

T. WINANS.

Pneumatic-Actions for Organs.

No. 153,143.

Patented July 14, 1874.

Fig. 1

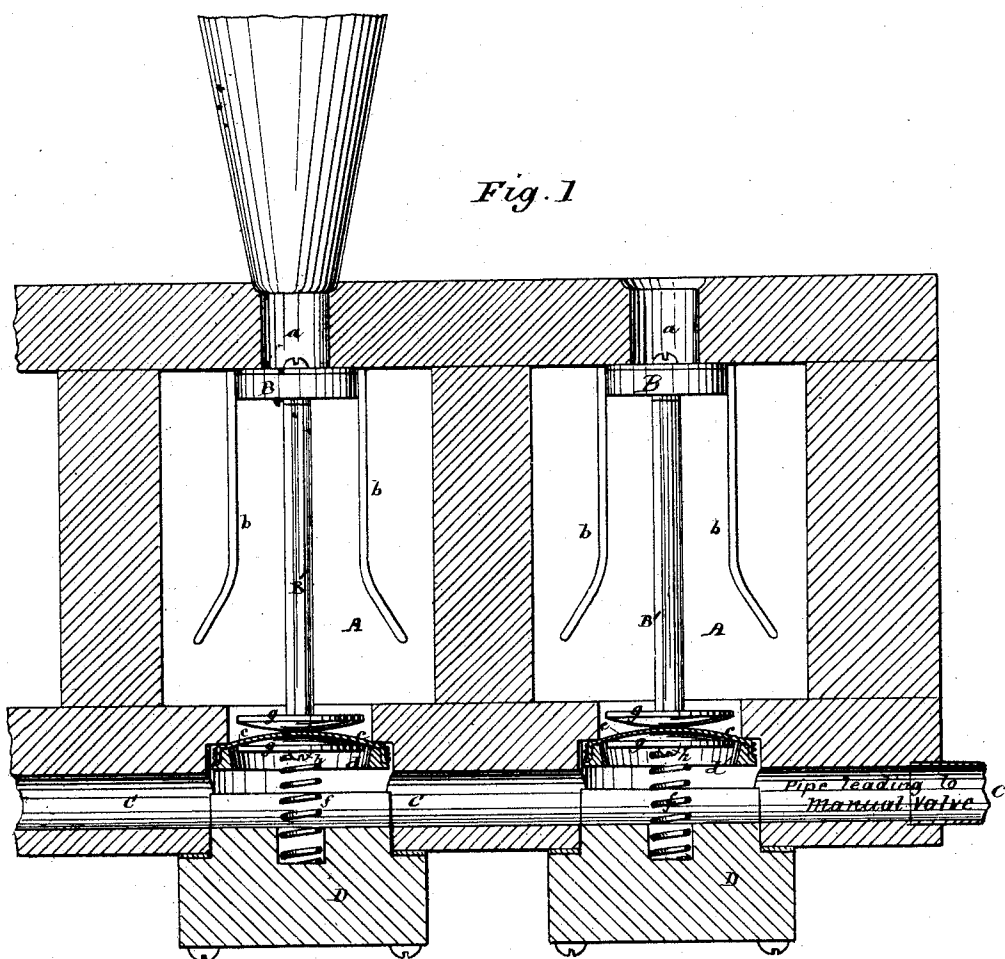


Fig. 2.

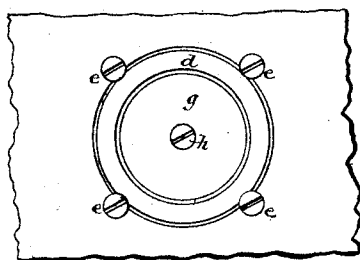
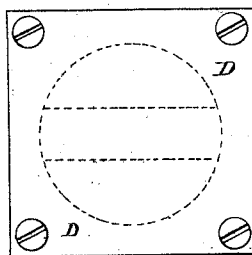


Fig. 3.



Witnesses.

Ernest A. S. S. S.
J. H. S. S. S.

Inventor.

Thomas Winans
by atty A. H. H. H.

UNITED STATES PATENT OFFICE.

THOMAS WINANS, OF BALTIMORE, MARYLAND.

IMPROVEMENT IN PNEUMATIC ACTIONS FOR ORGANS.

Specification forming part of Letters Patent No. **153,143**, dated July 14, 1874; application filed June 15, 1874.

To all whom it may concern:

Be it known that I, THOMAS WINANS, of Baltimore, Maryland, have invented certain new and useful Improvements in Pneumatic Action for Organs, of which the following is a specification:

My present invention relates to that for which Letters Patent of the United States, No. 143,602, were granted to me on the 14th October, 1873, and it has special reference to what are termed in said Letters Patent the pneumatic valves, which control admission of air to the register wind-chests, or the pipes, as the case may be.

The general principle of action described in that patent remains unchanged under my present invention, the pneumatic valve being operated, as before, by differences in air-pressure. I have, however, considerably simplified and improved the construction and arrangement of the valve, making it cheaper, more effective in action, and less liable to get out of order.

I dispense entirely with the piston and cylinder, which, in my patented action, were shown as combined and operating in connection with the valve proper, and in lieu thereof I mount the valve on a flexible diaphragm, by the rising and falling of which the valve is moved to open or close the air-opening. This diaphragm occupies substantially the same position as the piston in my patented arrangement, and, like that piston, is operated to rise and fall by the difference in air-pressures above and below the same, this difference being produced substantially in the same way as described in my said patent.

