W. SHRIVER.

HYDRAULIC ORGAN BLOWER.

No. 184,801. Patented Nov. 28, 1876.

Fig. 1.

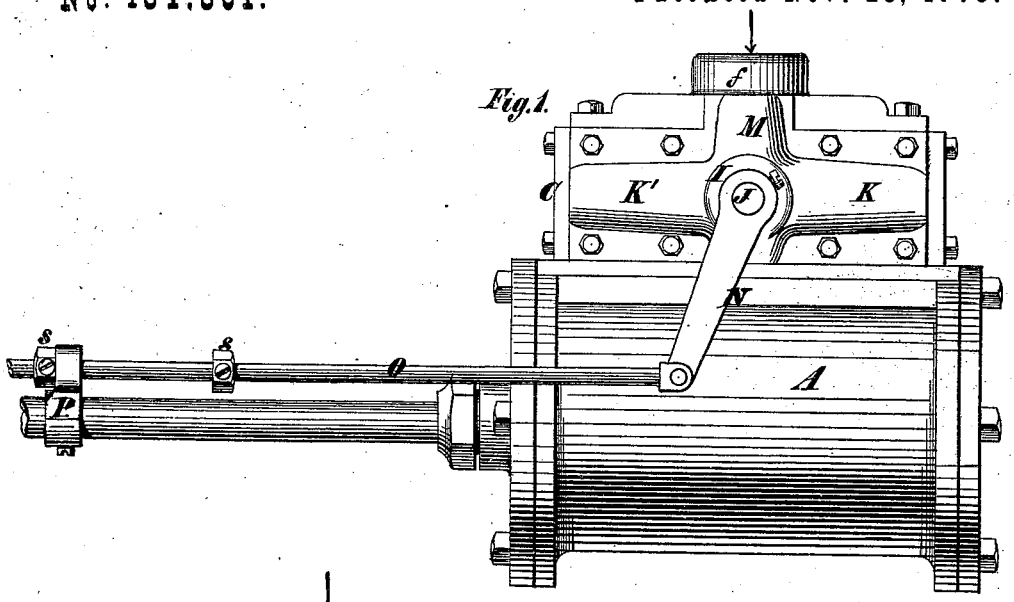


Fig. 2.

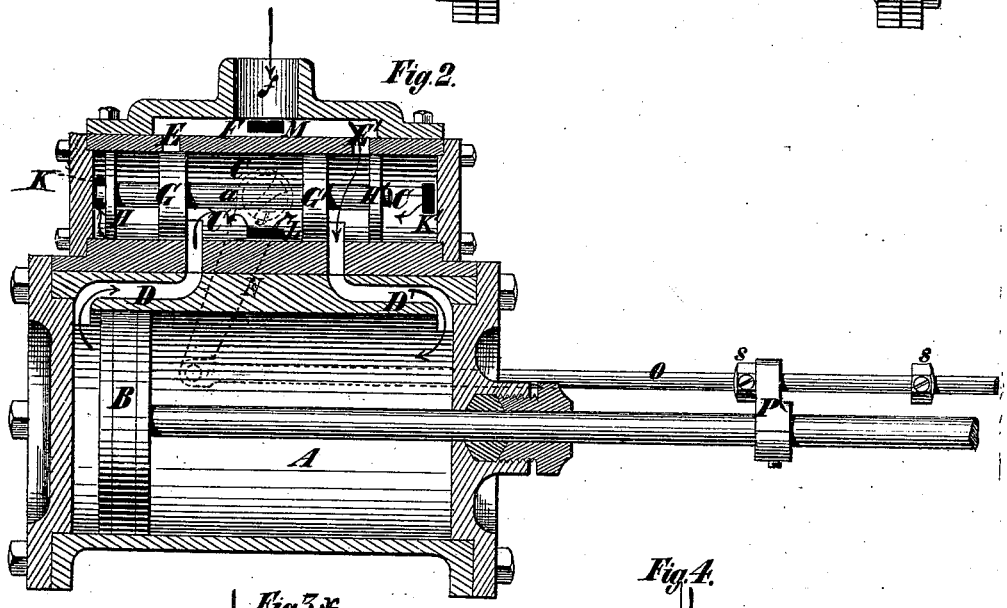


Fig. 3.

