

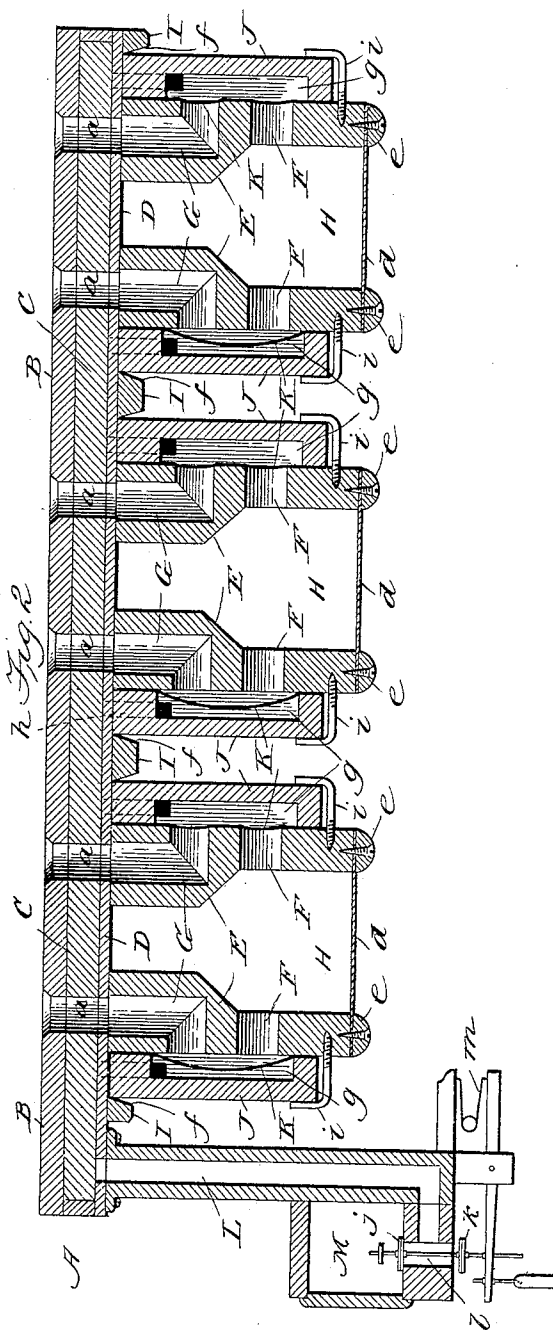
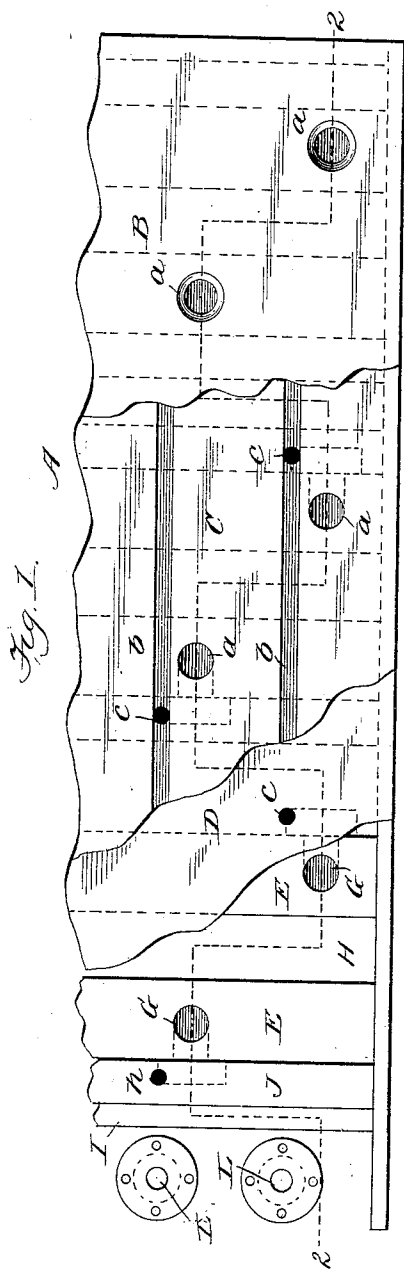
(No Model.)

