W C & J S Burnham,

Double-Acting Pump.

No. 12,342. Patented Feb. 6, 1855.

Fig. 4.

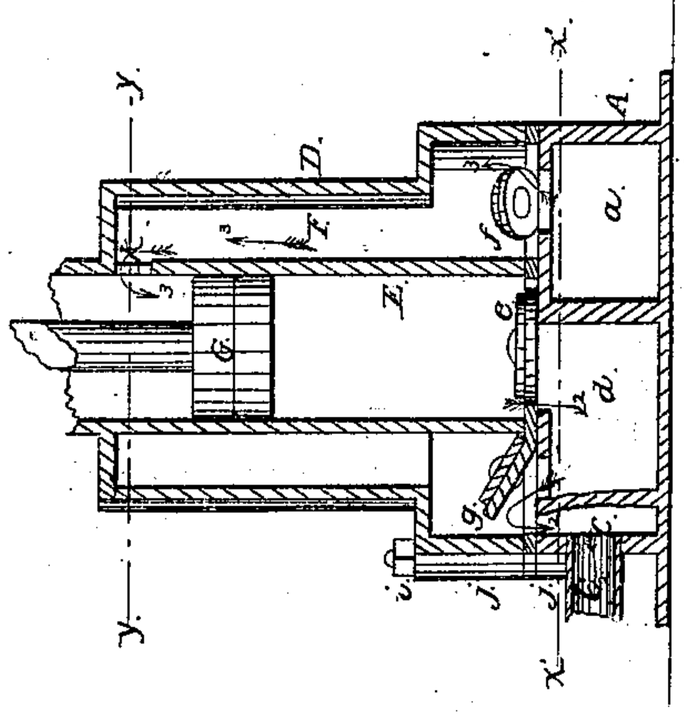


Fig. 5.

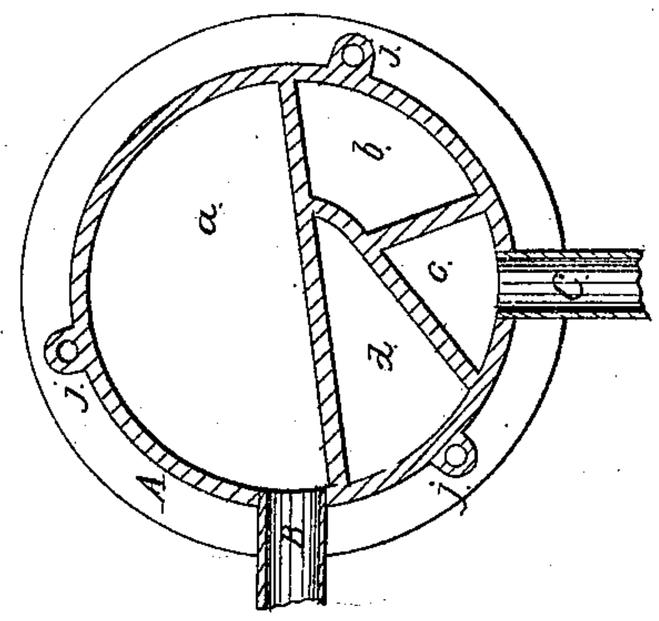


Fig. 3.

