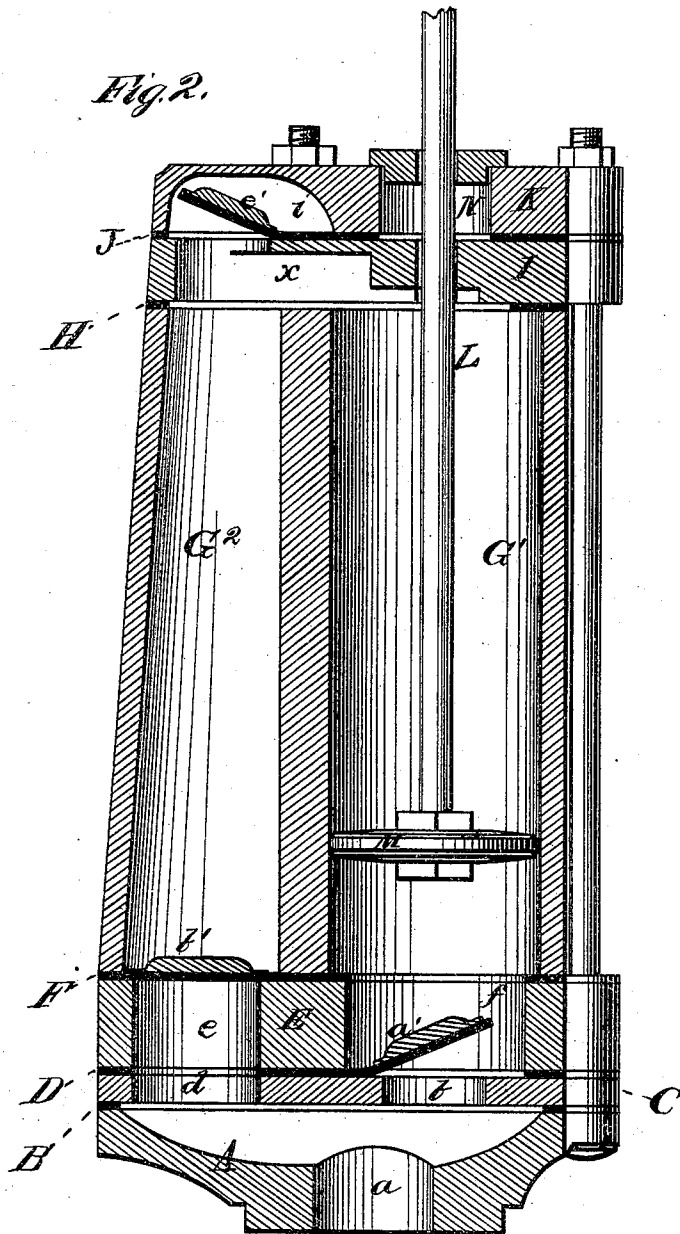


T. GARDNER.
FORCE-PUMP.

No. 179,293.

Patented June 27, 1876.



WITNESSES

Robert Emmett
John D. Aiken

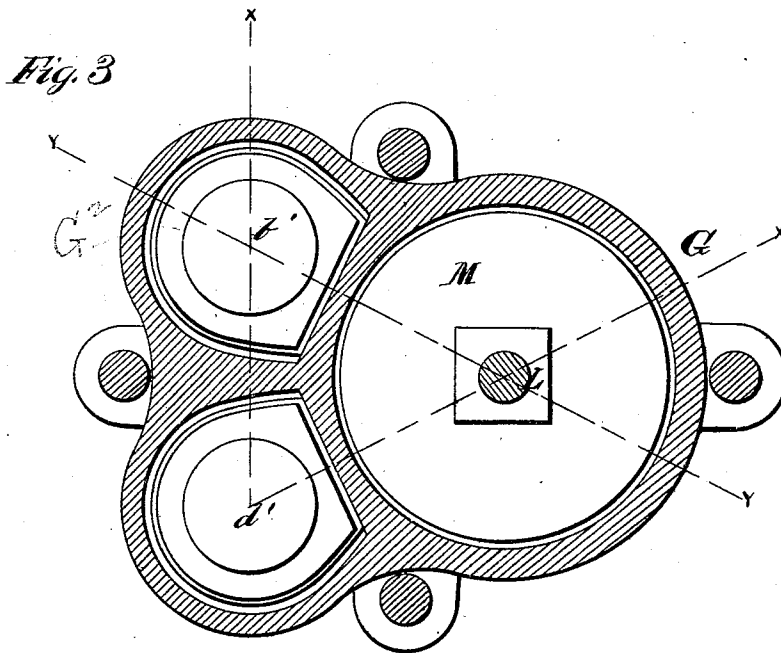
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Fig. 4.