2 Sheets—Sheet 1.

P. WIRSCHING.
WIND CHEST FOR PIPE ORGANS.

No. 560,559.

Patented May 19, 1896.



WITNESSES:

Edwin L. Bradford
J. H. Patten

INVENTOR
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(No Model.)

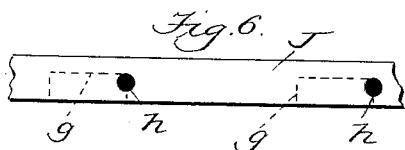
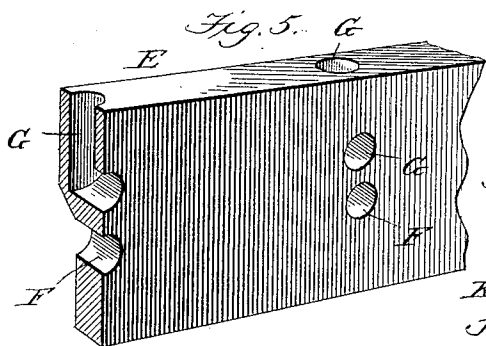
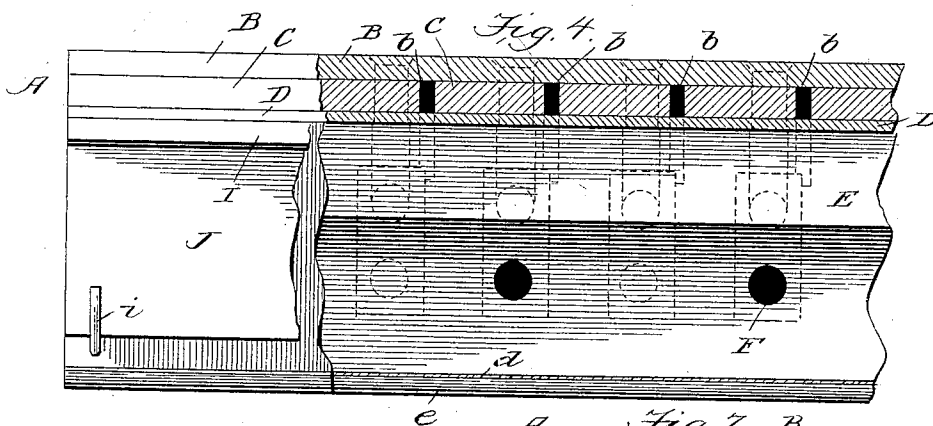
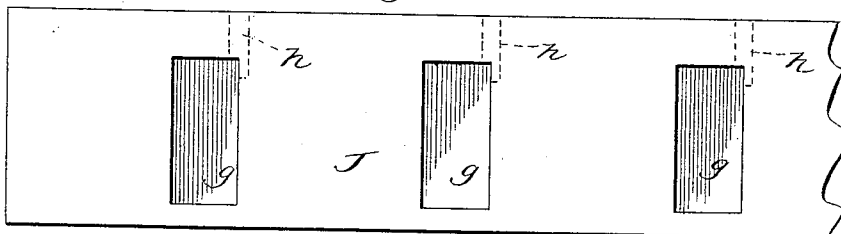
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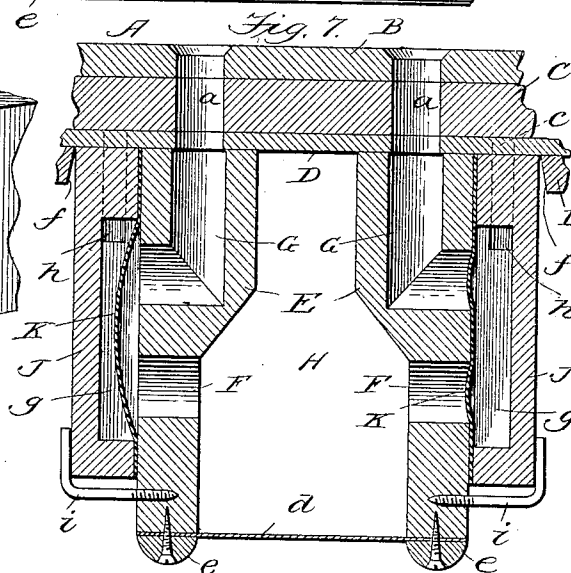
Patented May 19, 1896.