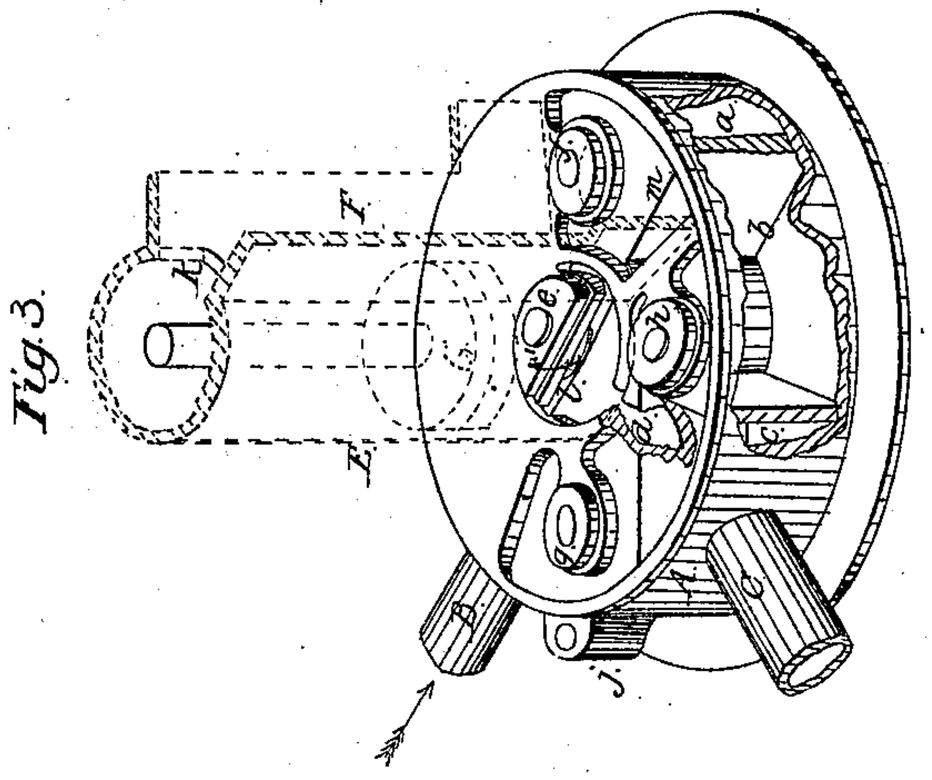


Fig. 1.

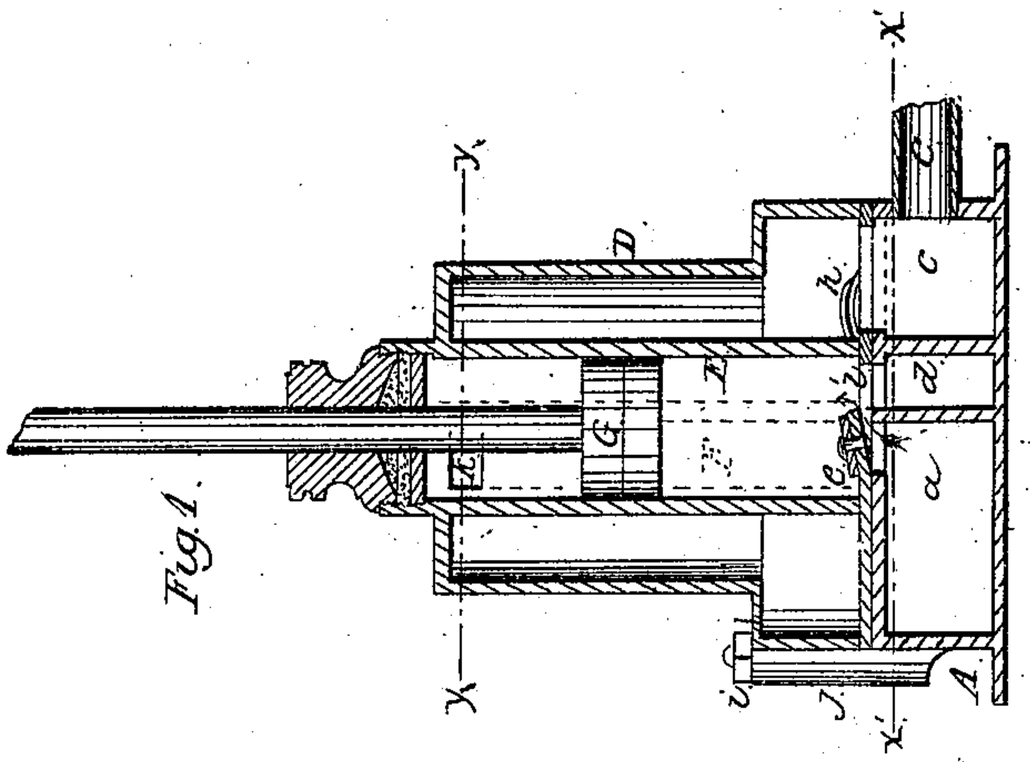
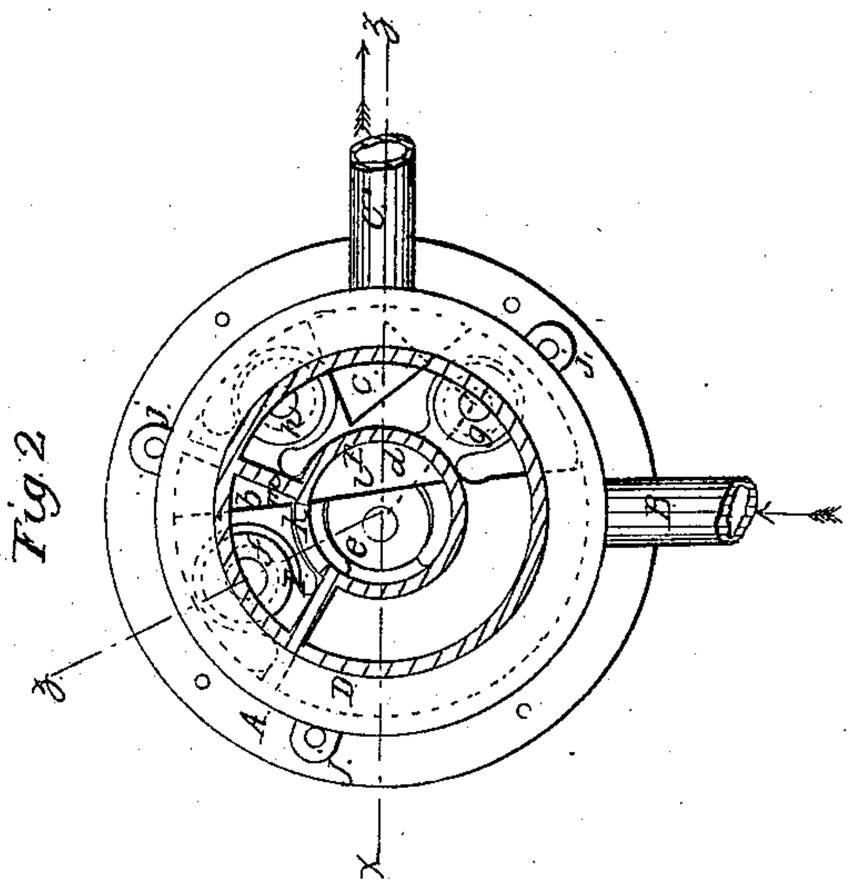


