O. Miller,

Steam Pump.

No. 60,535. Patented Dec. 18, 1866.

Fig: 1.

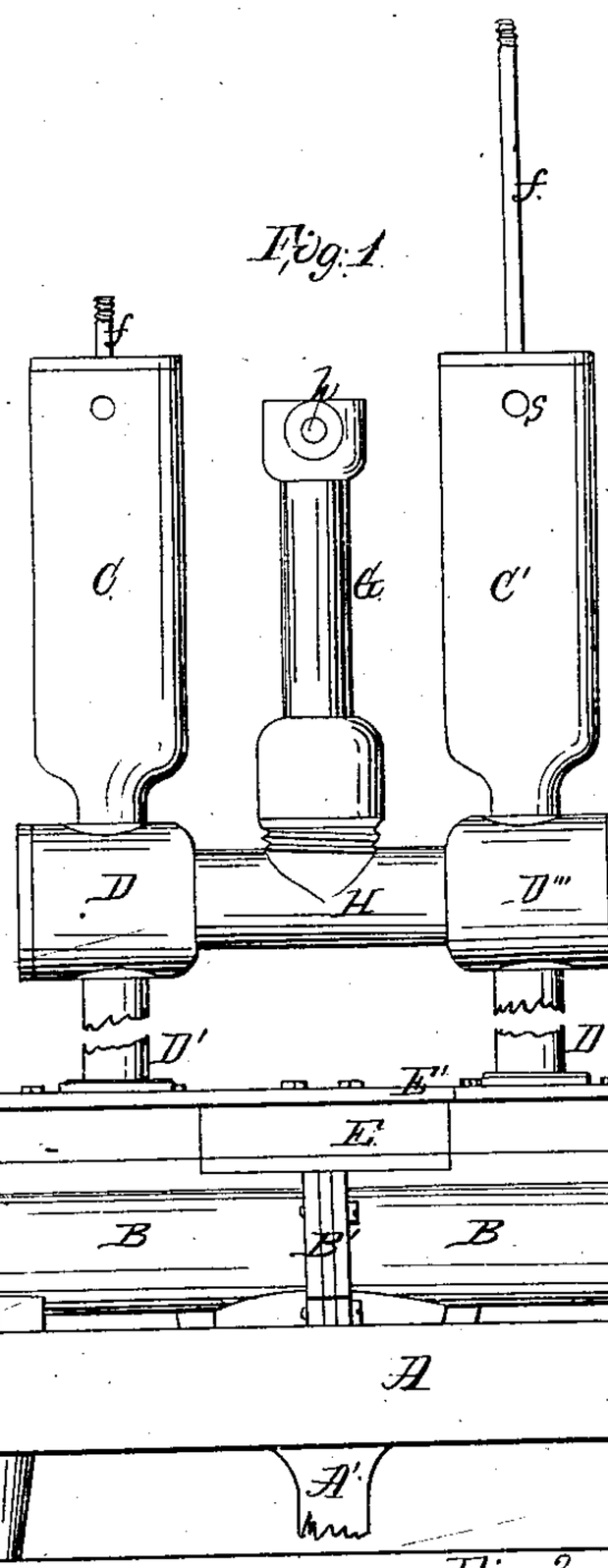


Fig: 2.

