No. 885,737. PATENTED APR. 28, 1908.

G. F. DÖHRING.

PNEUMATIC VALVE.

APPLICATION FILED SEPT. 12, 1906.

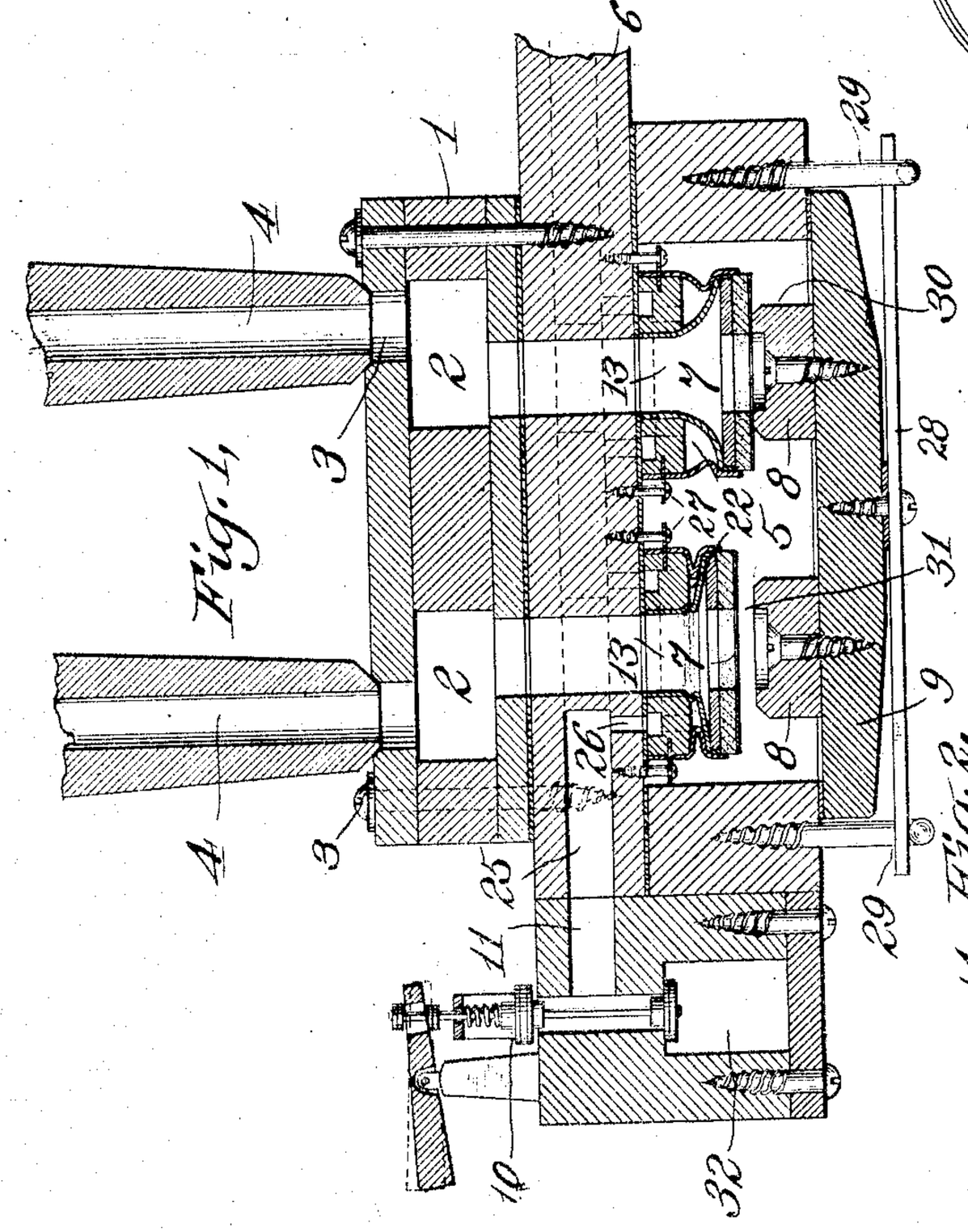

Fig. 1.