Fig. 2.



UNITED STATES PATENT OFFICE.

W. C. BURNHAM AND J. S. BURNHAM, OF NEW YORK, N. Y.

DOUBLE-ACTING FORCE-PUMP.

Specification of Letters Patent No. 12,342, dated February 6, 1855.

To all whom it may concern:

Be it known that we, W. C. BURNHAM and J. S. BURNHAM, of the city, county, and State of New York, have invented a new and Improved Double-Acting Force-Pump; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1, is a vertical section of ditto, taken at the line (*x*) (*x*), Fig. 2. Fig. 2, is a horizontal section of ditto, taken at the line (*y*) (*y*) Figs. 1 and 4. Fig. 3, is a perspective view of ditto, the upper portion of the outer casing being removed. Fig. 4, is a vertical section of ditto, taken at the line (*z*) (*z*) Fig. 2. Fig. 5, is a horizontal section of ditto, taken at the line (*x'*) (*x'*), Figs. 1 and 4.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to a new and improved double acting force pump, and consists in the peculiar construction of the pump, whereby the expense of manufacturing force pumps is much reduced and the pump simplified, so that it is not liable to get out of repair, and its valves may be kept in repair by any person not at all skilled in the construction thereof.

To enable others skilled in the art to fully understand and construct our invention, we will proceed to describe it.

A represents the base of the pump, which is a circular chamber cast separately from the other parts, and having four compartments (*a*) (*b*) (*c*) (*d*), all of which are shown in Fig. 5.

B is the suction pipe which communicates with the compartment (*a*) and C is the force pipe which communicates with the compartment (*c*), see more particularly Fig. 5.

