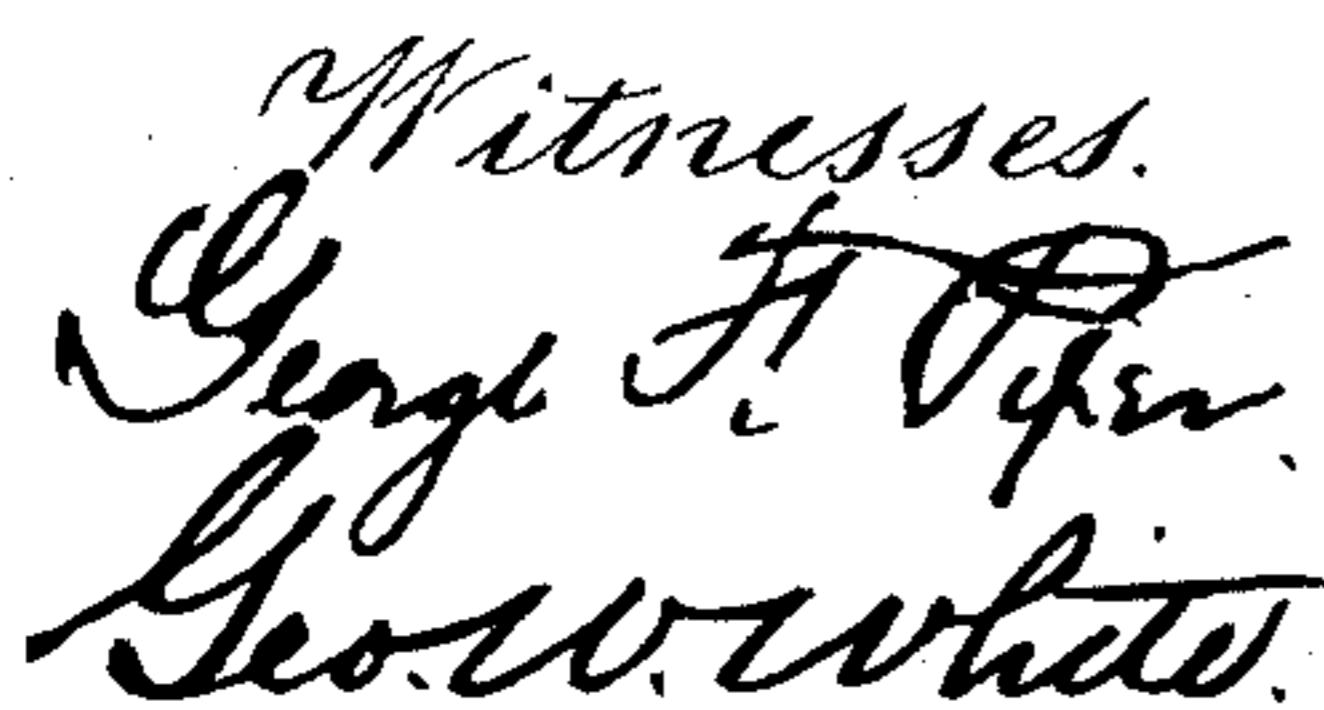


J. E. TREAT.
PNEUMATIC ACTION FOR ORGANS.

Patented May 27, 1890.



Inventor.
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UNITED STATES PATENT OFFICE.

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PNEUMATIC ACTION FOR ORGANS.

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To all whom it may concern:

Be it known that I, JAMES E. TREAT, a citizen of the United States, and a resident of Boston, in the county of Suffolk and State of Massachusetts, have invented new and useful Improvements in Pneumatic Actions for Organs, of which the following, taken in connection with the accompanying drawings, is a specification.

This invention relates to improvements in pneumatic actions for organs for the purpose of facilitating the operation of stop or register rods or other organ-action, and it is carried out as follows, reference being had to the accompanying drawings, wherein—

Figure 1 represents a plan view of the improved pneumatic device. Fig. 2 represents a vertical section on the line X X, shown in Fig. 1. Fig. 3 represents a vertical section on the line Y Y, shown in Fig. 1. Fig. 4 represents a section on the irregular line Z Z, shown in Fig. 2. Fig. 5 represents a cross-section on the line T T, shown in Fig. 2. Fig. 6 represents a cross-section on the line U U, shown in Figs. 2 and 4. Fig. 7 represents a cross-section on the line V V, shown in Figs. 2 and 4; and Fig. 8 represents a cross-section on the line W W shown in Fig. 2.

