

J. BINNIG.
PIPE VALVE FOR ORGANS.
APPLICATION FILED SEPT. 27, 1905.

2 SHEETS—SHEET 1.

Fig. 1.

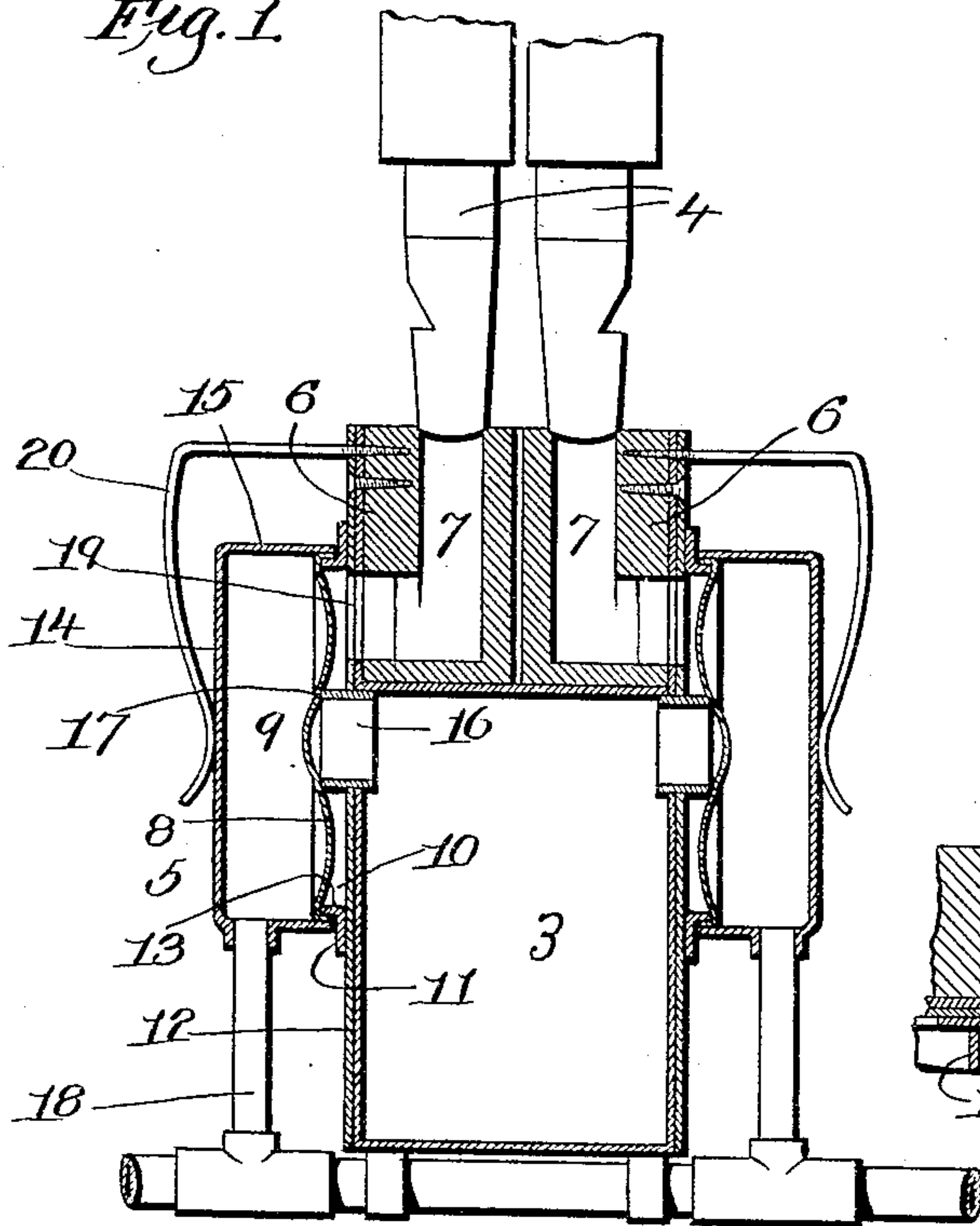


Fig. 3.

