M. R. Clapp,

Steam Pump.

No. 46,638. Patented Mar. 7, 1865.

Fig 1.

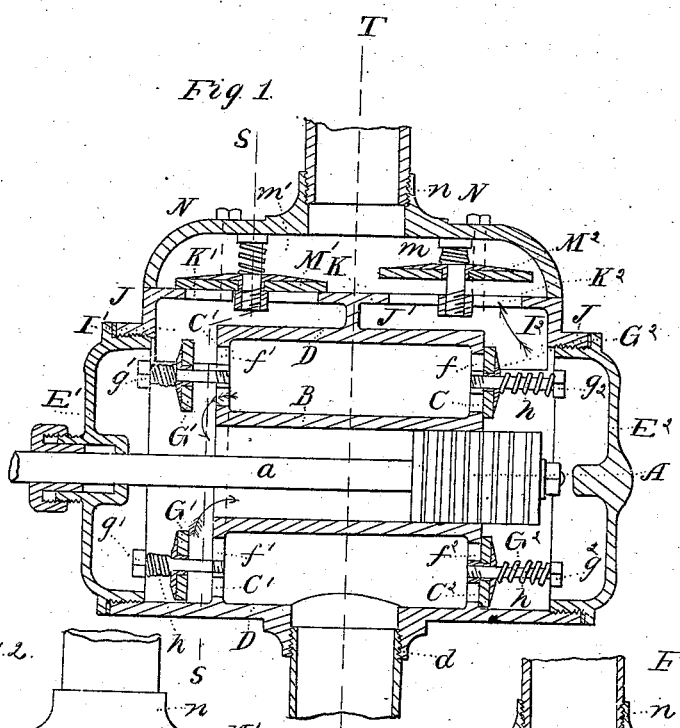


Fig 2.

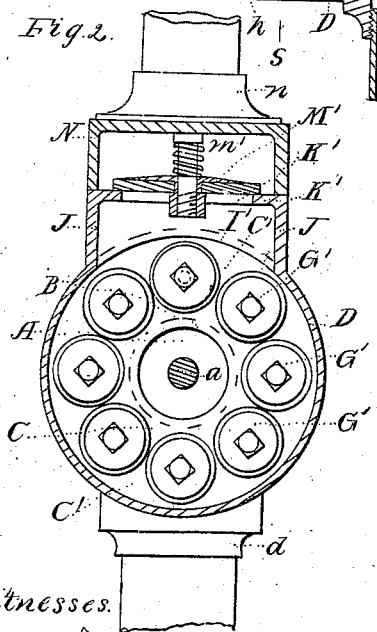
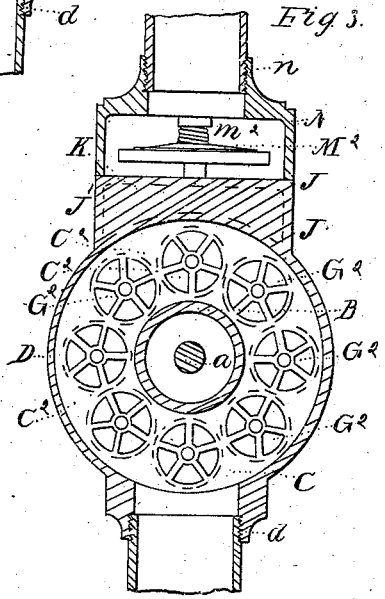


Fig 3.



Witnesses.

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UNITED STATES PATENT OFFICE.

M. R. CLAPP, OF NEW YORK, N. Y.

IMPROVEMENT IN PUMPS.

Specification forming part of Letters Patent No. **46,638**, dated March 7, 1865.

To all whom it may concern:

Be it known that I, M. R. CLAPP, of the city and county of New York, have invented certain new and useful Improvements in Pumps; and I do hereby declare that the following is a full and exact description thereof.

The accompanying drawings form a part of this specification.

Figure 1 is a central longitudinal vertical section. Fig. 2 is a cross-section on the line S S in Fig. 1. Fig. 3 is a cross-section on the line T T in Fig. 1.

Similar letters of reference indicate like parts in all the figures.

My improved pump is intended more especially for use in steam fire engines and in other situations where a very high pressure of the water is to be borne and a very quick action admissible. My pump has been worked under pressures as high as three hundred pounds per square inch and as rapidly as three hundred double strokes per minute in throwing large streams of water at a great height.

To enable others skilled in the art to make and use my invention, I will proceed to describe it by the aid of the drawings and of the letters of reference marked thereon.