Similar letters refer to similar parts wherever they occur on the different parts of the drawings.

The device is inclosed within a case a , of which a' is the bottom, as shown.

Within the case a are made two horizontal partitions b and b' , and above the former is made a vertical partition c , that divides that part of the case a above the partition b into two chambers a'' and a^3 , as shown in Figs. 2, 3, and 6.

Within the chamber a'' is arranged the main bellows d , having the stationary plate d' , secured to the partition c and the inner wall of the chamber a'' , and having the movable plate d'' , to which is attached a rod d^3 , that passes loosely through a perforation in the stationary plate d' and the wall of the chamber a'' , as shown in Figs. 2, 3, and 5. The outer end of the rod d^3 is to be attached to the stop or register rod of an organ or other action that is to be operated by the device.

a^4 is a perforation in the vertical partition c

and stationary plate d' of the bellows, for the purpose of establishing at all times a communication between the chamber a^3 and the interior of the bellows d , as shown in Figs. 2 and 3.

Below the horizontal partition b' is the valve-chamber a^5 , containing air under pressure, which may be conveyed to it by means of a suitable pipe leading from the air-forcer of the organ.

Within the valve-chamber a^5 are arranged the valves E and F, which are held upwardly against their seats on the under side of the partition b' by means of springs e and f , having their respective upper ends pressing against the respective valves and having their lower ends pressing against the stationary spring-bar a^6 , arranged within the valve-chamber a^5 , as shown in Figs. 2, 3, and 4.

a^7 represents a detachable cover secured to the open end or side of the valve-chamber, as shown in Figs. 1, 2, 3, 5, 6, 7, and 8.

E' is a port or passage leading from the valve-chamber a^5 to the chamber a^3 , and F' is a similar port or passage leading from said valve-chamber to the bellows-chamber a'' , as shown. The lower end of the passage E' is adapted to be opened and closed by the valve E, and the lower end of the passage F' is adapted to be opened and closed by the valve F.

Between the horizontal partitions b and b' there is a chamber B, containing the auxiliary bellows E'' and F'', as shown in Figs. 2, 3, 4, and 7.

b'' are perforations leading from the exhaust and auxiliary-bellows chamber B to the outside of the case a , as shown in Figs. 2, 3, and 7.

e' is a perforation leading from the passage E' to the interior of the auxiliary bellows E'', and f' is a similar perforation leading from the passage F' to the interior of the auxiliary bellows F'', as shown in Figs. 2, 3, and 4.

e'' is a port leading from the auxiliary-bellows chamber B to the main-bellows chamber a'' , and f'' is a similar port leading from the said auxiliary-bellows chamber B to the chamber a^3 above the partition b , as shown in Figs. 2, 3, and 4 and in dotted lines in Fig. 6.

On top of the partition b is arranged within the chamber a^3 the rocking valve G, adapted to rock on suitable guide-pins or other equiv-

alent fulera, and said valve is adapted to intermittently open and close the upper ends of the ports or channels E' and f'' . H is a similar rocking valve arranged on top of the said partition b within the chamber a'' , and adapted to rock on suitable guide-pins or equivalent devices, so as to intermittently open and close the upper ends of the ports F' and e'' .

e^3 is a sticker interposed between the movable plate of the auxiliary bellows E'' and the rocking valve H , and f^3 is a similar sticker interposed between the auxiliary bellows F'' and the rocking valve G , as shown.

The valves E and F are operated by the following mechanism, viz: Within the valve-chamber a^5 is suspended on the fulcrum k' the rock-lever k , the ends of which are connected to the valves E and F , preferably by means of rods or trackers e^4 and f^4 , as shown in Fig. 4. k'' is a rod or tracker attached to one end of said rock-lever k and having its lower end projecting through a perforation in the bottom a' , as shown in Figs. 2 and 4. The lower end of said tracker or rod k'' may be connected in a suitable manner to a knob, pull, or other device arranged within convenient reach of the player, as may be desired. Between the other end of the rock-lever k and the bottom a' or other stationary part of the device is interposed the spring k^3 , which when the rod k'' is released causes the rock-lever k to be rocked sufficiently to open the valve F and to release the spring-pressed valve E and causing the latter to be automatically closed by the influence of its spring e .

