B. BRANSON.

Force and Suction Pump.

No. 167,060. Patented Aug. 24, 1875.

Fig. 1.

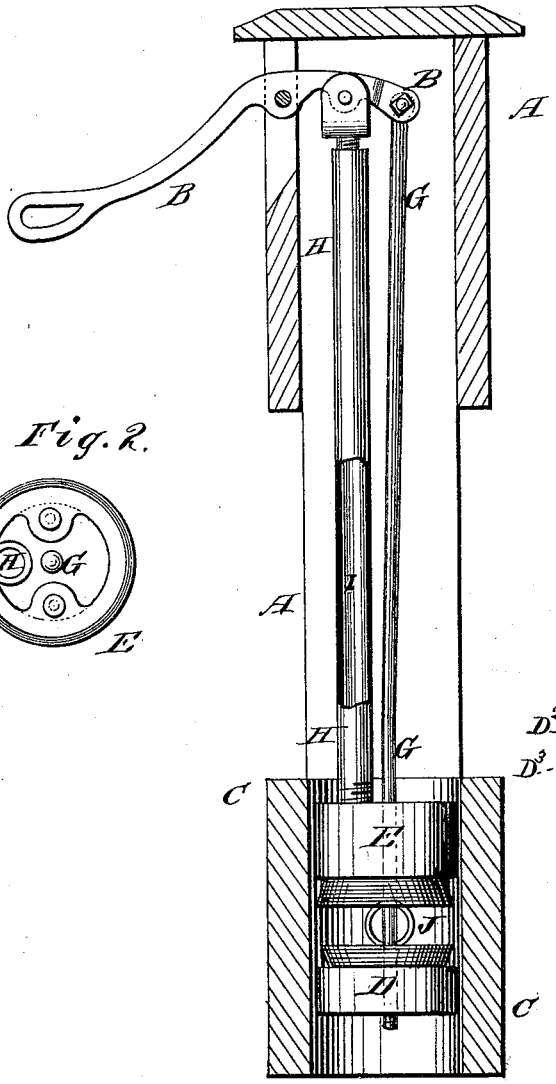
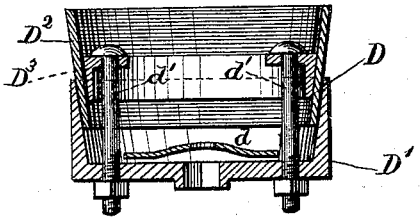


Fig. 2.

Fig. 3.



WITNESSES.

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BENJAMIN BRANSON, OF BARNESVILLE, OHIO, ASSIGNOR TO HIMSELF, JOSEPH BRANSON, AND LEVI BRANSON, OF SAME PLACE.

IMPROVEMENT IN FORCE AND SUCTION PUMPS.

Specification forming part of Letters Patent No. **167,060**, dated August 24, 1875; application filed April 8, 1875.

To all whom it may concern:

Be it known that I, BENJAMIN BRANSON, of Barnesville, in the county of Belmont and State of Ohio, have invented certain new and useful Improvements in Force and Suction Pumps; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

My invention consists in constructing the air-chamber of a force-pump of a long tube of small bore, by which, while I secure sufficient capacity of air-chamber, I am able also to avail myself of the laws governing the flow of water through tubes, to secure a steady stream of water even when the pump is operated with a slow motion. My invention also consists in combining the air-chamber so constructed with the piston or pistons, to serve also as operating-rods for the same.

Figure 1 is a central vertical section of a double-piston pump embodying my invention. Fig. 2 is a bottom view of the force-bucket. Fig. 3 is a central vertical section of the suction-bucket.