A is the piston or plunger and *a* the plunger-rod. B is the cylinder or body of the pump proper. C′ C² are annular heads, which project outward like broad flanges from the ends of the cylinder B. D is an outside cylinder longer than A, and secured to the peripheries of the annular heads C′ C² and projecting considerably beyond them, as represented. E′ E² are exterior heads, secured to the ends of the cylinder D. The piston-rod *a* plays through a stuffing-box in the head E′, as represented. G′ and G² are series of circular valves, singly adapted to slide axially on stems *g′ g²*, and to cover the induction-orifices *f′ f²*, cored or otherwise formed in the annular heads C′ C². The valves G′ G² are made of vulcanized rubber, lined and backed with a casting, which serves as a guard to receive coiled springs *h h*, which tend to force each valve to its seat. These springs prevent the valves from sliding outward, and prevent concussion by striking forcibly against the heads of the stems or slides *g′ g²*.

Two large ports, I′ I², are cut through the outer cylinder, D, at the points represented. A casing, J, formed on the upper side of the cylinder D, incloses both these ports, and is surmounted by a flat plate, K. The space inclosed in the chest J K is divided into two parts by the stout partition J′.

On the plate K are mounted valves M′ M². These cover corresponding apertures in the plate K. These valves are of rubber, backed and lined with metal, and are adapted to slide axially on the guides *m′ m²*. These valves are also provided with springs. An additional chest, N, incloses these delivery-valves and discharges the water through a nozzle, *n*, into a hose. The nozzle *d* at the bottom leads the water in through a suction-hose. The hose or pipes may be provided with air-chambers or not, and the couplings, screw-bolts, or other fastenings, stuffing-box, piston-packing, &c., and the means of driving the pump may be of any approved kind.

In the operation of my pump each movement of the piston to the right compels the valves G′ to open and draw water through the nozzle *d* and through the valve-apertures *f′* to follow the piston, and also opens the valve M², drives the water from before the piston up through the port I², and out through the valve passage *k²*. The reverse movement of the piston shuts the valves G′ and M² and opens the valves G² and M′ and induces a flow of water up through the nozzle D, out through the valves G², into the cylinder B, to follow the piston, while the water to the left of the piston is driven out of the cylinder B, up through the port I′, and through the valve-passage, thus maintaining the stream through the delivery-nozzle.

My arrangement of the valves and valve-passages allows very ready access to all the valves and to their seats and fittings, and also allows an unusually free water-way. In the figures the piston A is supposed to be just completing its forward stroke, and the valves G² and M′ are tightly closed, while the valves G′ and M² are lifted to allow an induction of water on the left hand and an eduction on the right.

It will be observed that although the valves G′ may be of such size and so crowded together as to nearly touch each other, the water issuing under them finds perfectly free egress

in one direction—to wit, on the side toward the axis of the pump. The water therefore flows with perfect freedom around into the interior of the cylinder B. In the delivery of the water at the other end of the pump the valves G^2, being closed, are out of the way, and the water flows out and rises with perfect freedom through the port I^2 and up through the valves M^2.

The plate K may be extended by enlarging the casing J and made to carry four or more valves, $M' M^2$. I propose to use as many in every case as shall be found to add in any appreciable degree to the freedom of the action of the pump; but there is less need of great freedom for the flow of the water in being driven out of the pump than in being inducted. Provided that sufficient power is available to impel the piston A, the water once got in the pump must by necessity be expelled during the proper movement of the piston; but a like certainty does not exist with regard to the induction. A pump worked very rapidly without great freedom of induction will form a vacuum in the pump which the water will not enter fast enough to fill. My pump, by allowing induction-valves to be distributed over the whole space surrounding the pump to deliver into the pump in the manner described, and making separate provision for the delivery-valves, is the most efficient in this respect of any known to me.

The facility for access to my valves $G' G^2$ is very great. By simply removing exterior heads E' or E^2, I can get at, examine, adjust, or repair any of these without difficulty, and by removing the chest N or a side-plate bonnet, or other ordinary provision thereon not represented, I can obtain ready access to the delivery-valves.

My pump has been subjected to very severe and continued trials, and proves little liable to get out of order.

It will be obvious that my double piston, constructed and arranged as described in the patent issued to me dated the 7th of January, 1862, may be employed in this pump, and will involve the same advantages as in any other, except that there is less necessity for such a duplication of parts and such increase in the expense of construction by reason of the increased freedom and adaptation to rapid working in this my present arrangement of the valves and passages. If, however, I choose in any extraordinary case to construct the body of the pump and the valves, casing, &c., in the manner hereinabove represented and described, and also to introduce the duplex pistons operated as described in my previous patent, I can work successfully and with little difficulty at a still higher velocity.

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

Inducting the water into the main cylinder B through openings $f' f^2$, which surround or nearly surround the cylinder at each end, controlled by valves $G' G^2$, as specified, and delivering the water through valves or sets of valves $M' M^2$, the several parts being arranged and adapted for joint operations and easy access, substantially as herein set forth.

M. R. CLAPP.

Witnesses:
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