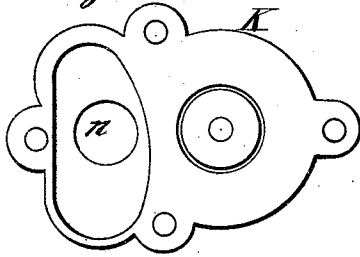


Fig. 5.

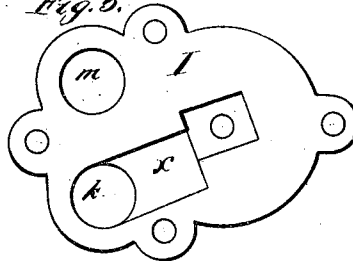


Fig. 6.

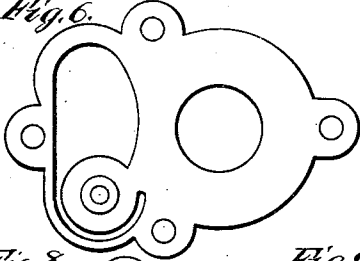


Fig. 7.

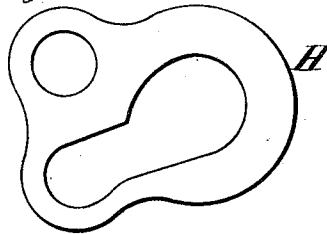


Fig. 8.

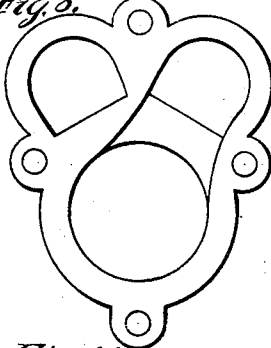


Fig. 9.

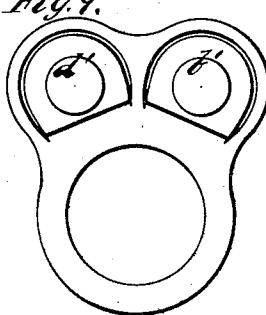


Fig. 10.

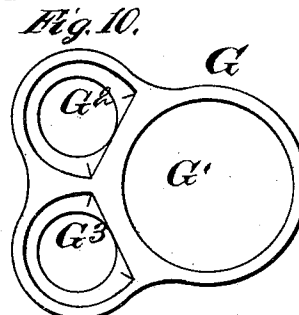


Fig. 11.

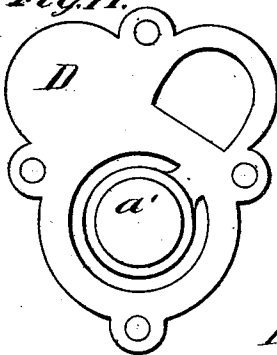


Fig. 12.

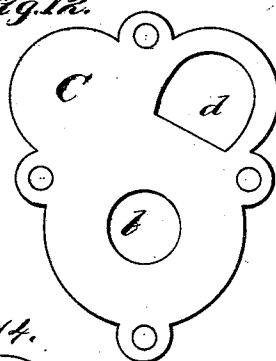


Fig. 13.

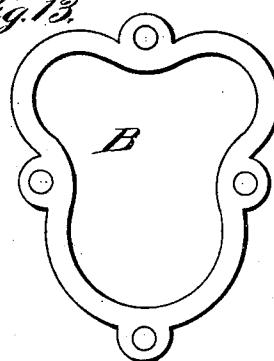
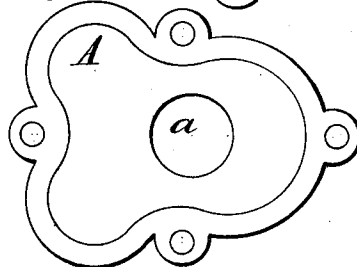


Fig. 14.



WITNESSES

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UNITED STATES PATENT OFFICE.