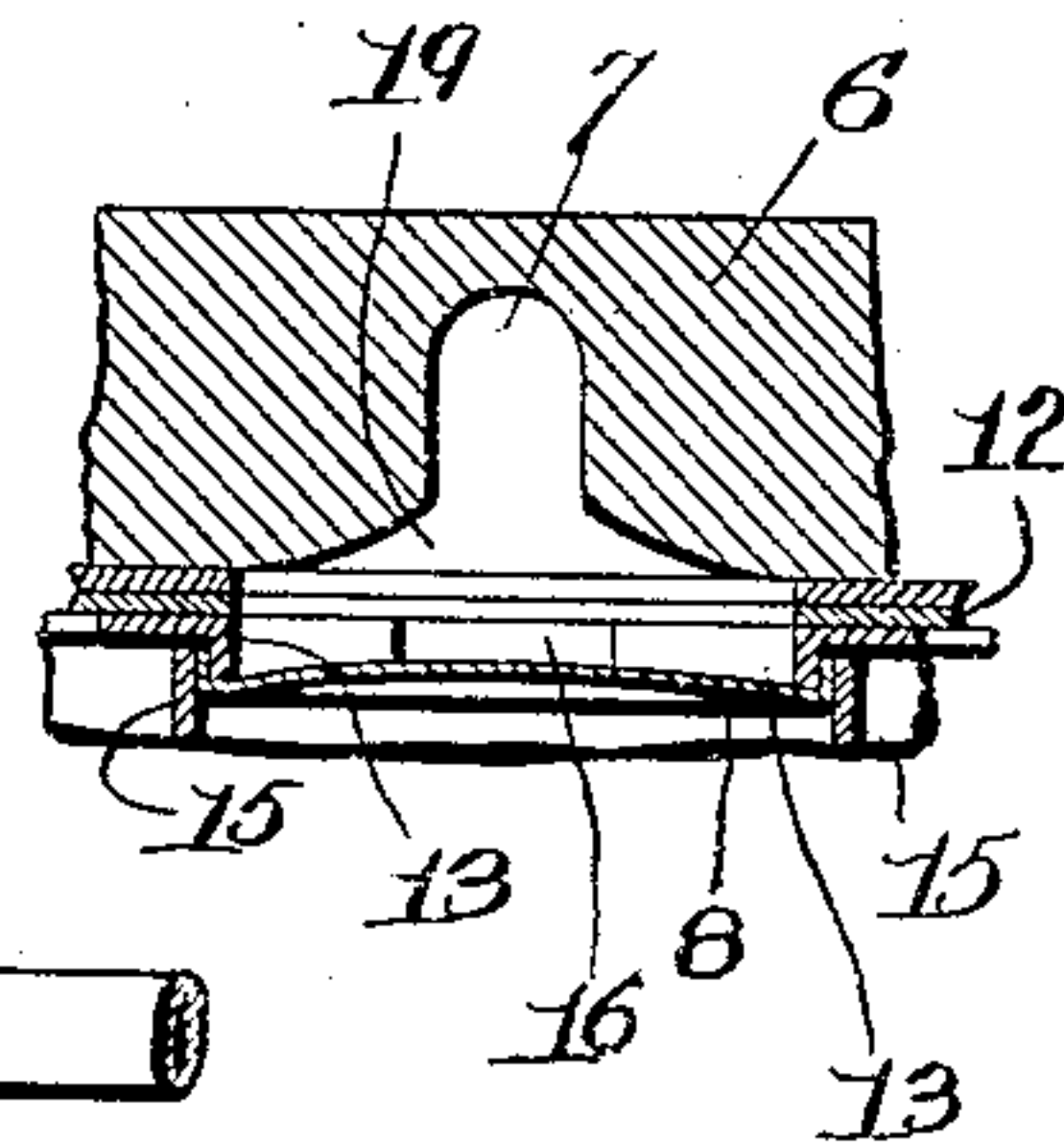
