(No Model.) 2 Sheets—Sheet 1.

I. BASSETT.

PNEUMATIC ACTION FOR ORGANS.

No. 336,982. Patented Mar. 2, 1886.

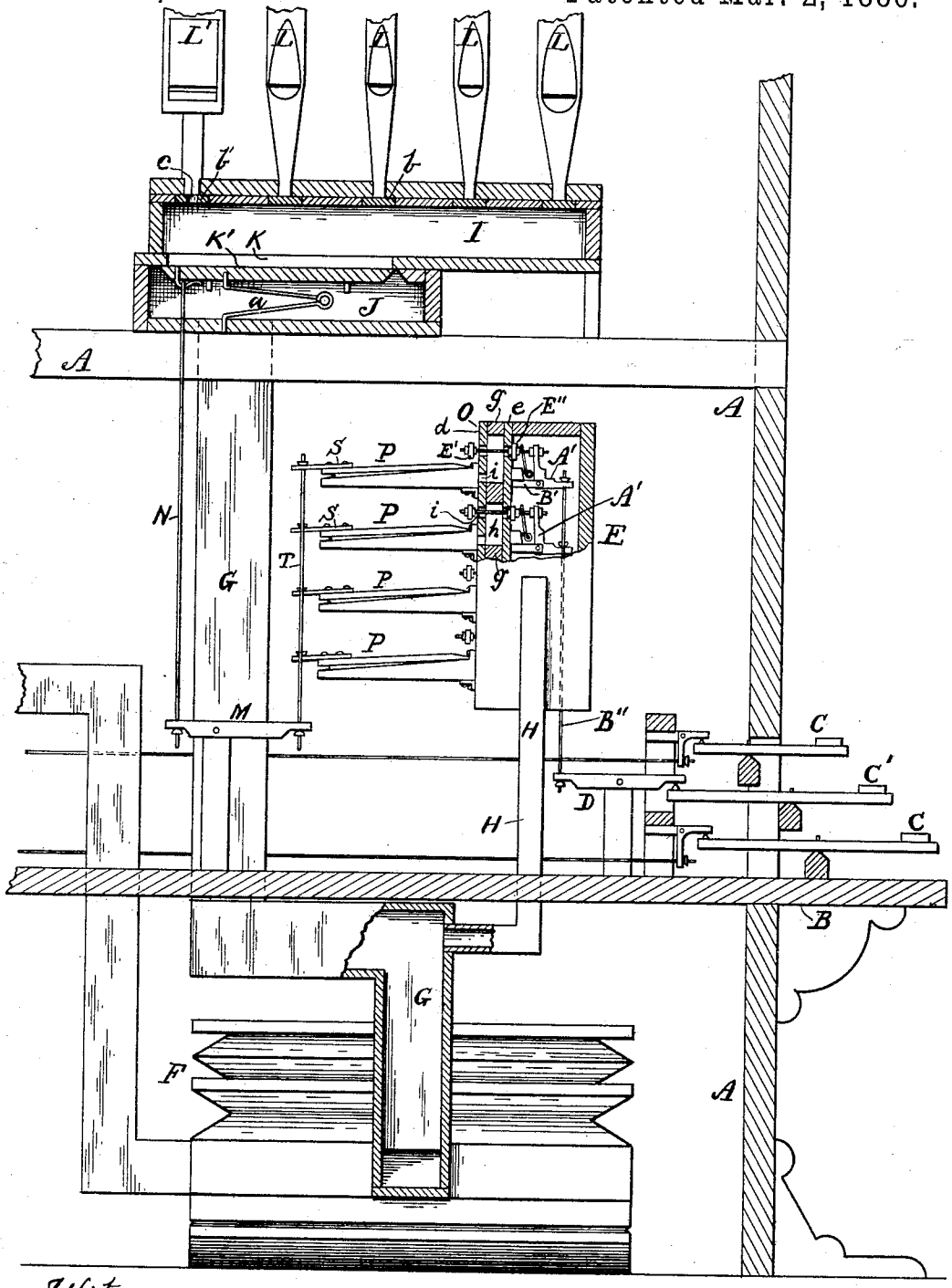

FIG. 1.

Witnesses:
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Inventor:
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(No Model.) 2 Sheets—Sheet 2.

I. BASSETT.

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FIG. 2.