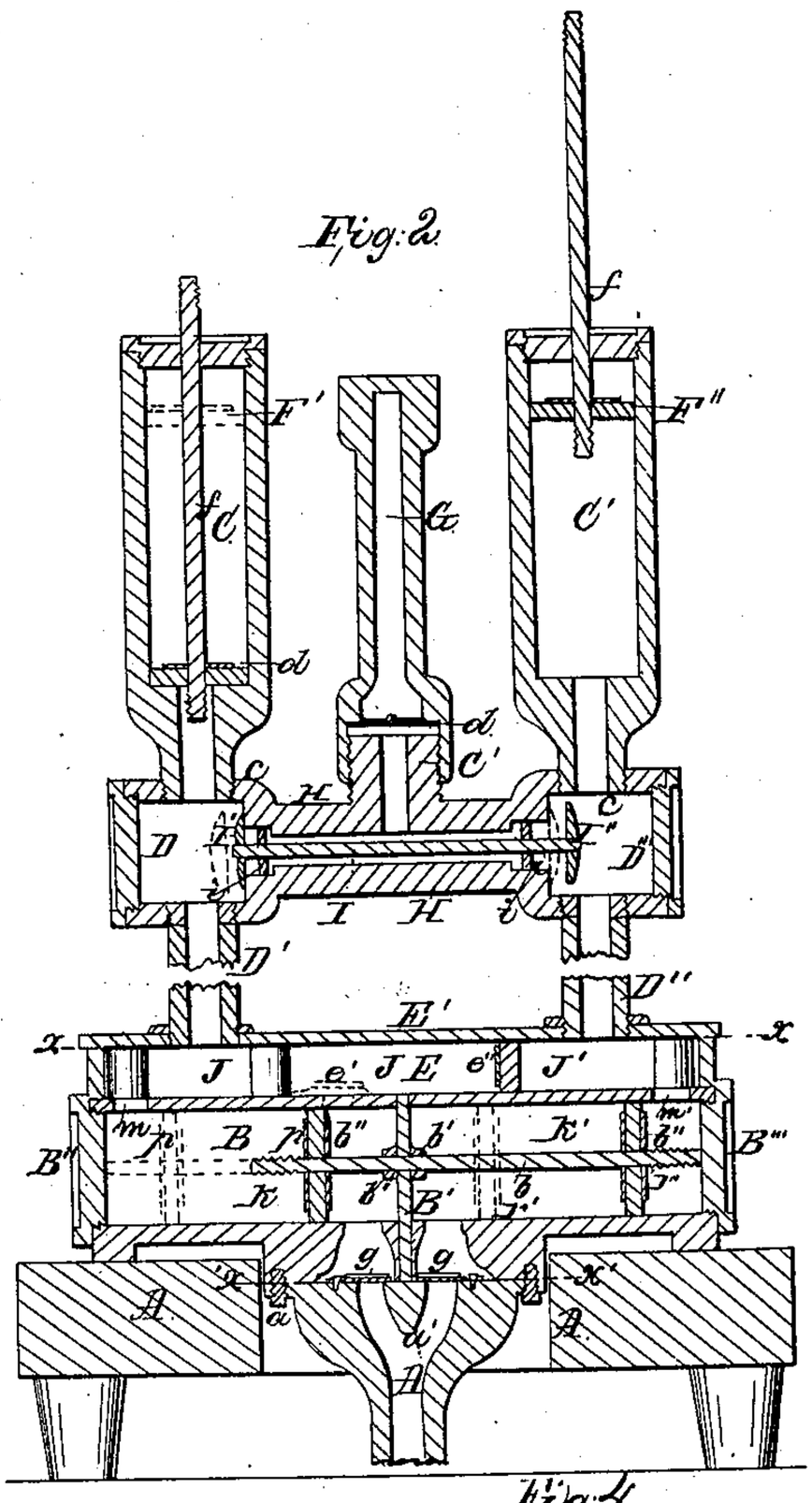


Fig: 3.

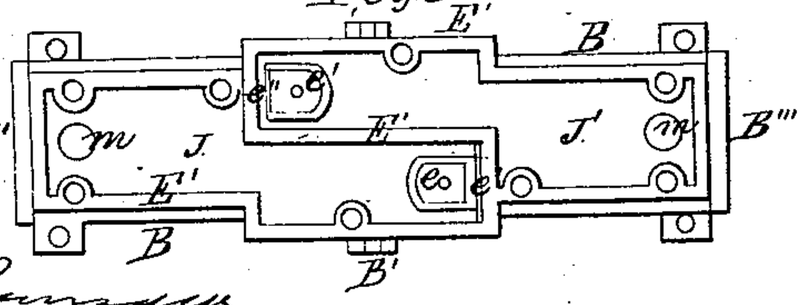
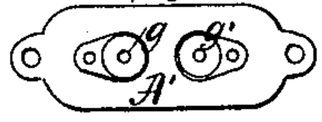


Fig: 4.



Witnesses:
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IMPROVEMENT IN PUMPS.

OLIVER MILLER, OF SALEM, OHIO, ASSIGNOR TO HIMSELF AND THOMAS D. BALL.

Letters Patent No. 60,535, *dated December* 18, 1866.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, OLIVER MILLER, of Salem, in the county of Columbiana, and State of Ohio, have invented certain new and useful improvements in Steam Pumps; and I do hereby declare that the following is a full and complete description of the construction and operation of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a front view of the pump.

Figure 2 is a vertical section.

Figures 3 and 4 are detached sections that will be referred to in the description.

Like letters of reference refer to like parts in the several views presented.