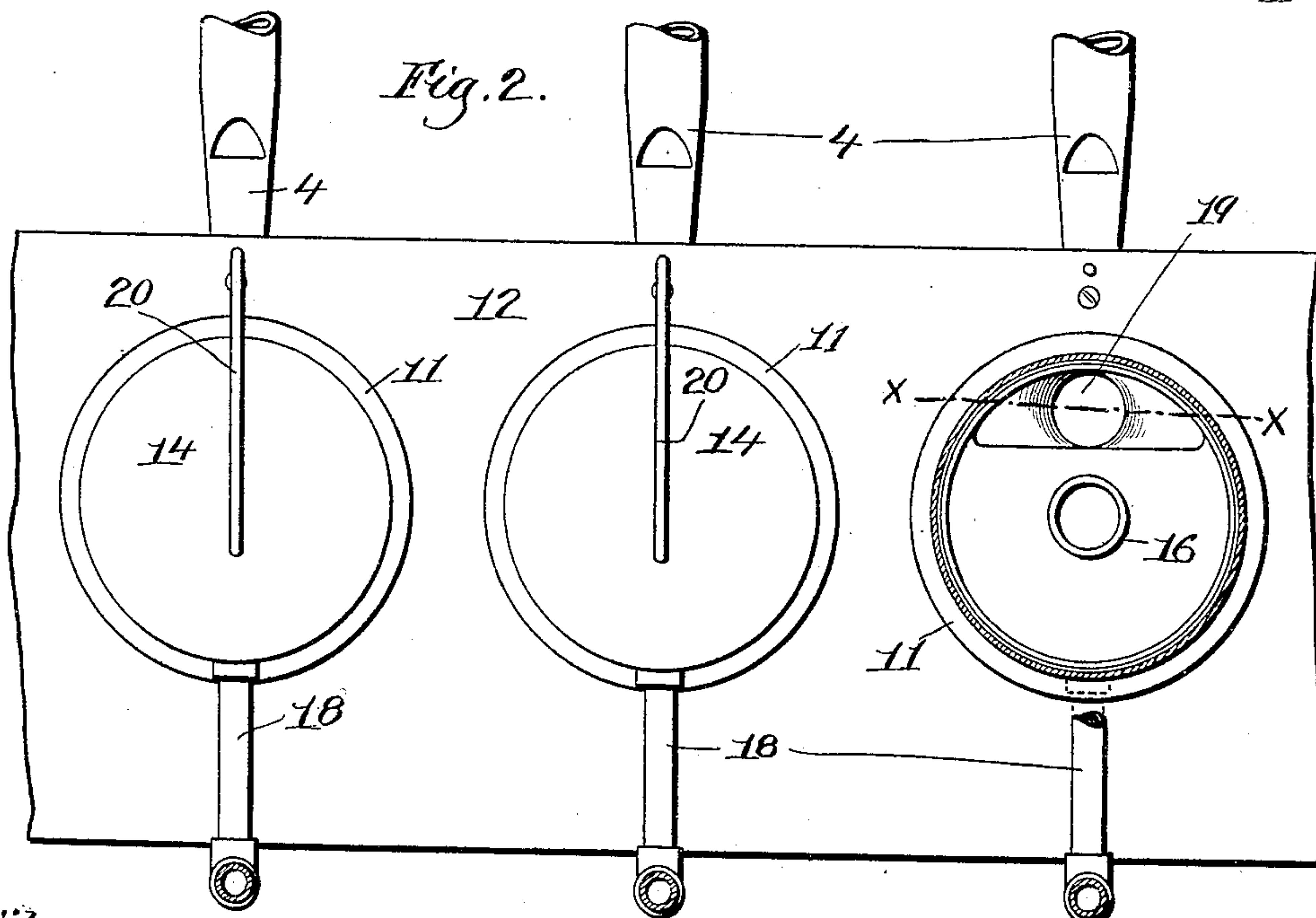


