A. G. HOLLAND.

Force-Pump.

No. 221,065. Patented Oct. 28, 1879.

Fig. 1.

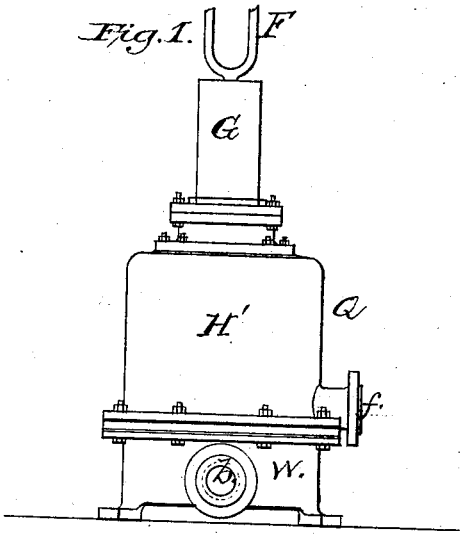


Fig. 2.

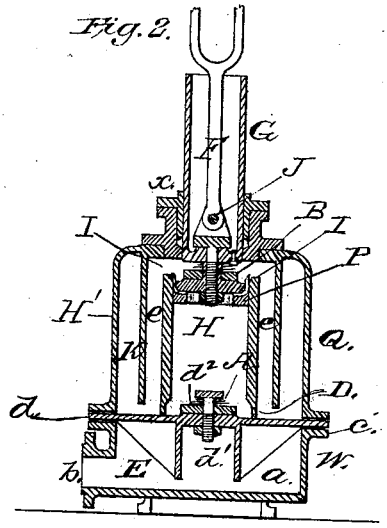


Fig. 3.

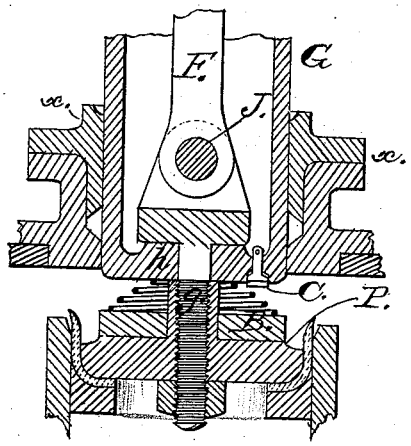
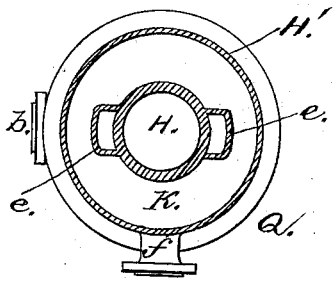


Fig. 4.



WITNESSES

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UNITED STATES PATENT OFFICE.

ALFRED G. HOLLAND, OF SEDALIA, MISSOURI.

IMPROVEMENT IN FORCE-PUMPS.

Specification forming part of Letters Patent No. **221,065**, dated October 28, 1879; application filed December 13, 1878.

To all whom it may concern:

Be it known that I, ALFRED G. HOLLAND, of Sedalia, in the county of Pettis and State of Missouri, have invented a new and useful Suction and Double-Acting Force-Pump, of which the following is a specification.

Figure 1 of the drawings is a representation of a side elevation of my improved pump. Fig. 2 is a vertical central section thereof. Fig. 3 is a sectional detail of the same. Fig. 4 is a horizontal section of the same.

This invention has relation to improvements in double-acting force and suction pumps.

The object of the invention is to so improve this class of pumps that the flow of water will not be reversed by the action of the piston, and the pounding common to those now in use when run at a high rate of speed will be effectually avoided. Another disadvantage in such pumps as now constructed is, that in operating from a crank the guide or device for maintaining a parallel motion of the piston-rod renders it imperative that the pump should be set up to accommodate the vibratory motion of the pitman. This frequently makes it impossible to attach the suction or force pipes without the use of short bends or elbows, which are obviously objectionable, in that they increase friction. The object of my invention is also to correct this defect.

