain combinations of parts, as will be hereinafter described and claimed.

In the accompanying drawings, wherein like letters designate like parts, A is the lower cylinder, provided with an inlet-pipe, A′, through which water is drawn into the cylinder, and prevented from returning by means of the valve B, which may be a flap-valve, as shown in the drawing, or a ball-valve, if the latter is found more effective under certain conditions. C is the upper cylinder, and is constructed of about half the diameter of the lower cylinder A. D is a hollow piston-rod, having a piston, E, suitably packed to closely fit the lower cylinder A, and a piston, F, of sufficient area to snugly fit the upper cylinder C. To the upper face of the piston F is pivoted a flap-valve, G, which serves to admit water from the lower cylinder through the hollow piston-rod as the latter is on its downward stroke, and close and prevent the escape of water on its upward stroke, thereby lifting the contained water in the upper cylinder C. A tube, H, is secured to the top of cylinder C, and said tube has an open connection with the upper cylinder. An exit or discharge pipe, I, is attached to tube H at a point below its upper end, thereby forming an air-chamber, J, above the discharge-pipe, to regulate the flow of water from the pump.

The top of tube H serves as a fulcrum for the hand-lever K, which is pivoted to a perforated lug formed on top of tube H. The short end of lever K connects, by a rod, L, with the lower portion of the hollow piston-rod, the lower end of rod L being pivoted to a lug, M, on the piston-rod D.

The operation of my device is as follows: By depressing the hand-lever K, the hollow piston-rod, with its attached pistons, is raised, creating a partial vacuum in the lower cylinder A, causing the water to raise the valve B and enter the cylinder A and piston-rod D. When the hand-lever is raised, the hollow piston is forced downwardly, and displaces the water contained in the lower cylinder, and forces the same upwardly through the hollow piston-rod into the upper cylinder C. The next stroke of the piston will operate to draw water into the lower cylinder, and also lift water from the upper cylinder into the superposed tube H, from whence the water is discharged through the discharge-pipe I.

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

1. In a double-acting force-pump, the combination, with independent cylinders, of a hollow piston-rod, carrying pistons at its ends to fit said cylinders, and suitable mechanism for reciprocating said piston-rod, substantially as and for the purpose set forth.

2. The combination, with the lower cylinder, having an inlet-valve, of a hollow piston-rod provided with pistons at each end, and an exit-valve at its upper end, substantially as and for the purpose set forth.

3. In a double-acting force-pump, the com-

bination, with the upper cylinder and hollow double piston-rod, of the superposed tube, provided with a discharge between its top and bottom, whereby an upper air-chamber is formed, substantially as and for the purpose described.

4. The combination, with cylinders A C and hollow piston-rod D, of the hand-lever K and rod L, substantially as and for the purpose specified.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

HENRY T. DRAIN.

Witnesses:
GEO. HOLLENBECK,
CHARLIE DRAIN.