In the drawings, A represents the platform on which the pump rests. A is the induction pipe which communicates with a reservoir below, and extends up, of the form shown in the drawing, being bolted at *a a* to the cylinder B, and is bifurcated at *a'*, thus communicating with the cylinder B. Through the centre of the cylinder is a diaphragm, B, through which the piston-rod *b* passes through the stuffing-boxes *b'*, on each side of the diaphragm; for the purpose of keeping the rod in position and prevent leakage from one chamber to the other. Near each end of the piston-rod are pistons, *b''*, as shown, which work backward and forward in said cylinder, the ends of which are closed by heads B'' B'''. C C' are cylinders that rest on and are screwed into the chambers D D''' at *c*, as shown in fig. 2, the ends of these chambers, D D''', and cylinders C C', being closed by heads in the same way as the cylinder B. The chambers D D''' are attached to the chest E, that rests on the cylinder B, by connecting pipes, D' D'', which can be of any desired length, the ends being screwed, as shown, in the chambers D D''' and chest E, thus connecting them; the chest E being covered by a cap, E', which is secured to the cylinder by screw-bolts or any other means. Between the cylinders C C' is a nozzle, G, which is screwed on to a projection, *c'*, of the cross-pipe H that connects the chambers D D'''; this nozzle is of the form shown in figs. 1 and 2. A check-valve, *d*, in the lower end, as represented, prevents the return of the water when the pump is at rest or otherwise. In each of the cylinders C C' is a plunger, F F'', connected to a rod, *f*. Through the cross-pipes, H, extends the valve-rod I, on each end of which is a valve, I I''. *i i* are boxes across the end of the cross-pipe, in which the valve-rod moves, the valves closing and opening the ends of said cross-pipes alternately. Fig. 3 is a view of the chest E, with the caps E' removed along the line X X, fig. 2. This chest is divided into two compartments, J J', there being a valve in each one; these valves are held in place by the edge of the plate *e''* resting on the end of the valves *e e'*. Fig. 4 is a view of the induction pipe removed along the line X' X', in fig. 2, and to which are attached the valves *g*, shown also in fig. 2. These valves are to allow the water to pass up through the induction pipe into the chambers K K' of the cylinder B, and prevent its returning. The diaphragm B', passing through said cylinder, makes two chambers, K K'.

The general construction being given, the operation is as follows: When the plunger F in the cylinder C is forced down from F' to F by steam, the rods *f*, being worked by means of a walking beam or other mechanical means, the column of water in said cylinder is forced or compressed down into the chamber D. As the water passes into this chamber it closes the valve I, and is passed down through the connecting pipe D' into the chest E, in this part or section, J, of the chest, closing the valve *e*, then through the opening *m* into the chamber K of the cylinder B, forcing the piston along from *p* to *p'*, in the position seen in fig. 2, thus forcing the water that had passed into the cylinder through the valve *g* from the induction pipe into the chest through the valve *e'*, indicated by the dotted lines *e''* fig. 2, in the section J', fig. 3, of the chest, filling it, and will pass up through the connecting pipe D'' into the chamber D'''. The valve I'' being open, the surplus water will pass into the cross-pipe H, and up through the valve *h*, shown in fig. 1, some of it passing from the chamber D''' up into the cylinder C', filling the space between the plunger F'' and the chamber D''', and some will pass from the chest E down through the opening *m'*, into the chamber K' of the cylinder B, between the piston *b''* and head B'''; the operation is then reversed, the space below the plunger F'' in the cylinder C', chamber D''' and head B''', in the chamber K' of the cylinder B, and their connections, being filled with water, when the plunger is forced down, acts upon the water, closing the valve I'' in the chamber D''', and thus opening the valve I' in the chamber

D, the section J′ of the chest being full, the force of the water closes the valve *e′*, thus passes into the chamber K′, between the piston and head, forcing the piston from *r* to *r′*, and allowing the chamber K to be filled, forcing the water that is in the chamber K′, between the diaphragm and piston, (which rushes up through the valve *g′* when the piston is removed into the position seen in fig. 2,) up through the valve *e* in the section J of the chest, through the connecting pipe D′, into the chamber D, forcing the plunger F, in the cylinder C, up from F to F′, filling the space below, the surplus passing into the cross-pipe H, and up through the check-valve into the nozzle and out at *k;* thus the operation is the same, only in reverse order. The water, on leaving the induction pipe, is equally distributed from the diaphragm through the several sections of the pump, producing thereby an equilibrium of the water throughout its entire arrangement, the water in the one side acting as a counterbalance to that in the other, producing thereby a uniformity of action in each. The steam being admitted through the ports *s*, at the upper end of the cylinders, it therefore acts directly upon the column of water in each; hence a greater efficiency and directness of action are obtained. Through the intervention of the plungers F F′, exhaust or direct steam, induced through the ports *s*, may be used as an adjunct, and act in concert with the appliances for operating the plungers, and the cylinders may be arranged in such way as to have the functions of condensers in employing steam, which may be done with effect and economy, to the engine working the pump.

I am aware that F. F. Prudhomme obtained a patent, September 22, 1863, for a certain improvement in pumps, which I do not claim; but what distinguishes my improvements from others, is the construction and arrangement of a steam pump, as hereinbefore described.

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

1. The chambered chest E, with its valves *e e′*, in combination with the cylinder B B, pistons *b″*, valves *g g′*, and induction pipe A, all arranged in relation to each other, and operating conjointly for the purpose set forth.

2. I claim, in combination with the foregoing, cylinders C C′, with the respective plungers, chambers D D‴ and valves I′ I″, pipe H, valve *d*, and nozzle G, arranged and operating in the manner and for the purpose set forth.

3. I claim the chamber J J′ of the chest E, valves *e e′*, and openings *m m′*, in combination with the cylinder B, pipes D′ D″, and chamber D D‴, as and for the purpose set forth.

OLIVER MILLER.

Witnesses:

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