G. W. RINEHART.

PUMP.

No. 181,363. Patented Aug. 22, 1876.

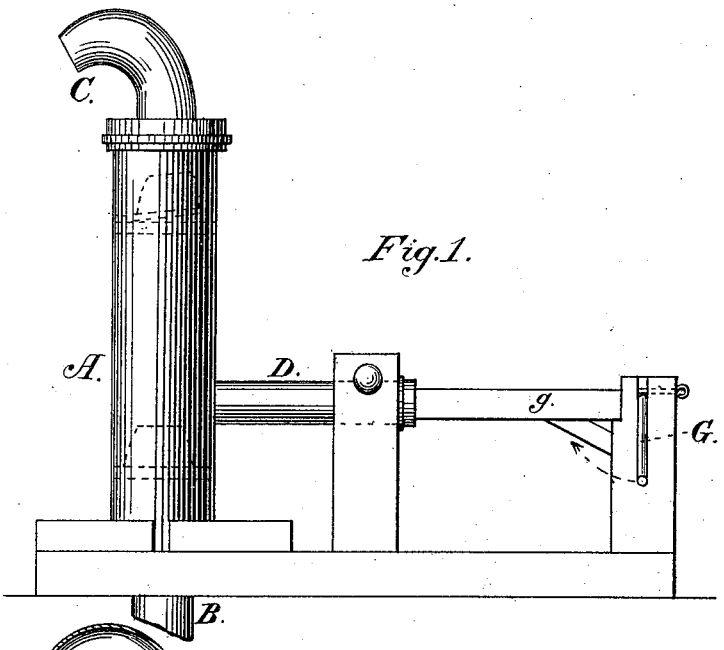

Fig. 1.

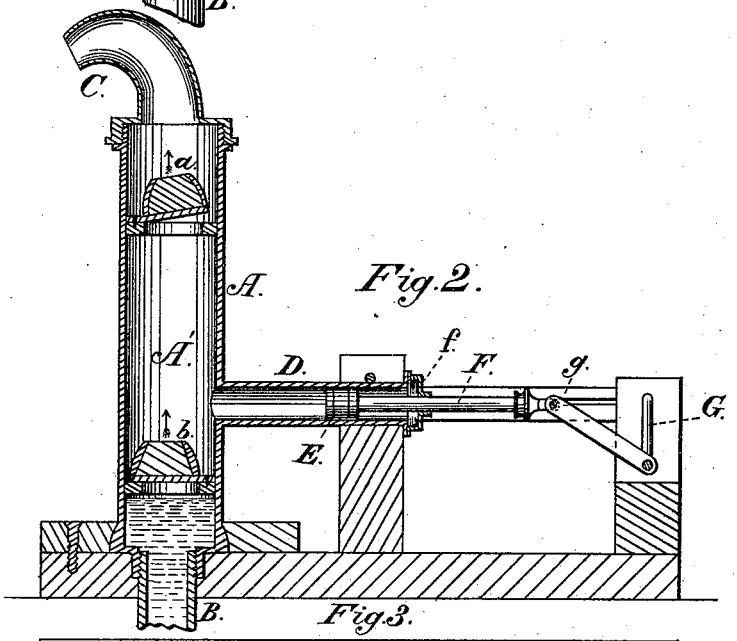

Fig. 2.

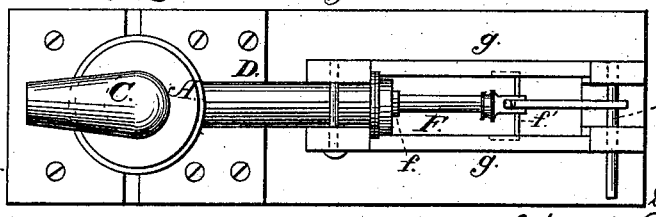

Fig. 3.

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UNITED STATES PATENT OFFICE.

GEORGE W. RINEHART, OF KEYSVILLE, VIRGINIA.

IMPROVEMENT IN PUMPS.

Specification forming part of Letters Patent No. **181,363**, dated August 22, 1876; application filed June 23, 1876.

To all whom it may concern:

Be it known that I, GEORGE W. RINEHART, of Keysville, in the county of Charlotte and State of Virginia, have invented certain new and useful Improvements in 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 pumps; and consists of a vertical valve-cylinder, at the central portion of which extends a horizontal suction or piston cylinder, the vertical cylinder being made of much greater diameter than the horizontal cylinder, and provided in its interior with a single induction and eduction valve, situated some distance apart, so as to form a large chamber or reservoir in the vertical cylinder, which shall be of greater diameter and capacity than the piston-cylinder, all as and for the purposes hereinafter more fully and at large will appear.