Over the compartment (*a*) there are two valves (*e*) (*f*), over the compartment (*d*) there is one valve (*g*), and one valve (*h*) over the compartment (*b*), all the valves are shown in Figs. 2 and 3, they all open upward and are all upon the top plate of the chamber or base A.

D Figs. 1, 2 and 4 represents an outer casing which is fitted directly over the base or chamber A and is secured thereto by bolts (*i*), see Figs. 1 and 4, which pass through projections or flanches (*j*) on the casing and base.

Within the casing D there is a cylinder E, extending the whole height of the casing and having an opening (*k*) at its upper end which communicates with a passage F between the casing D and cylinder E, see Figs. 2, 3, 4 and dotted lines on Fig. 1. The casing D is secured over the circular chamber or base A so that the cylinder E is directly over the valve (*e*) which communicates with the compartment (*a*), and also over an opening (*l*) which communicates with the compartment (*d*) see Figs. 1, 2 and 3. The passage F is over the valve (*f*) which communicates with the compartment (*a*) and an opening (*m*) which communicates with the compartment (*b*) see Figs. 2 and 3.

Within the cylinder E there is a piston G see Figs. 1, 3 and 4, the rod H of which works through a stuffing box I at the upper part of the casing D, see Fig. 1. The space within the casing D between the cylinder E and passage F serves as an air chamber, and the compartment (*a*) within the base or chamber A serves as an air chamber between the suction pipe B, and cylinder E.

Operation: Suppose the piston G to be at the lower end of the cylinder E, and the pump now first operated. Upon drawing the piston upward, the valve (*e*) will of course open and the water will flow into the chamber (*a*) through the suction pipe B and into the lower end of the cylinder E through the valve (*e*), as shown by arrows 1, in Figs. 1 and 3. The valve (*f*) at the lower end of the passage F will be kept closed by the pressure of the air against it as the piston rises. When the piston is moved downward the water that entered at the lower end of the cylinder is forced through the opening (*l*) into the compartment (*d*), the valve (*e*) being closed by the pressure of the water, and the water in the compartment (*d*) being under the pressure of the piston G will raise the valve (*g*) and flow into the chamber (*c*) and out of the pipe C, see arrows 2, Fig. 4, the chamber (*c*) being open at the top, as shown in Fig. 3. Upon the downward motion of the piston G a suction is formed in the passage F and the water rushes from the compartment (*a*) through the valve (*f*) up the passage F into the upper part of the cylinder E through the opening (*k*) see arrows 3 Fig. 4, and when the piston is moved upward this water that entered into the cylinder through the opening (*k*) is forced down the passage F through the opening

(*m*) into the compartment (*b*), the water in the compartment (*b*) raising the valve (*h*) and passing into the compartment (*c*) and out of the pipe C. Thus it will be seen that a continuous stream is thrown by the pump, and its mechanism is extremely simple. The casing D, with its cylinder E and passage F may be cast in one piece. The base or chamber A with its compartments (*a*) (*b*) (*c*) (*d*) may also be cast in one piece. There is nothing to get out of repair except the valves, and these being all upon the top of the base or chamber A are readily got at by unscrewing the bolts (*i*) and may be repaired or replaced by new ones by any one however unskillful as a mechanic.

Another important point in our improved pump is, that we obtain, notwithstanding the simplicity of its construction all the essential features of the most perfect acting force pump, we have two air chambers, one between the cylinder and force pipe, which air chamber is the space between the cylinder E and passage F and the casing D, and the other air chamber is the compartment (*a*) in the base or chamber A the latter air chamber being between the cylinder and suction pipe.

Good operating force pumps are expensive. A small one for family use being worth about $40. Ours may probably be made so as to not exceed $10.

Having thus described out invention, what we claim as new and desire to secure by Letters Patent, is—

The general construction of the pump as herein shown and described, viz: Having the casing D cylinder E and passage F arranged as shown and cast in one piece and secured upon the upper part of a base or circular chamber A having compartments (*a*) (*b*) (*c*) (*d*) within it, and valves (*e*) (*f*) (*g*) (*h*) upon its top plate arranged and communicating with the several passages as herein shown and described and for the purpose as set forth.

W. C. BURNHAM.
J. S. BURNHAM.

Witnesses:
S. H. WALES,
I. G. MASON.