The nature of my invention will be hereinafter fully set forth.

In the annexed drawings, the letter W indicates the base of my improved pump, having a cylindrical cup-shaped cavity, *a*, having an induct, *b*, connected with the feed-pipe, leading into the well, cistern, tank, or stream, and having at its base means of attachment to a stand or well-curb, and at its upper edge a flange, *c*, the object of which will be hereinafter fully shown.

Resting upon the flange *c* is a metallic plate, *d*, having a valve, d^2, opening upward, and forming, with the base W, a vacuum-chamber, E, the object of which will be hereinafter fully explained.

The valve d^2 is arranged at the upper end of a cylindrical tube, d', projecting downward from the under side of plate *c*. It is made of vulcanized rubber, and is held down upon its seat by means of a suitable spring.

Q indicates the body of the pump, consisting essentially of the barrel or cylinder H, and a larger cylinder, H′, between which is an annular air-chamber, K. The inner cylinder has near its upper end the ports I′, opening into the ducts *e*, secured to the outer walls of the said cylinder within the air-chamber, and reaching nearly to the bottom thereof. The part Q is secured to the base by means of suitable screws or bolts, and has near its bottom an outlet-pipe, *f*.

P indicates a piston, having a suitable packing, a valve, B, of vulcanized rubber, opening upward, and held down upon its seat by means of a spring, and a short rod, *g*, connected to the pitman F by a knuckle-joint, J. This rod and pitman are passed downward through a cylindrical plunger, G, having in its bottom a short sleeve, *h*, through which the threaded end of rod *g* projects. The piston is screwed onto this rod until it abuts against the end of the sleeve, thus securing the plunger to the said rod. The plunger has in its bottom a small valve, C, closing upward as the piston descends, and designed to admit a small quantity of fluid into the barrel of the pump to prime the same. There is also a small hole, D, at the bottom of the cylinder, that drains the pump.

The operation of my improved pump is as follows: When the piston moves upward, its valve closes, the valve A at the bottom of the cylinder H opens, water rushes up the suction-pipes, through the induct, into the vacuum-chamber, completely filling it, and also the cylinder below the piston. At the downstroke of the piston valve A closes, valve B opens, water rushes through it into the upper part of the cylinder, whence it is forced into the air-chamber through ports I and ducts by the hollow plunger aforesaid. The strokes being continued, water will be forced in a continuous stream out of the ~~induct~~ outlet. The valve A being tight upon its seat, the chamber E is air-tight, and will always contain sufficient water to start the pump, this being due to the partial vacuum at its upper part and the pressure of the atmosphere.

As shown in Fig. 3, the plunger extends through a stuffing-box, *x*, secured to the pump-body, and has an extended bearing therein;

consequently the pump may be turned in any direction required to direct the suction or force pipes to any desired point, thus avoiding bends or elbows. This is due to the fact that the inside face of the cylinder H and of the stuffing-box serve as guides, the usual fixed guides being dispensed with. It is also clear that the water having free passage at the downward stroke through the piston, the flow of water is in the same course or direction, and not reversed; consequently there can be no pounding.

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

1. The combination, with a plate, *d*, having an upwardly-opening valve, A, of the concentric cylinders H H′, forming an air-chamber, K, the ports I, the valved piston P, and the displacing-cylinder secured to said piston, and extending through the stuffing-box, substantially as specified.

2. The combination, with the recessed base W, having the induct-pipe *b*, plate *d*, closing said recess, forming a vacuum-chamber, E, and provided with the upwardly-opening valve A, of the cylinders H H′, forming air-chamber K, the ports I, the valved piston P, the plunger G, and piston-rod and pitman F *g*, substantially as specified.

ALFRED G. HOLLAND.

Witnesses:
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