Fig. 2.



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No. 825,294.

PATENTED JULY 10, 1906.

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2 SHEETS—SHEET 2.

Fig. 4.

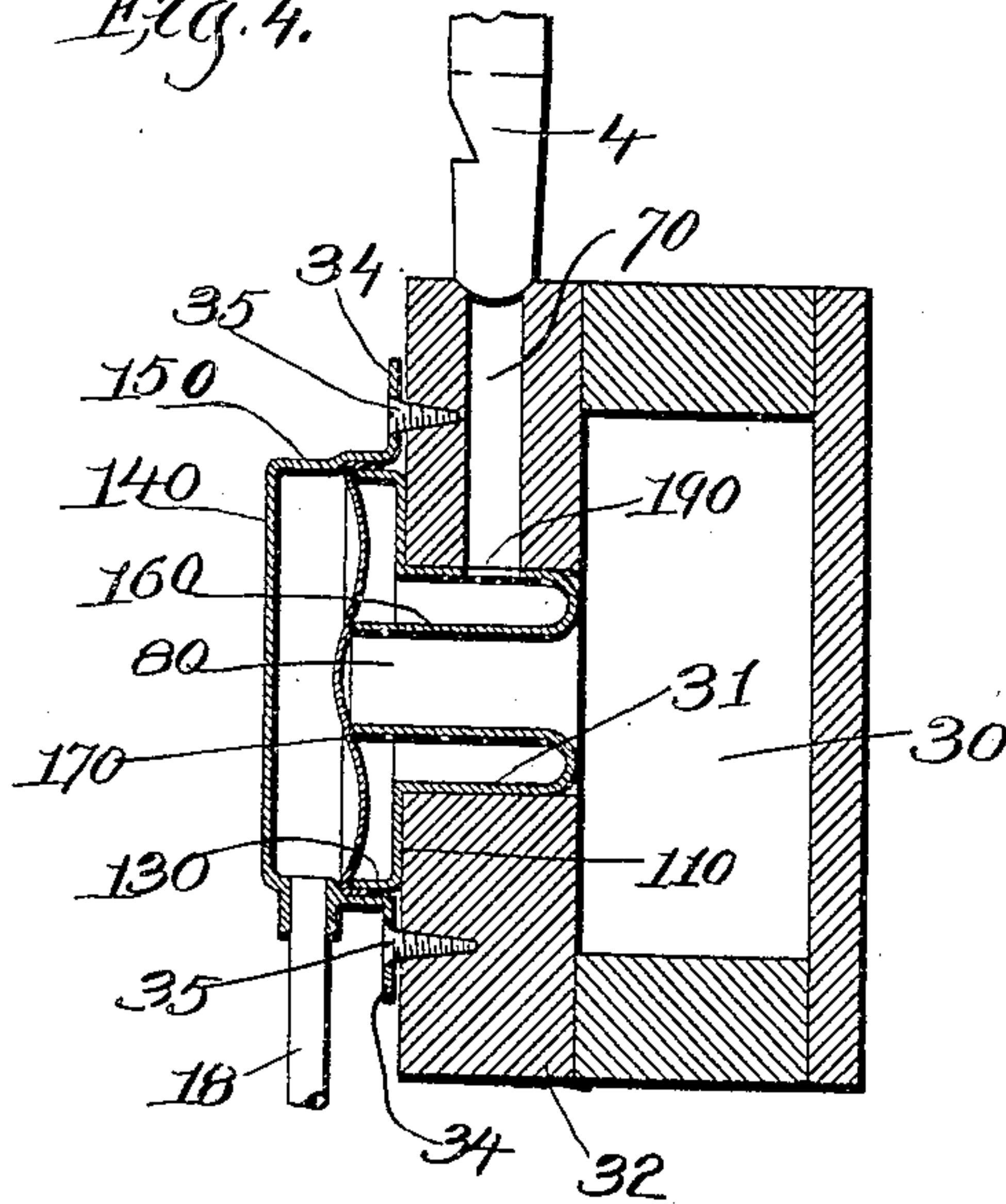


Fig. 5.