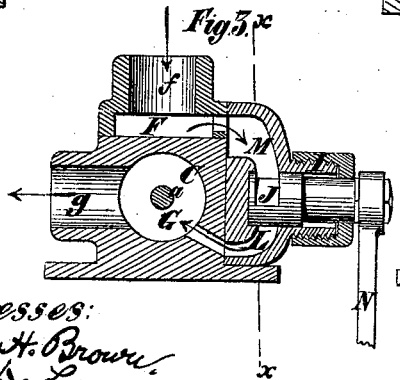
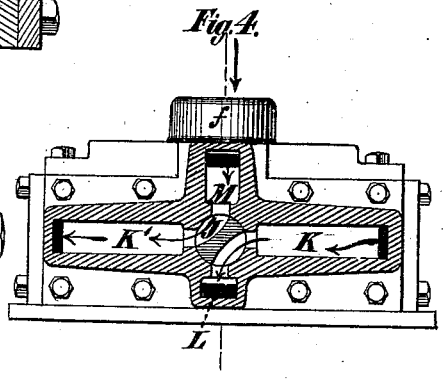


Fig. 4.



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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN HYDRAULIC ORGAN-BLOWERS.

Specification forming part of Letters Patent No. **184,801**, dated November 28, 1876; application filed March 3, 1875.

To all whom it may concern:

Be it known that I, WALTER SHRIVER, of the city of New York, in the county and State of New York, have invented new and useful Improvements in Hydraulic Organ-Blowers; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, which forms a part of this specification.

This invention consists in the combination, with a main cylinder and its piston, an auxiliary cylinder, and a balanced piston valve or set of balanced piston-valves, adapted to work back and forth in said auxiliary cylinder, to control the induction and eduction of water to and from the main cylinder, and a suitable piston or set of pistons for shifting such balanced piston valve or valves, of a four-way cock for controlling the induction and eduction of water to and from the said auxiliary cylinder, for the purpose of shifting its said piston valve or valves, and suitable mechanism for connecting the plug of said cock with the rod of the main piston, whereby I produce a machine which is very reliable and durable, among other reasons, because the pressure being balanced on both sides of the piston-valves controlling the induction and eduction of water to and from the main cylinder, the said valves are not liable to stick fast, nor to grind away and become inefficient, like a common slide-valve held against its seat by the enormous pressure of water on its back or outer side.

In the accompanying drawing, Figure 1 is a side view of a hydraulic organ-blower embodying my invention. Fig. 2 is a central horizontal section of the same. Fig. 3 is a central transverse section through the valve-box thereof; and Fig. 4 is a longitudinal section of the valve-box, taken on the plane of the dotted line *x x*, Fig. 3.

A designates the main cylinder, and B its piston, both of which may be of the usual or any other suitable form or construction. C designates an auxiliary cylinder closed at both ends, and D D′ designate two ports leading from the said auxiliary cylinder to near the ends of the main cylinder A. E E′ designate ports leading to the auxiliary cylinder C, from a chamber, F, communicating with an induction-orifice, *f*. An eduction-orifice, *g*, communicates with the central portion of the auxiliary cylinder. G G′ designate balanced valve-pistons, one for each of the ports E E′, said pistons fitting in the auxiliary cylinder C. In the example shown both of these balanced valve-pistons are secured to a single stem or rod, *a*, of such length that, by coming in contact with the heads of the said cylinder, it will prevent the balanced pistons from passing their respective ports E E′ in an outward direction, and yet will permit either to slide under its respective port to close it, as shown in Fig. 2. H H′ designate two pistons, which are, respectively, arranged on the stem or rod *a*, at suitable distances beyond the balanced valve-pistons G G′. These pistons H H′ serve to move the spindle *a* with its balanced valve-pistons G G′, by water admitted from the main induction-orifice through the auxiliary ports K K′, regulated by an auxiliary valve, J, which valve will be more particularly described hereafter.