Fig. 3.



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UNITED STATES PATENT OFFICE.

PHILIPP WIRSCHING, OF SALEM, OHIO.

WIND-CHEST FOR PIPE-ORGANS.

SPECIFICATION forming part of Letters Patent No. 560,559, dated May 19, 1896.

Application filed February 27, 1895. Serial No. 539,894. (No model.)

To all whom it may concern:

Be it known that I, PHILIPP WIRSCHING, a citizen of the United States, residing at Salem, in the county of Columbiana and State of Ohio, have invented certain new and useful Improvements in Wind-Chests for Pipe-Organs; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to pipe-organs, but has special reference to the wind-chest, constituting a most important feature thereof.

The invention more generally stated resides in certain characteristic features of construction involved in wind-chest bars or partition-bars employed as side walls of the stop-channels; the combination therewith of flexible diaphragm-valves by means of which communication is established between the stop-channels and their respective musical pipes; diaphragm cases or pockets for inclosing said valves and communicating with exhaust-channels in the top board; means whereby said stop-channels and exhaust-channels are placed in controllable communication with a wind-trunk or organ-bellows common to both for supplying them with wind at a uniform rate of pressure, and in certain arrangements and combinations of parts hereinafter set forth and claimed.

This being the nature of my invention, its object is the production of a wind-chest wherein the mechanical and pneumatic properties are designed and adapted to insure prompt, noiseless, and easy action of the parts with perfect accord and the least possible expenditure of power; a wind-chest composed of interchangeable parts adapted to be cheaply and accurately assembled by labor that may be comparatively unskilled; a wind-chest which is extremely simple in its construction, effective in its operation, and durable, all as will be hereinafter fully set forth, and definitely pointed out in the claims following, due reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents a fragmentary plan view of my improved wind-chest with the pipe or top board broken away, exposing two of a

series of exhaust-channels formed in the latter and two of a series of stop-channels beneath. Fig. 2 represents a vertical transverse section on the line 2 2, Fig. 1, showing wind-chest bars, stop-channels, pipe-ducts, diaphragm-valves with cases, and a fresh-wind box. Fig. 3 represents a plan view showing a series of valve cases or pockets formed in a diaphragm-board. Fig. 4 represents a side elevation of wind-chest with front diaphragm-board and wind-chest bar broken away, exposing to view the opposite wind-chest bar. Fig. 5 represents a detail enlarged view in perspective of a fragment of one wind-chest bar, being partly in section. Fig. 6 represents a similar plan view of one diaphragm-board; and Fig. 7 represents an enlarged vertical section through one stop-channel and adjacent parts, illustrating one pipe-duct in condition for sounding a pipe and one closed.

Reference being had to the drawings, upon which like letters indicate like parts wherever employed, A represents a wind-chest upper board, being by preference built from three parts—namely, pipe-board B, channel-board C, and base-board D—of corresponding size securely glued or otherwise fastened together when assembled. The tri-part upper board thus constructed is pierced at predetermined points by a series of wind-ducts *a*, opening through the structure, their flaring upper ends serving as seats for musical pipes, (not shown,) which, owing to the location of ducts *a*, are dogged upon the pipe-board B or arranged in stagger form for the purpose of economizing space. The intermediate or channel board C, in addition to wind-ducts *a*, is broken by a series of transverse parallel exhaust channels or grooves *b* in controllable communication with the wind-trunk or bellows. Base-board D, in addition to ducts *a*, is perforated by openings *c*, which extend up into the channels *b* and communicate below with valve-chambers in the manner and for a purpose that will later appear.

