

F. Ransom,
Force Pump.

Patented July 11, 1865.

N^o 18,720.³⁴

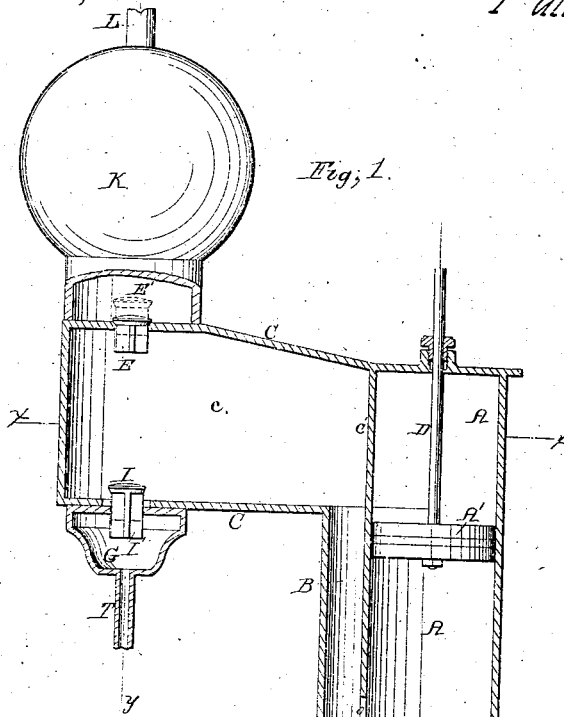


Fig. 1.

Fig. 3.

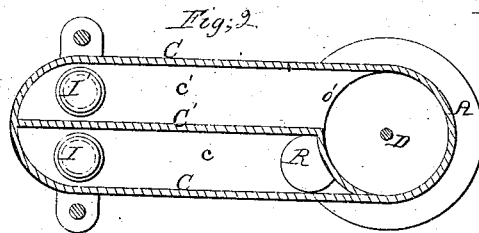
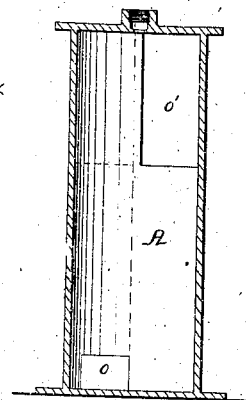
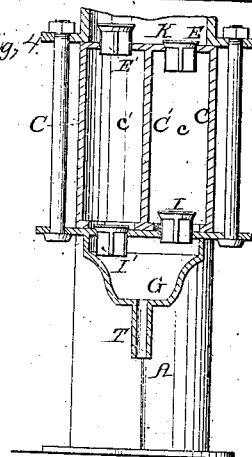


Fig. 2.

Fig. 4.



Witnesses;
J. W. Coombs
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UNITED STATES PATENT OFFICE.

FRANKLIN RANSOM, OF BUFFALO, NEW YORK.

IMPROVEMENT IN PUMPS.

Specification forming part of Letters Patent No. 48,720, dated July 11, 1865.

To all whom it may concern:

Be it known that I, FRANKLIN RANSOM, of Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in 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 drawings, forming part of this specification, in which—

Figure 1 is a nearly central vertical section of a pump constructed according to my invention. Fig. 2 is a horizontal section of the same in the plane indicated by the line *x x* in Fig. 1. Fig. 3 is a central vertical section of the cylinder transverse to Fig. 1. Fig. 4 is a transverse vertical section in the plane indicated by the line *y y* in Fig. 1.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to double-acting pumps for liquids or air, or both. Its principal feature of novelty consists in the arrangement of the valves, as hereinafter described, in communication with a divided chamber, each of whose compartments communicating with one end of the cylinder is of a capacity greater than the displacement produced in the cylinder by the piston, whereby I always maintain between the piston and the inlet-valves a quantity of water or other liquid at least greater than the aforesaid displacement.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

A is the cylinder, arranged in upright position and closed at top and bottom.

A' is the piston without valves, and D its rod, working through a stuffing-box in the cylinder-cover.

On one side of the upper part of the cylinder there is cast a chamber, C, standing out horizontally therefrom, and divided by a vertical partition, C', into two compartments, *c c'*, each of a capacity greater than the displacement produced in the cylinder by the stroke of the piston. Each of these compartments has communication at the bottom by means of an induction-valve with a chamber, G, with which the induction-pipe T is connected, and at the top by means of an eduction-valve with an air-chamber, K, with which the eduction-pipe L is connected.

I is the induction-valve, and E the eduction-valve, of the compartment *c*, and I' is the induction-valve, and E' the eduction-valve, of the compartment *c'*. The compartment *c'* communicates directly with the cylinder A above the piston by means of an opening, *o'*, and the compartment *c* communicates with the lower part of the cylinder below the piston by means of a side pipe, B, cast on the cylinder, and having an opening, *o*, close to the bottom of the cylinder.

The operation of the pump is as follows: Before starting, the cylinder A and the two compartments of the chamber C are filled with water or other liquid, either through the seats of the eduction-valves before the air-chamber is put on or through openings provided in the aforesaid compartments for the purpose, and provided with stop-cocks, but preferably and especially in the air-pump in the latter manner, as the said openings provide for the introduction of additional water whenever necessary. On the first ascending stroke of the piston the water above it is forced out through the opening *o'* into the compartment *c'* of the chamber, and the water in the said compartment is forced out through the eduction-valve E into the air-chamber, while water from the compartment *c* of the chamber C enters the cylinder through the pipe B, filling the cylinder below the piston and opening *o*, and water or air enters by the valve I from the induction-pipe to fill the vacuum formed in the said compartment *c*. On the first descending stroke of the piston the water in the cylinder below it is forced out through the opening *o* and side pipe, B, into the compartment *c* of the chamber C, and the water or air with which the said compartment was filled during the ascending stroke is forced out through the valve E into the air-chamber K, while the water which entered the compartment *c'* from the cylinder during the ascending stroke passes back into the cylinder, and water or air enters the valve I' from the induction-pipe to fill the vacuum formed in the said compartment *c'*. The operation being continued, the piston at each stroke, upward or downward, forces out the water at one or the other end of the cylinder into its respective compartment *c'* or *c*, and this water displaces from that compartment the water previously contained therein, and forces it through

the valve I' or I into the air-chamber, and through the eduction-pipe, and at the same time the water from the other compartment, c or c', enters the cylinder and follows the piston, and water or air enters that compartment through the valve I or I' from the induction-pipe T. The compartments c c' of the chamber C being of greater capacity than the displacement produced in the cylinder by the piston, a quantity of liquid greater than the quantity displaced by the piston at each stroke is always retained between the piston and the lower valves, I I, so that when the pump is used as an air-pump no air will enter the cylinder and be retained there, but the air must of necessity pass out through the upper valves, E E', and water will always remain in the said compartments c c' to seal the valves I I'; and when the pump is used for water or other liquid no dirt or grit contained in the water or

liquid will enter the cylinder and injure it, for the same liquid with which the pump was first charged continues to return and fill the cylinder, while the gritty or muddy water enters only the chamber C, and is forced out therefrom into the air-chamber and through the suction-pipe.

What I claim as my invention, and desire to secure by Letters Patent, is—

The arrangement of the inlet-valves I I' and the divided chamber C, having two compartments of greater capacity than the displacement of the piston, in combination with each other and with the cylinder of the pump, substantially as and for the purpose herein specified.

FRANKLIN RANSOM.

Witnesses:

C. C. BRISTOL,
E. D. BRISTOL.