The nature of my invention, and the manner in which the same is or may be carried into effect, will be understood by reference to the accompanying drawing, in which so much of the organ-action is shown as needed to illustrate my present improvement.

Figure 1 is a vertical section of a portion of the sound-board. Figs. 2 and 3 will be hereinafter referred to.

The sound-board is divided up into register-chests A A in the usual way. Pipe-openings are indicated at *a*, and their controlling pneumatic valves at B B'. The valve-head is preferably jointed to its stem B', so as to have

capacity for a slight movement to adapt itself more perfectly and accurately to the opening, and it moves between guides *b*, as shown in my aforesaid patent.

The valve-stem is mounted on or attached to a flexible diaphragm, *c*, which closes the opening formed in the bottom of the sound-board through to the pipe C, that communicates with its proper key or manual valve, and is, by means of that valve, filled with or exhausted of air taken from the source of compressed-air supply, as will be better understood by reference to my patent before recited.

The diaphragm, which is of a suitable flexible material—preferably leather—is just a little slack, to give it capacity to rise and fall to the desired extent, and may be held in place by any suitable means.

The holding device that I prefer consists of an externally-flanged metallic ring, *d*, which fits in a properly-shaped recess formed for it in the bottom of the sound-board, as seen in Fig. 1. The outer edges of the diaphragm are folded over onto the periphery of the ring above the flange, and are bound thereon by cord or other suitable means. The ring is inserted, diaphragm upward, into its recess in the bottom of the sound-board, and is there held by screws *e*, or their equivalents, whose heads overlap the flange on the ring, as shown in Fig. 2, which is an under-side view of the ring in place.

If the air-pressure in the pipe C be greater than that of the air in the register-chest, then the diaphragm will be pressed upward so as to hold the valve against the valve-opening. If, on the other hand, the air-pressures above and below the diaphragm are normally equal, then a spring is employed to hold up the valve.

Either of these methods of upholding the valve may be employed. The latter is the one represented in the drawing, *f* being the upholding spring.

The valve-stem can be connected with the diaphragm in any proper manner. I prefer to connect the two by the means shown in the drawing, consisting of two convex-faced buttons or disks, *g*, the one above and the other below the diaphragm, with their convex faces

turned toward each other. These disks have a diameter somewhat less than that of the opening in the bottom of the sound-board in which they are located, and the disks, diaphragm, and valve-stem are united together by a central pin or screw, *h*, passing up through the disks and diaphragm into the base of the valve-stem.

The under button or disk has the office of equalizing the distension of the diaphragm when it is pressed upward, the diaphragm resting on its convex face, as seen in the drawing. It has the further important office of serving in some sort as a piston to start the valve in its down movement, when the air-pressure below is removed. The air from above, in this case, presses on the disk through the intermediary of the diaphragm, which is in contact with the convex face of the disk, and so long as, and to the extent to which this contact continues, the disk acts as a piston. When the valve has been so far depressed as to remove the diaphragm from contact the disk, of course, ceases to have this function. Without the use of this button the diaphragm would require to be made considerably larger, which would not only take up too much room, but would also have the effect of retarding, to a certain extent, the speaking of the pipe, inasmuch as the amount of air to be supplied and exhausted by the key or intermediate valve would be greater. The upper disk serves to equalize the distension, and to prevent the local straining of the diaphragm when depressed, the latter in this case bearing against the convex face of the upper disk just as it bears on the face of the under disk when it is elevated. Either of these disks or buttons may be used to the exclusion of the other, but I much prefer to employ them jointly. The spring *f* bears at its upper end against the under disk, and at its lower end is seated in a socket formed in a cap-piece, *D*, which is fitted to the bottom of the sound-board, and formed so as not to obstruct the pipe *C*, in order to

permit the compressed air to pass freely through the whole length of the pipe. The cap is held in place by screws, as indicated in Fig. 3, and is readily removable to permit access to the diaphragm-ring whenever it becomes necessary to inspect or remove the valve.

The devices described are much simpler than those for a like purpose described in my aforesaid patent. They are more readily fitted in place, the cost of manufacture is very materially reduced, and there is less liability of their getting out of working order.

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

1. In an organ, the pneumatic valve mounted on, and rising and falling with, a flexible diaphragm, operated by differences in the air-pressures above and below the same, substantially as described.

2. The combination of the valve, the flexible diaphragm, and the diaphragm-supporting ring, for operation substantially as shown and described.

3. In combination with the pneumatic valve and its flexible supporting-diaphragm, the spring located beneath the diaphragm, and adapted to normally uphold the valve, substantially as shown and set forth.

4. The pneumatic valve and the flexible diaphragm, in combination with the under convex-faced button or disk, fast to, and moving with, the said valve and diaphragm, as and for the purposes shown and set forth.

5. The combination of the pneumatic valve, the flexible diaphragm, and the upper and under convex-faced buttons or disks, under the arrangement, and for operation, substantially as shown and set forth.

In testimony whereof I have hereunto signed my name this 13th day of June, A. D. 1874.

THOMAS WINANS.

Witnesses:

GEO. T. WORTHINGTON,
W. S. WILKINSON.