E indicates wind-chest bars or partition-bars, securely fastened in a depending position from the under side of upper board A, each being provided with a series of valve-throats F, passing therethrough, and a corresponding series of angular pipe-ducts G immediately above, said pipe-ducts by prefer-

ence entering the bar in a horizontal plane, thence making an angular turn, and finally passing out through the upper edge of the bar E in a vertical direction, though it will be understood I by no means limit myself to the precise location or arrangement of the valve-throats and pipe-ducts shown. As thus provided with an inlet and outlet port—to wit, valve-throat F and pipe-duct G—the wind-chest or partition bars E are arranged longitudinally within the wind-chest in parallel pairs, the upper ends of pipe-ducts G registering with wind-ducts *a* through the tri-part upper board A.

It represents stop-channels formed between each pair of bars E, constituting the side walls thereof, being closed above by the base of upper board A and below by any material, as shown at *d*, adapted to render the compartment air-tight, oiled cloth being preferred, owing to its lightness and durability, a convenient means of fastening such closure *d* being strips *e*, corresponding in length and width with the lower edge of bars E, between which bars and strips the closure is secured by screws passing therethrough, said strips serving the double function of securing the member *d* and protecting it against breakage while handling the wind-chest for purposes of shipment or construction. At given points between bars E, as thus applied to a wind-chest, are securely fastened longitudinal cleats I, beneath the upper board A, said cleats having their edges beveled, as at *f*, for the purpose of assisting in the assembling of parts and retaining them in position when assembled.

J indicates a diaphragm-valve case or cases formed by a continuous strip, as illustrated in Fig. 3, provided upon its inner surface with a series of depressions or valve-chambers *g*. If preferred, however, such chambers may be formed of individual blocks; but in either event it is important that they communicate with exhaust-channels *b* in the channel-board C above through their exhaust-ports *h*, as clearly shown. To the inner surface of case or cases J, closing the depression or chambers *g*, are fastened suitable diaphragm-valves K, of any flexible material, though by choice consisting of soft sheep-leather. These diaphragm-valves may be affixed by glue in continuous strips or in small sections of a size sufficient to completely cover the individual valve-chambers, and when so applied may be rubbed down slightly between their points of fastening at edges of the chambers *g* for the purpose of imparting to the valve a slight fullness and rendering it more flexible, especially when used in connection with the larger pipes.

In assembling the several parts of my improved wind-chest, bars E and cleats I being properly secured to the upper boards A, the diaphragm-valve cases J are next introduced between the beveled surface F of cleats I and the upper portion of bars E, said bevel aiding to insure an air-tight joint between the case J,

upper board A, and bar E, with the diaphragm-valve K interposed between said case and bar, where it guards the inlet and outlet ports of the latter. At this point said case or cases J are further secured by dag-screws *i*, which may be applied to the lower portion of bars E without the aid of a screw-driver, its angular end engaging and retaining the lower edge of the valve-cases against leakage or accidental dislodgment. Upper board A is generally constructed in three parts, one of which is arranged with cross-grain for the purpose of preventing warping; but it is apparent that the base-board D may, if desired, be omitted. The channel-board C, however, is an essential feature of the invention, and exhaust-channels *b*, arranged at right angles to the stop-channels H, as also the exhaust-ports *h*, and through them the valve-chambers *g*, are placed in controllable communication with the wind-trunk or bellows of the organ as follows: Each channel *b* is intersected near its end by a vertical windway L, which terminates in a fresh-wind box M, common to all of said windways and channels. Box M in turn communicates directly with the wind-trunk or bellows of the instrument, and accordingly stands normally full of compressed air, the introduction of which to channels *b* is controlled by a double puppet-valve *j* *k*, guarding a valve-throat *l*, said valves being operated by particular keys on the keyboard, together with interposed mechanism of the mechanical, tubular-pneumatic, or electric types, acting against the spring *m*, the tendency of which latter is to retain the supply-valve *j* normally open.

