





# UNITED STATES PATENT OFFICE.

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## ORGAN-ACTION.

SPECIFICATION forming part of Letters Patent No. 539,178, dated May 14, 1895.

Application filed November 22, 1893. Serial No. 491,625. (No model.) Patented in England September 21, 1889, No. 14,912.

*To all whom it may concern:*

Be it known that I, MARTIN HETHERINGTON, a subject of the Queen of Great Britain, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Organ-Actions, (for which I have obtained a patent in Great Britain, No. 14,912, bearing date September 21, 1889,) of which the following is a specification.

My invention relates to improvements in the construction of pneumatic organs whereby the whole of the key, pedal stop, and combination actions, one or all, may be operated by atmospheric pressure only, instead of using the compressed air from the bellows, as has heretofore been practiced in pneumatic organs.

The objects are to insure prompt and perfect repetition with the keys at any distance from the action, to simplify the action, and to save wind.

In carrying out my invention I construct the keys, stop-pulls, and pedals separate from the other parts of the organ so that they may be placed and used at any suitable distance therefrom, their action being communicated to the valves by the following means: With each key, stop-pull and pedal I combine an air-tight (and valveless) bellows with the chamber of which I connect a tube leading to a similar bellows or "pneumatic" in proximity to each key, stop, and pedal valve of the instrument. Above, or suitably near, the motor valve-bellows are arranged hinged flaps, or bars, adapted to be raised and lowered by the action of the motor valve bellows, thereby opening and closing the various valves of the instrument when the distant keys, stop-pulls, and pedals are operated.

To enable my invention to be fully understood, I will describe how it can be carried into practice by reference to the accompanying drawings, in which—

Figure 1 is a vertical section showing the key-boards, one of the stop-pulls, and one of the pedals constructed separate from the other parts of the organ and adapted to be used at a distance therefrom according to my invention. Fig. 2 is a vertical section of an organ-valve adapted to be operated from a

distance according to my invention, the instrument being arranged to be worked on the pressure system. Fig. 3 is a similar view, but showing the valve constructed for use with an instrument arranged to be worked on the exhaust system. Figs. 4 and 5 are sections of the pedal sound-board of an organ, the valves of which are operated by pedals placed at a distance.

Similar letters in all the figures indicate similar parts.

Referring to Fig. 1, *a, a* are the swell and great keys, and *b, b* are the key-levers. *c* is one of the top-pulls, and *d*, one of the pedals, all of which parts are of usual construction, but mounted in a frame, *e*, separate from the other parts of the organ.

*f, f* are the air-tight bellows, one of which I adapt to each key-lever, *b*. The said bellows are fixed in a horizontal position on the frame, *e*, and are normally expanded or open, but are closed when the keys, *a*, are struck, by means of a wire, *h* and sticker, *h'*, attached to the movable parts of the bellows, *f*, and to the tail ends of the key-levers, *b*. The said movable parts of the bellows are weighted in order to cause the bellows to open quickly and the keys to quickly rise when the pressure of the fingers is removed from the latter.

*i* is one of the bellows which I connect to each stop-pull, *c*, by means of a joint, *j*, on the tail-end thereof so that, when the stop-pulls are drawn out the bellows are inflated but closed when they are pushed in.

*k* is the pedal bellows, one to each pedal, connected thereto by a sticker, *l*, so as to close the bellows (which are normally inflated) when the pedal, *d*, is depressed, the pedal being again raised when pressure is removed therefrom, and the bellows again inflated by the action of the pedal-spring, *m*.

*n, n, n, n* are the tubes which I insert with air-tight connections in the bellows, *f, f, i* and *k*, the said tubes being of sufficient length to lead to the place where the instrument to be played is situated.

*o* (Fig. 2) is one of the bellows which receives the air-tubes, *n*, from the key-bellows, *f*. It is fixed to the board, *p*, beneath the hinged flap, *q*, formed with a curved under surface, as shown, which bears against the movable



part of the bellows, *o*, so that, when the bellows is inflated, it will raise the hinged flap. The sticker, *r*, of the valve, *s*, bears upon the upper surface of the flap, *q*, and the valve therefore rises and falls with the flap. By this means when the keys, *a*, are operated the air in the key-bellows, *f*, will be forced into and inflate the valve-bellows, *o*, thereby opening the valve, *s*, which will remain open so long as the finger is on the corresponding key, *a*, and allow the wind to pass from the passage, *t*, to the motor that works the pipe-valves. Directly the finger is removed from the key the key-bellows, *f*, opens and exhausts the air from the valve-bellows, *o*, the flap, *q*, falls and the valve, *s*, closes.

The arrangement of bellows and flap is the same if the instrument works on the exhaust system, as illustrated in Fig. 3. When the valve-bellows, *o*, is inflated, as shown in the said figure, the valve, *s*, stops the passage of the wind from the channel, *t*, to the channel, *u*, and the wind in the channel, *u*, is exhausted through the outlet, *v*.

The stop-valves may consist of small or auxiliary valves, like the key-valves shown in Figs. 2 and 3, and are operated from the stop-pulls, *c*, by bellows, *o*, and flaps, *q*, in a similar manner to that in which the key-valves are operated from the keys. The bellows can, however, if required, be made larger so as to adapt them to act directly upon the valve that admits the wind to the different pipe chambers. The pedal, or pipe valves, *w*, are also similarly operated from the pedals, *d*,

as illustrated in Figs. 3 and 4, but the flaps, *q*, are made wider so as to adapt them to operate directly on two or more pipe-valves at once, according to the number of stops on the soundboard without the aid of auxiliary valves.

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

1. In an organ, the combination of the bellows, *e*, adapted to be operated by the keys, stop-pulls, or pedals, the bellows, *o*, connected to the bellows, *e*, by tubes, *n*, and the hinged-flaps, *q*, operated by the bellows, *o*, so as to actuate the key, stop, or pedal-valves of the instrument.

2. The combination with a key, stop, pedal, or analogous controller, and a motor valve controlling the pressure of wind to the pipe or pipes corresponding to the said key, or controller, of a valveless bellows, or pneumatic, to be expanded and deflated by the movements of the key, or controller, and a second valveless bellows, or pneumatic, connected by an air conduit with the first bellows to be inflated on the deflation thereof and vice versa, and a medium for the transmission of the movement of the second bellows to the motor valve in conjunction with which such bellows is arranged, substantially as and for the purpose set forth.

MARTIN HETHERINGTON.

Witnesses:

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K. I. CLEMONS.