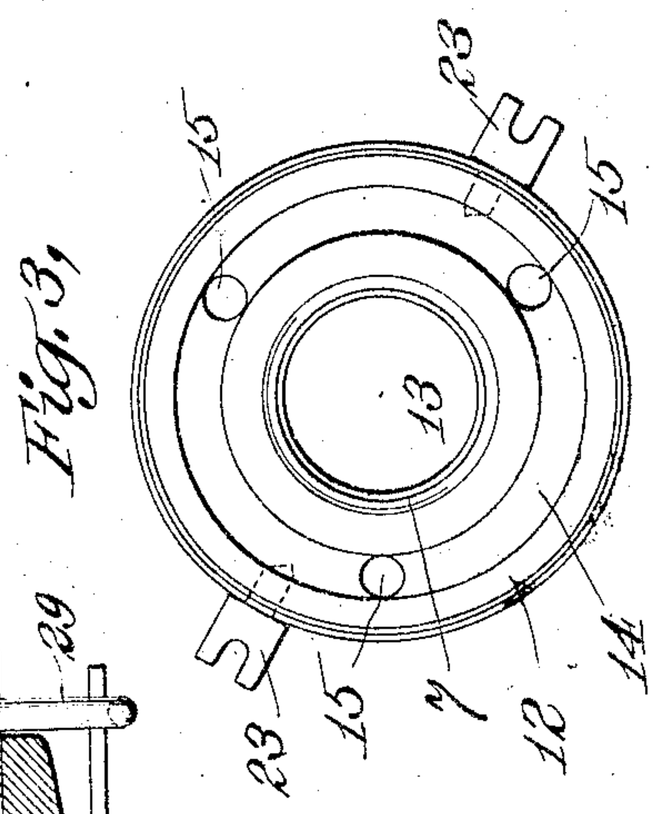

Fig. 3.

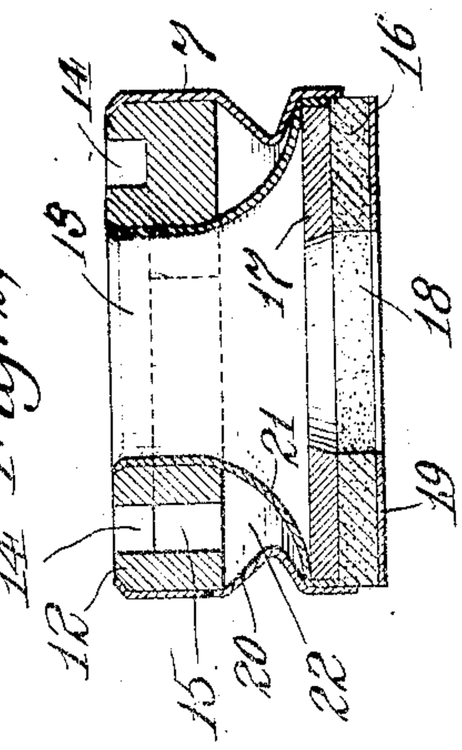

Fig. 2.

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PNEUMATIC VALVE.

No. 885,737. Specification of Letters Patent. Patented April 28, 1908.

Application filed September 12, 1906. Serial No. 334,340.

To all whom it may concern:

Be it known that I, GUSTAV F. DÖHRING, a citizen of the United States of America, and resident of the town of Cranford, county of Union, and State of New Jersey, have invented certain new and useful Improvements in Pneumatic Valves, of which the following is a specification.

My invention relates to pneumatics or pneumatic valves for wind instruments, such as pipe organs, and has for its object to produce a valve of this class which shall be simple and effective in its construction and operation and which, by using less material and occupying less space, decreases the cost of construction.

The object of my invention is further to produce a construction which shall be especially convenient for inspection and repairs.