The operation of the device is as follows: By pulling lightly on the tracker k'' the valve E is opened, allowing the wind-pressure from the chamber a^5 to enter the passages E' and e' , thereby causing the rocker-valve G to be tripped, as shown in Figs. 2 and 4, by which an open communication is established between the pressure-chamber a^5 , the chamber a^3 , and the interior of the main bellows d , causing the latter to expand, as shown in Figs. 2, 3, and 5, and thereby causing the register-rod or other device attached to the rod d^3 to be actuated. During said movement of the rocker-valve G its opposite end closes the port f'' , leading to the exhaust-chamber B , and causes the small bellows F'' to be compressed by the sticker f^3 , as shown in Figs. 3 and 4.

During the inflation of the main bellows d , as above described, it is essential that the port e'' , leading from the chamber a'' to the exhaust-chamber B , should be automatically opened, and this is accomplished by the air-pressure from the chamber a^5 entering the bellows E'' through passage e' , by which such bellows is inflated, its sticker e^3 causing the rocker-valve H to be tripped, so as to uncover the port e'' and close the passage F' , as shown in Figs. 2 and 3, thus establishing an open communication between the interior of the chamber a'' and the outer atmosphere.

The main bellows d and its rod d^3 will remain in the position shown in Figs. 2, 3, and 5 as long as the valve E is kept open. By relieving the pull on the tracker k'' the spring k^3 will trip the lever k sufficiently to close the valve E and to open the valve F , by which a reverse action and movement of the above-described parts takes place—that is, the air-pressure from the chamber a^5 enters the passages $F'f'$, causing the valve H to be tripped, so as to establish a communication between the air-pressure chamber a^5 and the main-bellows chamber a'' , by which the bellows d is collapsed and the rod d^3 pushed outward. During such movement of the rocker-valve H its opposite end closes the port e'' , leading to the exhaust-chamber B , and causes the small bellows E'' to be compressed by the sticker e^3 , interposed between the movable plate of said bellows and the valve H .

As the main bellows d is exhausted an open communication is established between the chamber a^3 and the exhaust-chamber B , as follows: The air-pressure from the chamber a^5 enters the passage f' and inflates the bellows F'' , causing its sticker f^3 to trip the valve G , by which the port f'' , leading from chamber a^3 to the exhaust-chamber B , is uncovered, thus establishing an open communication between the interior of the chamber a^3 and the outer atmosphere. During such movement of the valve G the passage E' is closed. It will thus be seen that in this my pneumatic device I use only one main bellows, which is inflated or exhausted by one wind, pressure conducted outside or inside of said bellows for the purpose of actuating the stop or register rod or other action, as may be desired.

As the valves E F are very small compared with the main bellows d , it will be apparent that it will only require a very slight pressure, pull, or resistance on the tracker k'' to obtain a great pressure or pull on the main-bellows rod d^3 . The normal position of the device is the reverse of that shown in the drawings, that is, the valve F is kept open by the influence of the spring k^3 and its lever k , the valve E being closed by the action of the spring e and the main bellows d exhausted.

Having thus fully described the nature, construction, and operation of my invention, I wish to secure by Letters Patent and claim—

1. In a pneumatic action for organs, a main bellows and valves covering supply and exit passages arranged on opposite sides of said bellows, and a pair of valves for intermittently conducting the air under pressure to opposite sides of said bellows and controlling the exhaust therefrom, substantially as and for the purpose set forth.

2. In a pneumatic action for organs, the case a , having the chambers a'' a^3 , and the main bellows d , having its interior in open communication with one of said chambers, and the air-pressure chamber a^5 , with its spring-

pressed valves E F and means for their operation, substantially as specified, combined with the wind-passages E' F' e' f', the rocker-valves G H, the exhaust-chamber B, the exhaust-ports e'' f'', and the auxiliary bellows E'' F'', arranged within the said exhaust-chamber B and having the respective stick-ers e³ f³, substantially as and for the purpose set forth.

10 3. In a pneumatic action for organs, a case having a main bellows adapted to be intermittently inflated and exhausted, and an air-pressure chamber having spring-pressed valves covering passages leading to opposite

sides of said bellows, combined with a pair of 15 rocker-valves, auxiliary bellows connected to the latter, and an exhaust-chamber adapted to be intermittently connected to opposite sides of the main bellows, substantially as and for the purpose set forth. 20

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 3d day of April, A. D. 1889.

JAMES E. TREAT.

Witnesses:

ALBAN ANDRÉN,
GEORGE F. PIPER.