The object of this invention is the construction of the parts so as to combine both a suction and force pump, which will be powerful in effect, but simple in its formation and arrangement, easy operated, durable, and not liable to be readily injured or get out of order, the suction and force being simultaneous and continuous in their operation, and by the same movement, the pump being intended, principally, for use where it is desired to elevate or carry the water some distance above the supply; and it is accomplished by drawing up the water by suction to the ordinary elevation attainable by this means, and then propelling or driving it by force to elevations or points greatly above this point—such as the top stories of elevated houses, &c.

In the drawings, Figure 1 represents a side elevation, Fig. 2 a vertical longitudinal section, and Fig. 3 a plan view, of my invention complete and in operation.

A is a vertically-secured cylinder or pump-stock, from the bottom of which extends the supply-pipe B. C is the delivery-pipe. In the interior or bore of the pump-stock A is placed two clack-valves, *a b*, the induction-valve *b* being placed or situated at the lower portion of the pump-stock, and the eduction-valve *a* being situated some distance above this, at the top of the stock, so as to form a considerable space or chamber, A′, between the two valves, for the purposes hereinafter more fully explained. Situated about midway of the stock A, and opening therein just above the induction-valve *b*, is a horizontally-secured cylinder, D, within which operates an air-tight piston, E. F is the piston-rod, which passes through a stuffing-box, *f*, at the end of the cylinder D, and is guided in its proper horizontal position by a cross-head, *f′*, working in guide-rails *g g*. G is the crank-shaft for communicating the proper movement, or driving the piston E. The suction-cylinder D is made of somewhat smaller size than the pump-cylinder A, as shown.

The operation of the pump is as follows: Upon drawing out the piston the water is drawn or sucked up through the pipe B into pump-stock A, the induction-valve *b* opening by the action of the current, and completely fills the chamber A′ in the pump-stock, and also the cylinder D. Upon the reverse movement of the piston, or its being driven back, the induction-valve *b* is closed, and the volume of water contained in the chamber A′, and in the cylinder D, is propelled with great force up and out at the pipe C. From this pipe C pipes or hose may lead off, so as to conduct the water to points above the pump, when desired.

In drawing up the water to fill the chambers A′ D the induction-valve opens by the action of the current of water, and the eduction-valve is kept closed by atmospheric pressure. When forcing the water out, the induction-valve is closed and the eduction-valve is opened by the pressure of the water, the action of these valves being simply as in ordinary cases.

As will be seen, the vertical valve-cylinder A is made of greater diameter than the horizontal suction-cylinder D, and the valves *a b* therein are placed some distance apart. Thus a large chamber or reservoir, A′, of much greater diameter and capacity than the suction-cylinder D, is provided, in addition to the chamber in the cylinder D. The object of thus forming the valve-cylinder of so much greater diameter than the piston-cylinder is to increase the

capacity and power of the pump, which increase will be equal to the ratio of the sectional areas of the two cylinders. In addition to this, the induction-valve being placed just below the mouth of the suction-cylinder, sufficient water is always left in the cylinder or reservoir to keep the lower valve prime. Thus the parts are less liable to get out of order, and the pump is more easily started in operation.

By providing only a single induction and eduction valve, and arranging the parts as shown, all shocks, jar, weight of water, and lost motion, occasioned when two or more sets of induction and eduction valves and separate water-way are employed, as is usually the case in horizontal pumps, are avoided, and the operation of the pump is made smooth, regular, and easy.

By this construction and arrangement it will be seen that a simple and effective combined force and suction pump is secured; and, although the capacity and force of the pump are increased, the power necessary to operate it is about the same as in ordinary cases. By this means water may be elevated by suction to to the full elevation attainable, and then from this point conducted or driven with sufficient force to elevate or carry it up many feet above, thus supplying water to any desired height.

I am aware that force-pumps have before been constructed with a reservoir or chamber at the end of the horizontal piston or suction cylinder. This, therefore, I do not claim; but

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

The pump herein described, consisting of large vertical valve-cylinder A, provided in its interior with a single set of induction and eduction valves, *a b*, and reservoir or chamber A′, horizontal smaller-sized piston-cylinder D, secured to the valve-cylinder at the central portion thereof, and just above the induction-valve *b*, pistons E F, and operating mechanism G *g*, all constructed and arranged to operate substantially as described.

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

GEORGE W. RINEHART.

Witnesses:

THOMAS W. GREER,

WALTER L. GARDEN.