When one of the balanced valve-pistons G G′ is in position to close its port E or E′, the other valve-piston and the adjacent piston H or H′ divide or partition off within the cylinder C a space through which water may freely pass from the adjacent port E or E′ to the corresponding port D or D′, and enter the main cylinder A.

I J designate a four-way cock, I being the shell or barrel, and J the plug thereof. The shell or barrel I communicates with the ends of the auxiliary cylinder C through two ports, K K′, with the middle or eduction portion of such cylinder by a port, L, and with the induction-chamber F by a port, M.

The plug J of the cock has passages in two opposite sides, which, during the operation of the machine, alternately establish communication between the port M and one of the ports K K′, and between the other of the ports K K′ and the port L, whereupon the induction of water to one end of the auxiliary cylinder, and the eduction of water from the other end of such cylinder are effected, and the balanced piston-valves G G′ shifted, as previously described.

N designates a rod or lever, arranged on

the stem of the plug J. O designates a rod, which is connected at one end to the lever N, and which, at a suitable distance therefrom, receives the end of a tappet-arm, P, secured to the rod of the main piston B. Upon the rod O, at a suitable distance apart, there are two tappets, *s s*, which, in the present instance, are adjustable, and secured in place by set-screws, and as the piston moves back and forth the rod P strikes and shifts the plug J of the four-way cock alternately in reverse directions.

It is obvious that the plug J and the rod of the piston B may be connected in other ways. For instance, the rod O may be rigidly connected to the piston-rod, and be furnished with tappets, for shifting the plug J by striking directly against its lever N.

The operation of this hydraulic blower is as follows: Water from the service-pipe enters the induction-chamber F, passes through the port M to the four-way cock I J, and thence, according to the position of the plug I, into one or the other of the ports K K′. Referring to Figs. 2 and 4, the water under pressure flows through the port K′ and into the auxiliary cylinder, and exerts pressure on the piston H′ and simultaneously the exhaust-water in the opposite end of said cylinder is permitted to escape through the port K into the eduction-port L, the result of which is that the balanced valve-pistons G G′ are shifted to the left. (See Fig. 2.) The port E is consequently closed, the port E′ opened, the incoming water is admitted through the port D′ to the right end of the main cylinder, and the waste water allowed to escape through port D to the space between the two balanced piston-valves G G′, and to the eduction-orifice *g*. In moving to the left the piston B reverses the plug I of the four-way cock, whereupon water under pressure is admitted to the left end of the cylinder C, and the exhaust water is allowed to escape from the right end, the balanced piston-valves G G′ are shifted to the right, and the water under pressure flows into the left end of the cylinder A, and the exhaust water flows out of the right end thereof into the waste-pipe, and the piston B is impelled to the right. In moving to the right end the said piston reverses the plug of the four-way cock, allowing water to enter the auxiliary port K′, and the operation is repeated.

It is obvious that the pressure is balanced on both sides of the piston-valves G G′, and but little power is needed to move them; also that said piston-valves on this account are not liable to stick fast, nor to be ground away, so as to become inefficient, like a slide-valve, held against its seat by the great pressure of live water on its outer or back surface.

The movement of the balanced valve-pistons G G′ is retarded by the exhaust water, which said pistons expel from the auxiliary cylinder at each stroke, and therefore the induction of water to the main cylinder A is gradually cut off, and all shock incident thereto is obviated, for which reason a comparatively noiseless, and otherwise very desirable, hydraulic organ-blower is produced.

It will be observed that a communication is at all times opened from the main induction-pipe *f* to either the main or auxiliary cylinder, so that the piston in one of these cylinders is in position to move, and hence the engine will always stop with its ports in a proper position for it to start again.

I will here remark that the water may enter through the orifice *g*, and escape through the orifice *f*; and that in such case the operation of the machine will be the reverse of that before described.

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

In a hydraulic organ-blower, the combination of the balanced piston-valves G G′ and pistons H H′ with the auxiliary cylinder C, main cylinder A, piston B, ports D D′ and E E′, four-way cock I J, and the described mechanism connecting the plug I of said cock with the rod of the main piston B, all constructed and arranged to operate substantially as herein shown and described.

WALTER SHRIVER.

Witnesses:

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