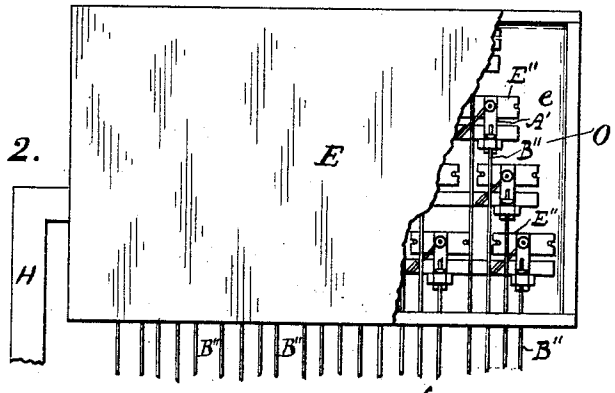
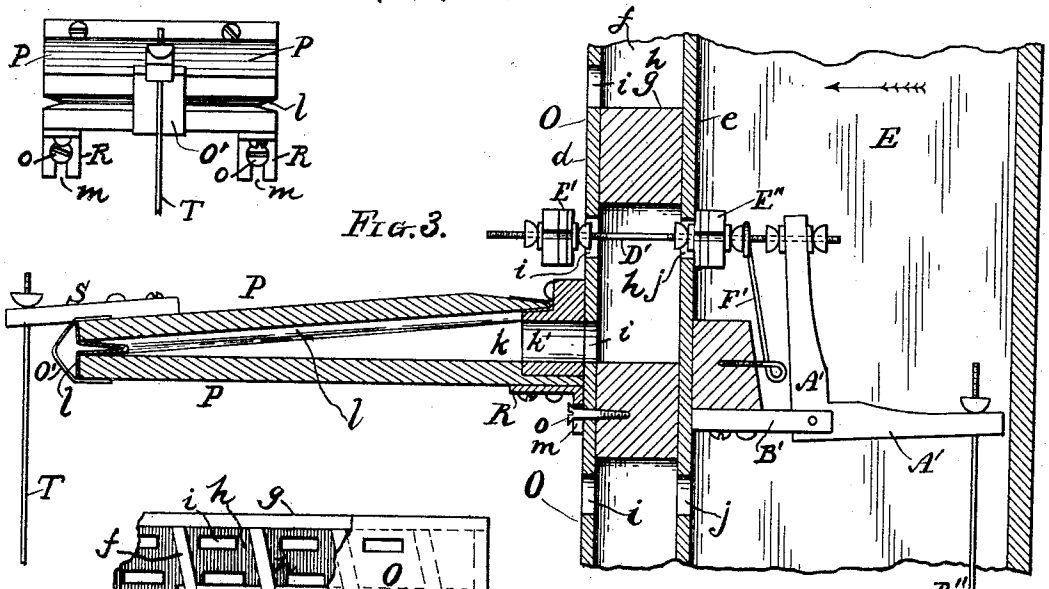


FIG. 6.

FIG. 3.



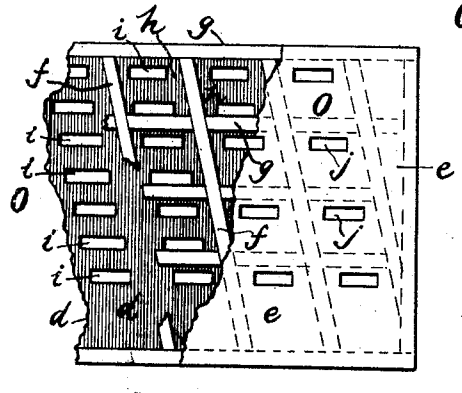


FIG. 5.

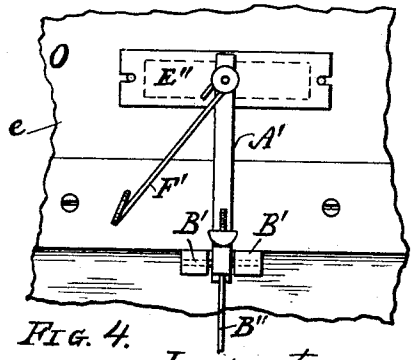


FIG. 4.

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UNITED STATES PATENT OFFICE.

IRA BASSETT, OF CHICAGO, ILLINOIS.

PNEUMATIC ACTION FOR ORGANS.

SPECIFICATION forming part of Letters Patent No. 336,982, dated March 2, 1886.

Application filed May 8, 1885. Serial No. 164,754. (No model.)

To all whom it may concern:

Be it known that I, IRA BASSETT, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Pneumatic Actions for Organs, of which the following, in connection with the accompanying drawings, is a specification.

