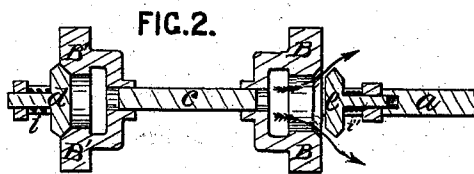
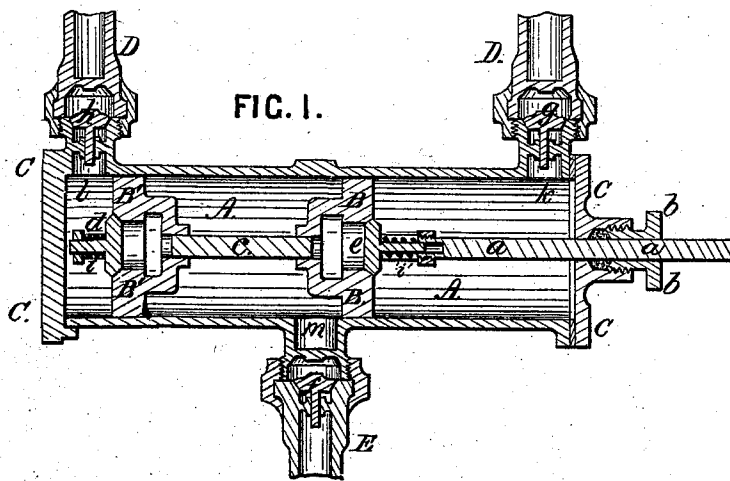


S. LANE, Jr.
Pumps.

No. 143,769.

Patented Oct. 21, 1873.



WITNESSES.

E. N. Johnson
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INVENTOR.

Stephen Lane Jr

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UNITED STATES PATENT OFFICE.

STEPHEN LANE, JR., OF ENGLEWOOD, NEW JERSEY.

IMPROVEMENT IN PUMPS.

Specification forming part of Letters Patent No. 143,769, dated October 21, 1873; application filed September 12, 1873.

To all whom it may concern:

Be it known that I, STEPHEN LANE, Jr., of Englewood, Bergen county, New Jersey, have invented an Improved Pump for Raising and Forcing Liquids, of which the following is a specification:

My invention relates to double-acting suction and force pumps; and consists in a novel construction, combination, and arrangement of parts, which have for their object to produce a pump more perfect in its action than has heretofore been made, as will be hereafter fully set forth.

Figure 1 is a longitudinal section. Fig. 2 is a longitudinal section of the piston.

A A represent the barrel or cylinder of the pump; B B', the pistons; *a a*, the piston-rods; C C, the cylinder-heads, and *b b* the gland or packing-box for keeping around the piston-rod fluid-tight. The cylinder has three ports, one, *m*, situated midway, being an induction, and the other two, *k l*, situated at each end of the cylinder, eduction. The pistons B B' are connected together by the rod *c*, which is screwed into cross-heads cast to them. In the pistons a central circular aperture is made, through which the fluid passes during the operation of the pump. These openings are provided with spindle-valves *d e*, which are arranged on the outside of the pistons, and are kept up against their seats by the springs *i i'* coiled around their spindles. The induction and eduction passages are provided with spindle-valves, as shown in Fig. 1, which operate by the action of the fluid and their own weight.

From the foregoing it will be understood that I employ a cylinder with one induction and two eduction orifices, provided with suitable valves, and two pistons connected together, each provided with a central valve opening outward.

The parts being constructed and arranged as described, they will operate to raise and force the liquid pumped as follows: On the out-stroke of the pistons a vacuum is created behind the rear piston B', and its valve will open to admit the air contained between the

pistons. On the return of the pistons the air that entered behind the piston B' will be expelled through the eduction-orifice *l*. The in-stroke of the pistons has created a vacuum in front of the forward piston B, and any air remaining between the pistons or in the suction-pipe E which was not drawn off by the out-stroke of the pistons is drawn into this vacuum before the front piston B, and on the pistons making another out-stroke this air is expelled through the valve *g*. It is now supposed that a sufficient vacuum has been created in the cylinder, and that there is equilibrium on each side of the pistons; this being effected, the fluid will lift the valve *f* and flow, by atmospheric pressure, into the cylinder and between the pistons. An out-stroke of the pistons will now augment the vacuum behind the rear piston B', and the fluid will force back the valve *d*, and flow into this space behind the piston B'. On the in-stroke the valve *d* shuts and forces the fluid through the valve *h*, while the valve *e* opens and admits fluid to the front of the cylinder.

The pump is thus double-acting, and, connection being formed with the fluid, a steady and powerful stream can be pumped with a short stroke, and the valves, being independent of each other, readily accommodate themselves to the action of the pump, which is a great desideratum, and also, being placed on the outside of the pistons, they can be more readily got at for repair and adjustment than if they were placed on the inside of the pistons.

I claim—

In combination with the cylinder A, induction and eduction ports E and D D, and pistons B B', the valves *d* and *e*, arranged to work independently of each other from the outward side of the pistons, all constructed and operating substantially as described.

STEPHEN LANE, JR.

Witnesses:

E. H. JOHNSON,
C. A. DURGIN.