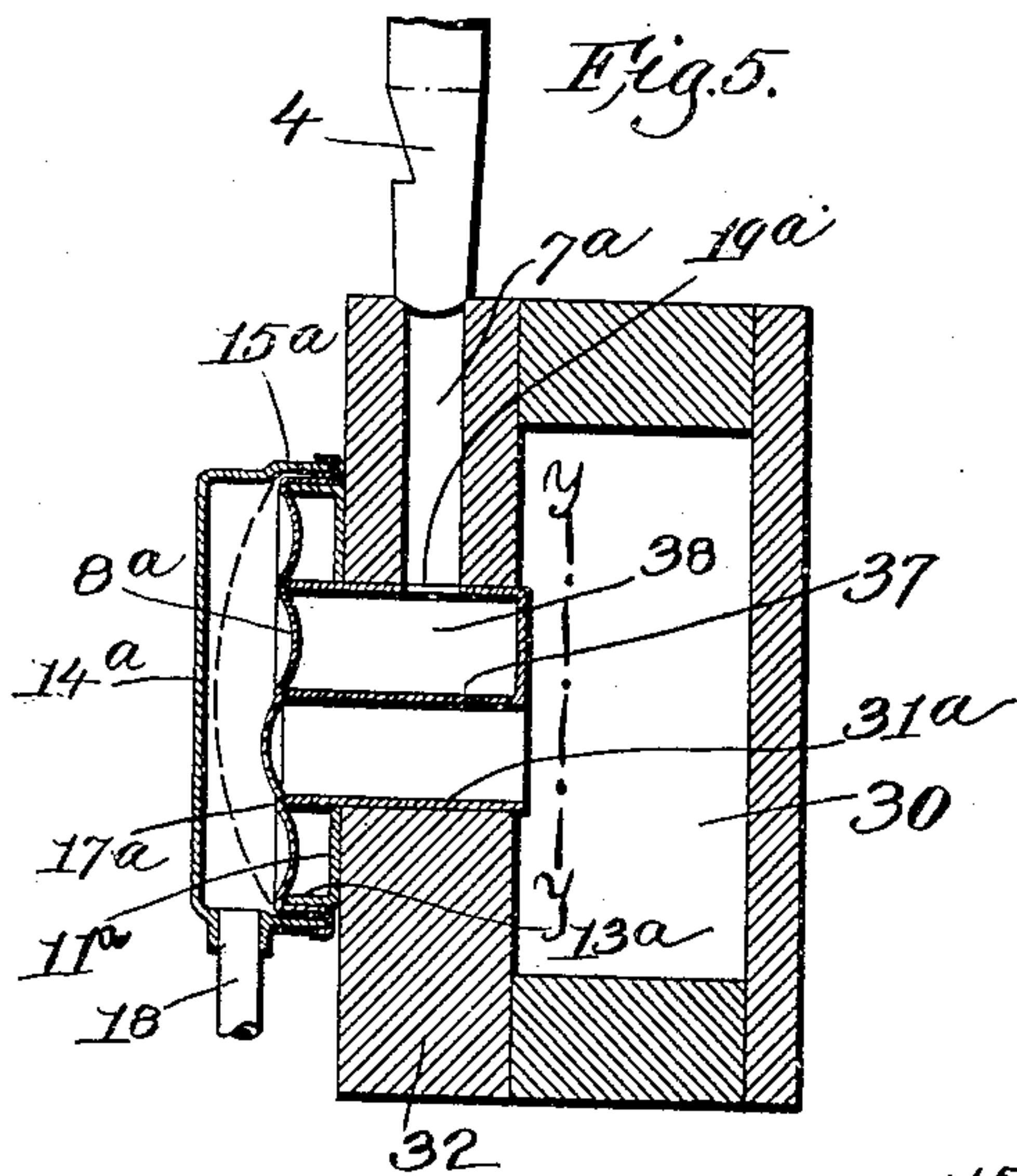


Fig. 6.