THEODORE GARDNER, OF HORSEHEADS, NEW YORK.

IMPROVEMENT IN FORCE-PUMPS.

Specification forming part of Letters Patent No. **179,293**, dated June 27, 1876; application filed May 6, 1876.

To all whom it may concern:

Be it known that I, THEODORE GARDNER, of Horseheads, in the county of Chemung and State of New York, have invented a new and valuable Improvement in Force-Pumps; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a longitudinal acute-angle section, and Fig. 2 is a longitudinal vertical section, of my force-pump. Fig. 3 is a transverse vertical section; and Figs. 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, and 14 are detail views of the same.

The nature of my invention consists in the construction and arrangement of a force-pump, as will be hereinafter more fully set forth.

In the annexed drawing, A represents the bottom head-block, made concave on its upper surface, and provided with a central opening, *a*, for the insertion of the pipe that is to extend downward into the well. Above the head-block A is placed packing B, cut out so as to leave the concave surface of the head-block open; and on this packing is the plate C, which has one opening, *b*, in the center, and one opening, *d*, near one corner. On this plate is the packing D, provided with an opening corresponding with the opening *d*, and has also a valve, *a'*, over the opening *b*. E is the head-block on which the cylinder rests. This head-block has three openings, *e*, *f*, *h*. *e* is directly over the opening *d*, and the two openings *f* and *h* form one on the bottom of the head-block, as shown. F is packing on top of head-block E. It has one opening corresponding with main barrel of cylinder, and two valves, *b'*, *d'*, over openings *e* and *h* in head-block E. The cylinder G has three bores or barrels, of which G^1 is the largest for the piston to work in. The other two, G^2 and G^3 , are smaller, and the three barrels coincide with the openings in head-block. On top of cylinder is packing H. I is the second head-block from the top, having three openings, *i*, *k*, *m*. *k*, *m* stand over barrels G^2 , G^3 , and a slot, *x*, cut across the head-block, connects

barrels G^1 and G^2 , and serves as an agent to enable me to repack the piston without disconnecting the pump. The packing H has an opening corresponding with the slot *x*. A head-block, L, is packing J, with openings to correspond with the openings *i* and *m*, and one valve, *e'*, to cover the opening *k*. K is the top head-block, and has an opening, *n*, to receive discharge-pipe, and another opening, *p*, to stand over the opening *i*. In the bottom is a concavity large enough to cover openings *k*, *m*, and admit of the working of the valve *e'*. L is the piston-rod, with piston M, composed of two metal plates with packing between them, and nuts above and below. The rod passes through stuffing-box N.

The piston can easily be repacked without taking the pump apart.

The operation is as follows: As the piston ascends, water is taken in through *a* in head-block A, and fills the concave space thereof; thence through *b* in plate C at valve *a'*, through *f* in head-block E, and fills barrel G^1 of cylinder. As the piston descends, valve *a'* closes, and the water is forced through *h* in head-block E at the valve *d'*, up the barrel G^3 , through *m* in head-block I, into concave space of head-block K, and out through *n*, the valve *d'* then closing and holding it out. At the same time water is being taken in at *a* in head-block A, through *d* in plate C, *e* in head-block E at the valve *b'*, up the barrel G^2 , through the slot *x* in the head-block I, and fills the barrel G^1 . Now raise the piston again; the valve *b'* closes, and the contents of the barrel G^1 are forced through *k* in head-block I into concave head-block K, and out through opening *n*, the valve *e'* closing and holding it out. At the same time the barrel G^1 is filled, as first described. Valves *e'* and *d'* hold all the hydrostatic pressure out of the cylinder from the top, and the valves *a'*, *b'* prevent all escape from the cylinder down the pipe. Thus, by working the piston vacuum is produced, and hydrostatic pressure forces water through the vacuum produced to the cylinder.

An air-chamber may be used in connection with this pump, if desired.

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

The three-barreled cylinder G, with the piston M, operating in the barrel G¹, in combination with the head-block E, with openings *e f h*, valves *a' b' d'*, and head-blocks I K, provided with openings, passages, and valves, as described, all constructed, arranged, and operating substantially as and for the purpose set forth.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

THEODORE GARDNER.

Witnesses:

FRANK S. BEWLEY,
CHARLES GARDNER.