In the drawings, Figure 1 is a sectional elevation of so much of an organ as it is necessary to show in order to illustrate my invention. Fig. 2, Sheet 2, is a front view or face view of the pneumatic air chest or box, a portion of the front being represented as broken away partly in order to show the parts within. Fig. 3, Sheet 2, is a detail, the same being a vertical section, on a larger scale, of one of the pneumatic actions shown in Fig. 1. Fig. 4, Sheet 2, is a front or face view of the parts shown in Fig. 3, viewed in the direction indicated by the arrow there shown. Fig. 5 is a detail, the same being a side view of the channel-board, which is represented as broken partly away in order to show its construction more clearly; and Fig. 6 is also a detail showing the manner of connecting the pneumatic bellows to the channel-board.

Like letters of reference indicate like parts.

My invention relates to what is known as the "pneumatic action" for organs. The compressed air in the wind-chest and the valve-springs offer resistance to the pressure applied to the keys, especially in large organs requiring a large consumption of wind, and consequently large valves. This resistance has been a source of trouble, as it affected the touch of the performer and made the pressure which was required to depress some of the keys so great as to be fatiguing. This annoyance has to some degree been overcome by means of pneumatic bellows or comparatively small supplemental bellows in connection with the larger valves (or valves offering much resistance) and under the control of the keys, through the instrumentality of levers, connecting-rods, and valves, the smaller bellows being also in communication with the larger or main bellows and shut off therefrom alternately as the keys were operated. The air-pressure produced by the main bellows was thus utilized to aid the performer in opening those valves, which offered much resistance to his touch while he was playing the instrument.

My aim is further to improve pneumatic actions of the class referred to, and in order to enable those skilled in the art to apply my improvements to use I will now proceed to describe the same with particularity.

A represents a portion of the organ-frame.

B is the key-sill, and C and C′ are the keys.

D is a lever resting at its forward or outer end on the inner or rear end of the key C′.

E is the pneumatic wind-chest or air-box.

F is the main or principal bellows, and G is an air-duct entering the said bellows.

H is an air-duct entering the duct G and the chest or box E.

I is the great organ-chest, and J is an air-box below it.

K is a valve-opening, and K′ is a downwardly-opening valve for controlling the passage of air from the box J into the chest I. This valve rests on a spring, *a*, and the duct G enters the box J.

L and L′ are organ-pipes arranged upon the chest I. The pipes shown are controlled by means of slides *b b′*, which constitute a part of the stop-movement of the organ, the whole of which movement it is unnecessary to show or describe, as will readily be perceived. I have shown the slide *b′*, which controls the pipe L′, as so drawn as to open the lower end of that pipe, thus placing it in communication with the chest I. It is to be understood that there is a series of pipes, L L and L′ L′, and that the slides *b b′* are arranged at the ends of the pipes in each series and have openings *c* therein, so that the pipes in each series may be alternately opened and closed, as may be desired.

M is a lever, and N is a tracker connecting the free or opening end of the valve K′ to one end of this lever.

O is the channel-board. This board constitutes the back of the chest or box E, and is constructed as follows: It consists of a back piece or outer wall, *d*, and of an inner wall, *e*, and between these walls are diagonal strips or bars *f f*, parallel to each other, and horizontal interposed or intersecting blocks or bars *g g*, thus dividing the space between the front

and rear walls into separate compartments, or comparatively small air-chambers *h h*. In the wall *d* are valve-openings *i i*, there being two of these openings for each compartment, and in the wall *e* are valve-openings *j j*, one for each compartment. The rows of compartments (considering them as extending from the top to the bottom of the board) are inclined, as shown.

P P are the pneumatic bellows. The heel *k* of each pneumatic bellows has therein an opening, *k'*. The lower side of these bellows is rigidly connected to the heel-piece, but the upper side is jointed or hinged thereto; the rear or innermost ends of the upper and lower sides of these bellows are connected by means of flexible or infolded material *l*, as usual, to permit inflation, and the sides of the bellows are constructed as usual.

O' is a tape to limit the extent of inflation.

I may say, in general terms, that the pneumatic bellows are constructed substantially as they have heretofore been made, excepting that I have made provision for allowing the air to enter and escape at the heel, as will be more fully explained, and that I prevent too great inflation by means of the tapes referred to.

I apply the pneumatic bellows to the rear side of the channel-board by means of angle-plates R R, attached to the lower side of the bellows at or near the heel thereof, and the depending parts of these plates have notches *m m* therein.

o o are screws or headed pins entering the channel-board, but extending sufficiently therefrom to enter the notches *m m*. The bellows may thus be applied and removed with facility, but will be held firmly in their proper places. The openings *k' k'*, as will be perceived, coincide with the lower openings, *i i*, in the compartments *h h*, respectively.