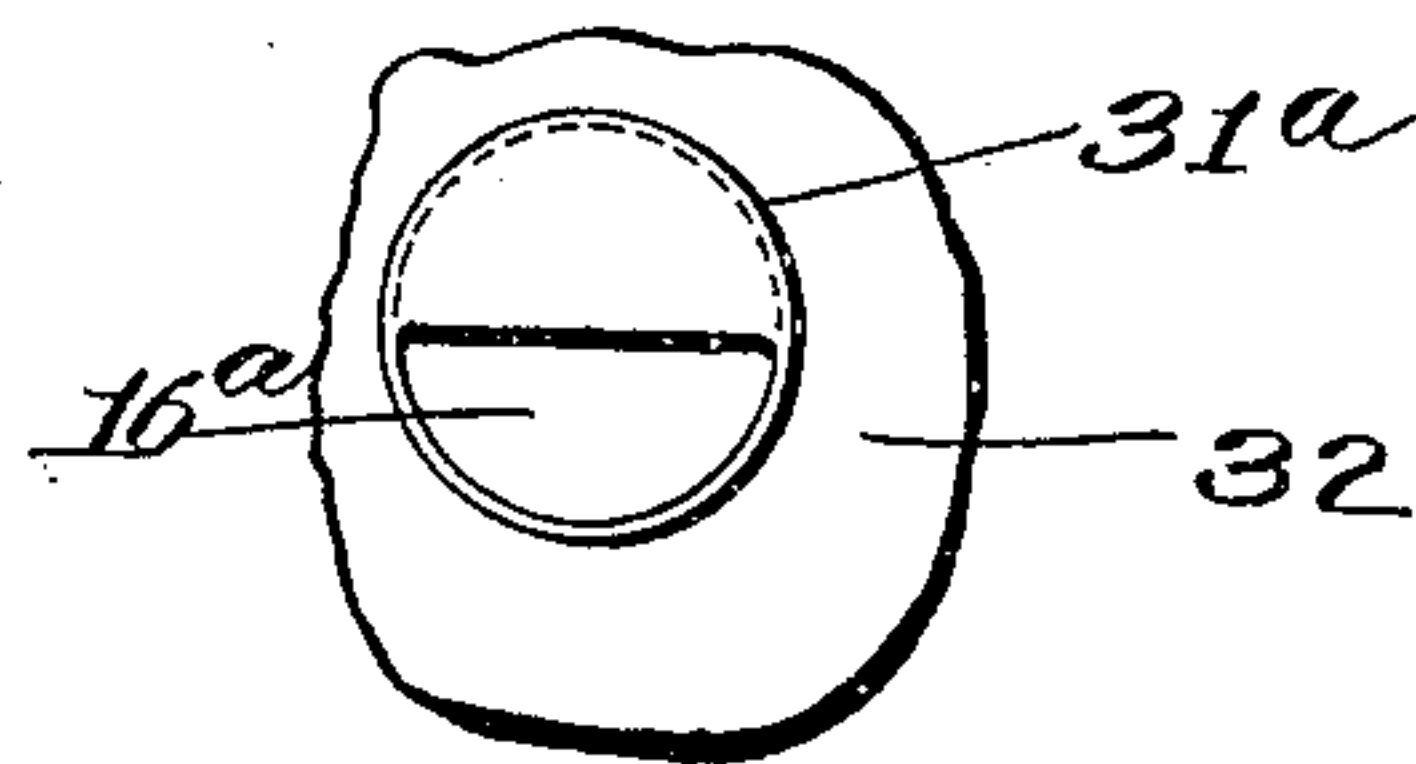