My invention consists in providing a pneumatic channel board of any approved construction and in forming, preferably on the under side of said channel board, a wind chest, having a lower removable cover; in providing a novelty constructed valve having a passage through it which registers with passages in the pneumatic channel board leading to the organ pipes, and which passages are opened and closed by the movement of the movable valve disk from and to a valve seat preferably attached to the lower removable cover of the valve chest.

My invention consists further of other novel features to be hereinafter pointed out and described.

In the drawings accompanying and forming a part of this specification, Figure 1 represents a transverse section through the wind chest and pneumatic channel-board provided with pneumatic valves embodying my invention; Fig. 2 is an enlarged section through a pneumatic valve; and Fig. 3 is a plan view of the same.

Numeral 1 represents a pipe channel board of any approved construction, having passages 2 therein which conduct air through the ports 3 to the pipes 4 from the wind chest 5. The wind chest 5 is separated from the pipe channel board 1 by the pneumatic channel board 6 which contains passages leading from the pipe channel board to the wind chest. The communication between the wind chest and these passages is controlled by the pneumatic valves or pallets 7 which open from and close towards the valve seat 8, preferably secured to a removable cover 9.

Numeral 10 represents a key action of any approved construction, which when operated—as shown in Fig. 1—opens communication between the passage 11 and the atmosphere, thereby permitting the pressure in said passage to drop to atmospheric pressure. When the valves controlled by the key action stand in their normal condition, communication between passage 11 and the atmosphere is closed and communication between said passage and a supply of air under pressure is established.

The pneumatic valve 7 constitutes one of the main features of my invention and it consists of a stationary block and movable disk connected therewith by a flexible diaphragm having a continuous passage through said disk and block. The block is preferably in the form of a ring 12 made of wood fiber or other suitable material. This ring has a central opening 13, an annular groove 14 and one or more holes 15 drilled through the body of said ring into said groove. The purpose of the annular groove 14 formed in the upper surface of the block 12 is to conduct the air from the hole 26 in the channel board to the holes 15 in the block 12. By forming the groove 14 in the block the care which would otherwise be necessary to bring the holes in the block into register with those in the wind chest is avoided. The disk 16 is preferably in the form of an annular ring made up of three layers; the upper layer 17 of fiber; the middle layer 18 of felt; and the lower layer 19 of leather. The block 12 is joined to the disk 16 by an outer flexible diaphragm 20 and an inner flexible diaphragm 21, so arranged as to form a chamber 22 between them, which chamber communicates with the annular groove 14, through the holes 15 and which is out of communication with the exterior, and the interior passage of the valve. The ring 12 is provided with clips 23 by means of which it is secured to the lower surface of the action channel board so as to have the central opening 13 register with the passage leading through the pneumatic channel board to the pipe channel board and pipe.

The pneumatic channel board is provided with channels or passages 25 which communicate with the key action valves 10 and with the annular groove 14 in the valve through the holes 26. The valve seats 8 secured to the removable cover of the wind chest, are so arranged as to register with the disk of the valves. The screws 27 in the lower face of

the pneumatic channel board engage the clips 23 and hold the valves in position. The removable cover 9 is provided with one or more bars 28 pivotally secured to the bottom of the cover and adapted to swing into engagement with the screw hooks 29.

When the valve is closed, the disk rests upon the valve seat 8, as shown at 30: when it is opened, the disk is raised above the valve seat as shown at 31.

The operation of my invention is as follows: Air is maintained under pressure in the wind chest and in the chamber 32. When the pipe is not speaking—that is when a key is not struck—communication between passage 11 and the atmosphere is closed and between passage 11 and passage 32 is open. This will cause the pressure of said passage to be exerted inside of the chamber 22 and this pressure acting upon the diaphragms will extend the valve chamber 22 and cause the disk 16 to engage the seat 8. Where the valves are placed in vertical position with the disk down, as shown, gravity will assist the action of closing.