S S are small bars or arms applied to the expanding ends of the pneumatic bellows, and T T are trackers connecting these arms with the levers M M. The sides or fixed or lower part of the bellows are tapering, as shown, being highest or broadest at the heel.

A' A' are bell-crank levers or angle levers, pivoted at their angles to short arms or bearings B' B', projecting from the forward side of the channel-board.

B'' B'' are trackers connecting the lower ends of the levers A' A' to the levers D D, respectively.

D' D' are valve-wires, and E' E'' are valves or pallets attached to the said wire, and one end of each of these wires is attached to the upper end of each lever A' A', respectively. The wires D' D' pass through the upper openings in each section or compartment of the channel-board, respectively.

F' F' are springs holding the valves E'' E'' in their closed position, and the valves E' E' in their open position, as is plainly indicated in Fig. 3.

It will be perceived from the foregoing description and from reference to the drawings, that as the key C' is depressed the lever D will be tilted, its inner end being moved downward. This downward movement of the lever D draws down the trackers B'' B'', thus rocking or tilting the lever A' A', opening the valve E'' and closing the valve E'. The air in the chest E now passes through the opening uncovered by the valve E'', and enters one of the compartments in the channel-board, and passes thence into the pneumatic bellows in communication with that compartment, and inflates the bellows. As the bellows is inflated, it raises the tracker connected thereto, and tilts the lever M. As the lever M is tilted, the tracker N is drawn down, and the valve K' is thus opened, and the wind is free to pass through and sound the pipe L'. It is to be understood, of course, that the air which produces this result is under pressure, the chest E being in communication with the main bellows through the medium of the tubes or conduits G and H, as shown and described. When the key C' is released, the spring F' returns the valve E'' to its seat, and at the same time the valve E' opens and permits the pneumatic bellows to exhaust, the spring *a* at the same time closing the valve in the main wind-chest. The air is thus free to pass out of the pneumatic bellows through the opening *k'*, and through the opening uncovered by the valve E'.

It is to be understood that a series of keys, C' C', operates in connection with a corresponding set of parts belonging to the pneumatic action which are the duplicates of those already described.

In the drawings I have shown means for operating four sets of pneumatic bellows, one arranged above the other; but in practice there will be six or more sets in larger organs. Heretofore the pneumatic bellows have acted by inflation, and have had below each row or series an air chest or box for supplying air to the bellows and levers for operating the valves. The pneumatic bellows have also been arranged and constructed to operate the larger valves by the exhaustion of the air from the bellows.

An advantage of the construction and arrangements of parts which I have shown and described and pertaining to my invention is, that my pneumatic stack will occupy much less space in the organ than others of like capacity of which I have knowledge. This compactness results from the fact that I supply the air to the pneumatic bellows by means of a vertically-arranged channel-board divided into compartments in the manner already described, each compartment communicating with its corresponding pneumatic bellows through an opening in the heel of the latter. By these means I am enabled to separate the pneumatic bellows from each other only far enough to permit them to become sufficiently inflated without interference with each other.

The means provided for connecting the pneumatic bellows to the channel-board has the advantage of simplicity, and of permitting the

pneumatic bellows to be applied and removed with facility.

The advantage of having the pneumatic stack occupy as small a space as possible without impairing its usefulness will be appreciated by organ-makers, who are frequently limited in the space set apart for the erection of the organ. In my opinion my improved stack will occupy about one-third the height of those constructed as heretofore.

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

1. A pneumatic action for organs in which are combined, substantially as described, the pneumatic wind-chest E, the valves or pallets E′ E″, in operative connection with the organ-keys, the channel-board O, divided into separate compartments or small air-chambers *h h*, each having therein valve-openings *i* and *j*, a series of pneumatic bellows, P P, each having in the heel thereof an opening, *k*′, coinciding with the openings *i i*, the trackers T T, in operative connection with the said bellows, and the valves in the grand organ-chest, all arranged for operation together, for the purposes set forth.

2. The combination, in a pneumatic action for organs, of a channel-board, the pneumatic bellows, the angle-plates R, having notches *m m* therein, and the headed studs *o o*, substantially as and for the purposes specified.

In testimony that I claim the foregoing as my own I hereto affix my signature in presence of two witnesses.

IRA BASSETT.

Witnesses:
F. F. WARNER,
C. B. RICH.