This being a description of my invention its use and operation are as follows: Presuming, for the purpose of illustration, that a number of the longitudinal stop-channels in a wind-chest—as, for instance, those illustrated in section by Fig. 2—stand charged with compressed air admitted by any convenient or well-known valve construction controlled from the keyboard by the withdrawal or replacement of a stop or stops. Presuming, further, that each of the exhaust-channels *b*, exhaust-ports *h*, and the valve-chambers *g* stand normally full of compressed air from the wind-trunk or bellows, it is apparent that the pressure within channels H and chambers *g* is equal, and consequently that the diaphragm-valves K are balanced, so far as pressure upon either side of valve-throat F is concerned; but at the entrance of pipe-ducts G it will be observed the absence of pressure upon one side of diaphragm-valves K causes them to be securely seated against said entrance, and the pipes above remain silent. If now, however, it is desired that pipes, the first, third, and fifth, reading from the left of Fig. 2, shall speak, this is accomplished by the usual touch of keys representing said pipes upon the keyboard with the following results: Valves *j*, located in fresh-wind box M, are seated, shutting off the supply of air from said

box to the wind-chest, and simultaneously therewith valves *k* are unseated, affording the compressed air from their respective windways *L* an avenue of escape to the atmosphere, whereupon the particular exhaust-channels *b* in communication with said windways, and through them their respective exhaust-ports *h* and valve-chambers *g*, are relieved of the pressure therein. Valve-chambers *g*, the first, third, and fifth from left of Fig. 2, being thus relieved of pressure, their valves *K* are immediately unseated under influence of the compressed air from stop-channels *H*, which finds vent through valve-throats *F*. Valves *K*, then being deflected by the pressure of fresh wind from channels *H*, serve as a means of conducting said fresh-wind supply to pipe-ducts *G*, and through them to the pipes above, which promptly speak and continue to sound so long as the keys to which they respond are depressed upon the keyboard.

This being substantially the construction, use, and operation of my invention in its preferred form I do not propose to limit myself to the precise arrangement and combination of parts shown, as many minor changes in construction, material, and workmanship will suggest themselves to those skilled in the art, and such changes may be embodied in my improved wind-chest without departing from the spirit of the invention, which having been thus described

What I claim is—

1. A wind-chest bar having formed therein a direct valve-throat and an angular pipe-

duct the upper edge of said bar being thickened to accommodate the pipe-duct, substantially as described.

2. In a wind-chest for pipe-organs the combination with stop-channels formed by independent wind-chest bars, of a series of valve-cases and valves therefor detachably secured to side of said bars and communicating with suitable valve-throats and pipe-ducts formed in the bars, substantially as described.

3. In a wind-chest for pipe-organs the combination with stop-channels formed by and between independent wind-chest bars, of a series of valve-cases detachably secured to side of said bars communicating with suitable valve-throats and pipe-ducts formed in the bars, valves guarding said throats and ducts, and means for disturbing the balance of said valves, substantially as described.

4. In a wind-chest for pipe-organs the combination with stop-channels formed by and between independent wind-chest bars, the latter bearing inlet and outlet ports communicating respectively with the stop-channels and musical pipes, balanced diaphragm-valves guarding said inlet and outlet ports, and key-controlled exhaust-channels leading from the valve-chambers for relieving pressure therein and disturbing the balance of the valves, substantially as described.

In testimony whereof I subscribe my signature in presence of two witnesses.

PHILIPP WIRSCHING.

Witnesses:

WM. E. DYRE,
II. M. STERLING.