When communication between passage 11 and the atmosphere is open and between it and passage 32 closed, as shown in Fig. 1, the pressure in the chamber 22 will fall, and the surrounding pressure in the wind chest will collapse the diaphragms and cause the valve disk to rise from its seat as shown at 31, Fig. 1. As soon as the disk is lifted from its seat, air will be conducted through the center of the valve and the pipe channel board to the pipe and the pressure of the air inside of the valve—that is in the passage 13—will tend to collapse the inner diaphragm 21 and thus give added power for raising the disk. When the valve is closed, as will be readily understood, the pressure in the interior space 7 of the valve exerted on the diaphragm 21, is that of the atmosphere, because the pipes 4 are always open to the atmosphere. The valves will not open until the difference in pressure between that of the wind chest and that of the atmosphere inside of the chamber 22 is sufficient for this purpose. When, however, they are once open a still greater effect is given and this insures the valve opening the proper distance promptly and without vibration.

When the valves have to be inspected, a mere turning of the bars 28 and removal of the lower cover 9, renders them easily accessible and if the valves themselves are to be taken from the wind chest it is merely necessary to remove one of the screws 27.

By means of my novel arrangement the valves automatically adjust themselves to their seats because of the flexible connection between the disk and the ring 13, and when opened the passage for the air from the wind chest to the pipe channel board is straight and uniform for all valves.

Having thus described my invention, what I claim is:

1. In a pneumatic valve the combination with a stationary member having an opening therein, of a movable disk having an opening therein, a conduit having flexible walls, joining said openings and a stationary seat for said movable disk.

2. In a pneumatic valve the combination with a stationary member having an opening therein, of a movable disk having an opening therein, a conduit having flexible walls, joining said openings, and a collapsible air chamber between said stationary member and said movable disk out of communication with said conduit.

3. In a pneumatic valve the combination with a stationary member having an opening therein, a movable disk having an opening therein, a flexible conduit joining said openings, a flexible walled air chamber connecting said stationary member and said movable disk, said stationary member having an opening therein leading to said air chamber and out of communication with said conduit.

4. An organ pallet consisting of a pair of rings joined by a pair of flexible imperforate connections surrounding the central openings in said rings and separated from each other to form an air chamber between them, one of said rings being provided with an opening leading to said air chamber.

5. A pneumatic valve having stationary and movable members each provided with openings, a flexible connection joining said members, said flexible connection being of such shape as to form a passage through said valve in communication with said openings and a collapsible air chamber between said members out of communication with said passage.

6. A pneumatic valve consisting of two relatively movable members, openings in said members and an annular collapsible air chamber composed of flexible walls connecting said members and surrounding said openings.

7. In an organ the combination with a pneumatic valve consisting of two relatively movable members having openings therein, and a flexibly walled air chamber connecting said relatively movable members and surrounding said openings, of a channel board having an opening therein in communication with the openings in said members and means for securing one of said members to said channel board.

8. In a pneumatic valve the combination with two relatively movable members each having an opening through it, of a pair of flexible imperforate diaphragms connecting said members and surrounding said openings and arranged at a distance apart so as to form an air chamber between them.

9. In an organ the combination with organ

pipes, key controlled air ducts and a wind chest provided with ports leading to the organ pipes and ports leading to the key controlled air ducts, of a pneumatic valve in said wind chest consisting of a stationary member having an opening therethrough in communication with the port leading to the organ pipe and an opening in communication with said key controlled air duct, a movable valve disk having an opening therein, a flexible conduit connecting said valve disk with said stationary member, a flexible walled air chamber surrounding said flexible conduit in open communication with said key controlled air duct and a valve seat in said wind chest adapted to be engaged by said valve disk.

10. In an organ the combination with organ pipes, key controlled air ducts and a wind chest having openings therein leading to the organ pipes and holes therein leading to the key controlled air ducts of a valve-pallet having a central opening through it in communication with said organ pipe opening and surrounded by an annular collapsible air chamber in communication with said key controlled duct, a removable cover for said wind chest and a valve seat secured to said cover adapted to be engaged by said valve-pallet.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

GUSTAV F. DÖHRING.

Witnesses:

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