A represents an ordinary frame-work, in the top of which the lever B is pivoted. C is the pump-cylinder, in which the pistons D and E work, the lower piston, D, being the suction-piston, and the upper one E the force-piston. The lower piston D is constructed as shown in Fig. 3, it being formed of a cup, D^1, having its inner periphery made tapering, and with perforations in its bottom immediately over which the valve *d* is placed. D^2 is the leather packing, inserted in the upper end of the cup D^1, and fastened or held in place by means of a tapering ring, D^3, which is connected to the cup by bolts *d'*, as shown, and wedges the leather packing between it and the tapering cup D^1. The leather packing extends a short distance below the lower edge of the ring, so that, as the water fills in the cup, the pressure of the water will cause the lower edge of the packing to be forced tight against the wall of the cup, and thus form a close joint, thereby preventing the egress of water between the cup and packing.

It will thus be seen that the valve is below the line of the packing in the bottom of the cup, rendering the plunger or bucket less liable to leak. The bucket E is constructed in the same manner, inverted, and without any perforations and valves.

G is the rod of the suction-bucket D, which rod passes up through the force-bucket E, as shown. H is the rod of the bucket E, and which is made hollow or tubular, to form the air-chamber for the pump. Both of these rods are attached to the inner end of the lever or handle B.

In operating force-pumps with a slow stroke, the ordinary construction of the air-chamber does not avail to prevent a delivery of the water in jets. To obviate this and secure a steady stream when the pump is operated slowly, I employ for an air-chamber a long tube or tubes of small bore, in which, by reason of the friction of the water within the tubes, and other causes affecting the movement of water in tubes, the water is not so instantly delivered from the air-chamber as under the ordinary construction. For obvious reasons of economy of space and material I employ the said tube as an operating-rod for the piston, and to secure sufficient length and and capacity in double-piston pumps, I may make both rods as above described.

The elongated hollow air-chamber and piston-rod H should be of such length in proportion to the diameter that, in the working of the pump, sufficient time will be required for the water to pass out of the air-chamber to compensate for the change of direction in the stroke of the lever B, and thus, in combination with the two buckets, cause a steady and continuous stream.

I am well aware that the employment of an air-chamber in connection with a pump is not new. I am also aware that an air-chamber consisting of a hollow tube which forms the piston-rod is not new. In such cases there has been no regulation as to relative proportions of the length and diameter of the air-

tube; hence if the tube is too short for its diameter, the water will not have time to pass out between the stroke, and the flow will be in jets, and not a steady stream as I receive when the pump-handle is slowly worked.

The elongated air-chamber H is constructed on the principle that increased length and diminished diameter within certain limits, and according to a definite rule, will produce the best results. The principal purpose of the air-chamber being the accumulation of force in the compressed air to be utilized during the intervals when the original force is necessarily withdrawn, it follows that such a construction is needed as that the operation of accumulated force will be continuous during the intervals above named, and from experiments I have found that the application of the above principle will produce this result.

In view of its variable capacities required, as well as the variable degrees of pressure to be overcome, the following general rule is believed to be applicable: The air-chamber should be made of such length in proportion to the diameter that the time required for the water to pass out of the air-chamber shall be sufficient to compensate for the loss of time in changing the stroke of the lever. In some cases, where the rod H cannot be long enough for this purpose, the other piston-rod G may also be made hollow, and form a supplemental air-chamber.

The operation of the pump shown is the same as other pumps of that character; but the piston or plunger as constructed may be used in any pump where applicable.

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

1. In a force-pump, an air-chamber constructed in the form of a long tube of small bore, for the purpose of procuring a slower action of the compressed air, a retarded delivery of the water therefrom, and a consequent steadiness of the stream from the pump when the latter is operated slowly, substantially as shown and described.

2. The combination of two pistons, one placed above the other in the same cylinder, and two piston-rods connected therewith and to the same operating-lever, the rod of the suction-piston passing through the force-piston, and one or both of said piston-rods made hollow, to form an elongated air-chamber to produce a steady stream of water, all substantially as and for the purposes set forth.

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

BENJAMIN BRANSON.

Witnesses:
R. McLANE,
JOSEPH H. BRANSON.