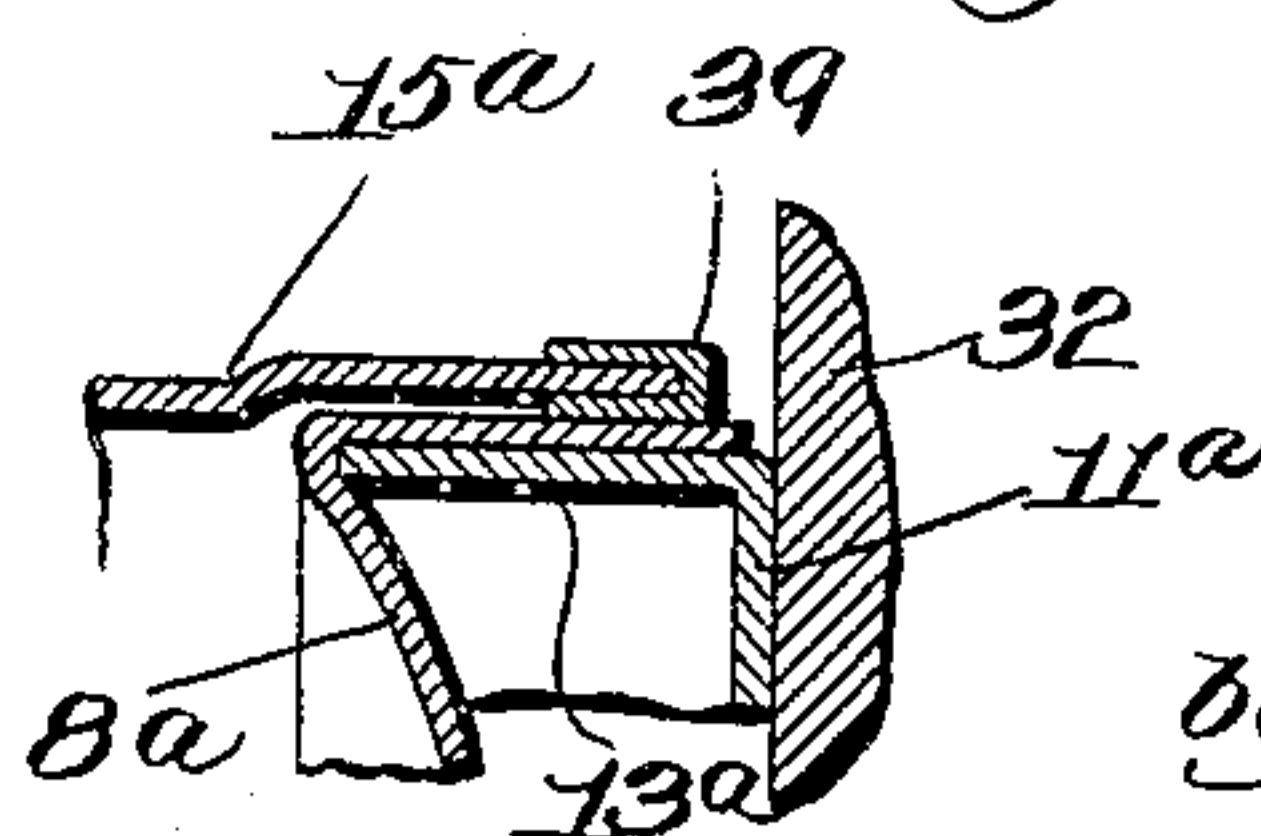


