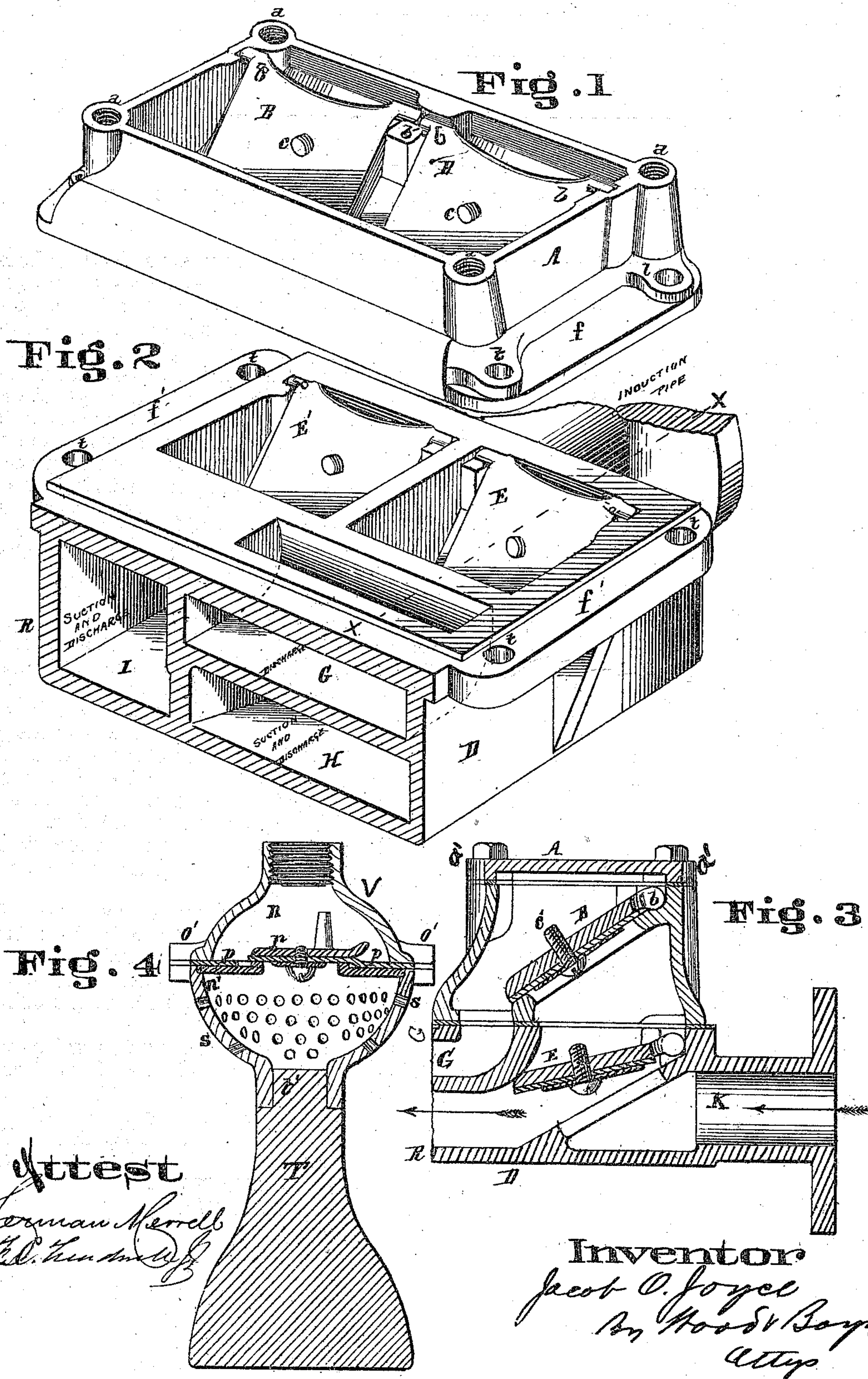


J. O. JOYCE.  
Force and Vacuum Pumps.

No. 128,631.

Patented July 2, 1872.



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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN FORCE AND VACUUM PUMPS.

Specification forming part of Letters Patent No. 128,631, dated July 2, 1872.

Specification describing an Improvement in Double-Acting Force and Vacuum Pumps, invented by JACOB O. JOYCE, of Dayton, Montgomery county, in the State of Ohio.

The first part of my invention relates to the construction and arrangement of valves and valve-chambers in such a manner that hinged valves may be employed and so arranged and placed that sand or muddy substances in the water will not interfere with their vibrations nor clog or obstruct the ports and passages of the pump. The second part of my invention relates to the construction and arrangement of a check-valve within a valve-chamber, which acts as a strainer.

Figure 1 is a perspective view of the upper valve-chamber. Fig. 2 is a perspective view of the lower valve-chamber with the ports and passages leading to the discharge-chamber. Fig. 3 is a vertical section of Figs. 1 and 2 on the line *xx*. Fig. 4 is a vertical section through the center of the check-valve chamber.

The other parts of the pump, not shown in the drawing, are fully described in Letters Patent granted to me November 10, 1868, and it is not necessary to describe them here. The ports and passages leading from the valve-chambers to the piston, air, and discharge chambers are also the same as described in my said patent.

A represents the upper valve-chamber, with the removable top *a' a'* removed. *a a a a* represent holes with threads for screws which fasten on the top. B B represent valves, attached to gudgeons *b b* at their top, as shown in Fig. 1, and placed at an angle of about forty-five degrees, the inner journals of the valves bearing on the partition *b'*. *c c* are screws, which secure the packing to the valve. D is the lower valve-chamber, and is a part of the base of the pump, the piston and air-chamber being removed, the valves E E' being hinged and arranged as shown in Fig. 2. I is the suc-

tion and discharge passage leading from the valve E'. H is the suction and discharge passage for the valve E. G G' are discharge-passages leading from the upper valve-chamber to the eduction-pipe. *f f'* are flanges for connecting the parts A and D together by means of screws or bolts passing through the holes *t t*. V is the check-valve chamber, which is connected to the induction-port in such manner as to stand upon the base T', placed at the bottom of the well, and is divided into two parts, *n n'*, connected by screws in the flanges *o' o'*. *p* is a diaphragm, shown here as connected to the bottom of the valve-chamber *n'*, but it may be attached to the top part, if desired. *r* is a valve seated on the diaphragm *p*. S S represent holes in the lower part of the check-valve chamber for the induction of water, and acting as a strainer at the same time. This check-valve chamber V is preferably globe-shaped. The base T' can be made of wood and connected to the neck of the globe by a tenon, *t'*, fitting tightly the neck of the valve-chamber. The check-valve may be placed at any distance from the eduction-port and connected by a proper pipe.

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

1. The valve-chamber A, composed of the removable top *a'*, with the inclined hinged valves B B with journal-bearings *b b* and partition and bearing *b'*, in combination with the chamber D and port G, all arranged substantially as set forth.

2. The improved check-valve and chamber V, composed of the parts *n n'*, diaphragm *p p*, valve *r*, orifices *s s*, and base T, all combined and arranged substantially as set forth.

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Witnesses:

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