Fig. 7.



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PIPE-VALVE FOR ORGANS.

No. 825,294.

Specification of Letters Patent.

Patented July 10, 1906.

Application filed September 27, 1905. Serial No. 280,273.

To all whom it may concern:

Be it known that I, JACOB BINNIG, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Pipe-Valves for Organs, of which the following description, in connection with the accompanying drawings, is a specification, like numerals on the drawings representing like parts.

Pipe-valves are commonly made of wood. One disadvantage inherent in a pipe-valve thus constructed is that the swelling and shrinking of the wood due to changes in the humidity of the atmosphere is apt to cause the valve finally to leak. My invention aims to avoid this objection by providing a metallic valve in which the only non-metallic part is the flexible diaphragm which is commonly employed in these structures.

I will first describe some embodiments of the invention and then point out the novel features of the invention in the appended claims.

In the drawings, Figure 1 is a vertical section through two pipe-valves embodying my invention. Fig. 2 is a side elevation of Fig. 1. Fig. 3 is a section on the line *xx*, Fig. 2. Fig. 4 is a vertical section through another embodiment of my invention. Fig. 5 is a similar section, showing still another embodiment of my invention. Fig. 6 is a view to the left of line *yy*, Fig. 5. Fig. 7 is a detail hereinafter referred to.

Referring first to Figs. 1, 2, and 3, 3 designates a wind-chest from which the pipes 4 of the organ are operated, and 5 designates generally a pipe-valve which controls the admission of wind from the wind-chest to the pipe. The wind-chest illustrated in Fig. 1 is made of metal and is surmounted by a member 6 on which the pipes 4 rest, as usual, said member being provided with a passage 7 leading to each pipe. In Fig. 1 I have shown two such members 6 arranged above the wind-chest, each one of which supports a row of pipes 4, though this arrangement is not essential to the invention. The pipe-valve herein illustrated is of that type in which the diaphragm is situated between opposite walls of the valve-chamber and divides it into two compartments, and the part forming the air-supply passage projects into the valve-

chamber and terminates in a valve-seat against which the diaphragm rests. A valve of this type is shown in my former patent, No. 784,203, dated March 7, 1905. In the embodiment of the invention shown in Fig. 1 the diaphragm is designated by 8, and it extends across the valve-chamber, dividing it into two compartments 9 and 10. The valve-chamber is preferably formed of two parts, between which the edge of the diaphragm 8 is clamped. One part is shown as a ring 11, which is secured in any suitable way to a backing-piece 12, and which has an outwardly-projecting flange 13, and the other piece is shown as a cap member 14, the walls 15 of which fit over the flange 13. The cap is preferably made detachable from the body portion. The edges of the diaphragm 8 are confined between the walls 15 of the cap and the flange 13. The air-supply passage through which wind is admitted from the wind-chest to the valve is in the shape of a tubular member 16, which is secured in any suitable way to the backing-piece 12, and which projects into the valve-chamber and terminates in a valve-seat 17 against which the diaphragm 8 is seated, said valve-seat being situated between opposite walls of the valve-chamber. 18 designates a pipe leading to any suitable pneumatic mechanism (not shown) by which the pipe-valve is operated. 19 designates a port leading through the backing-piece 12 and communicating with the duct or passage 7, said port and passage constituting the communication between the pipe-valve and the organ-pipe 4. The cap 14 may be held in place in any suitable way, and in Fig. 1 this is accomplished by means of a suitable retainer 20, which is preferably more or less resilient. The retainer herein shown is in the form of a spring-finger, which is bent to form a stem that is secured to and projects from the member 6, the resilient portion of said finger engaging the cap and holding it in place. The backing-piece 12 for each valve might be separate from that for any other valve, but preferably a single plate will extend the full length of the port 6 and the various rings 11 for each valve will be secured thereto. In this embodiment of my invention the rings 11 and backing-piece 12 constitute the body of the valve and the entire valve is composed of the valve-body, the cap, and the

diaphragm which is confined between the valve-body and cap.

In the embodiment shown in Fig. 4 the wind-chest 30 is made of wood instead of metal, and the pipe-valve, although made of metal, has a slightly-different construction from that shown in Fig. 1. In this embodiment the valve-body 110 is shaped to present an outwardly-projecting flange 130 and the stem 31, which enters an aperture in the side wall 32 of the wind-chest. Extending through the stem is a neck or tubular member 160, which forms the air-supply passage, said neck terminating in a valve-seat 170, against which the diaphragm 80 seats, said tubular member projecting into the valve-chamber so as to bring the valve-seat between opposite walls of said chamber. The cap member of the valve is designated by 140, and the walls or flanges 150 thereof overlie the flange 130, and the edges of the diaphragm 60 are confined between the flange 130 and the walls 150. The cap is provided with the foot portion 34, which overlies the side 32 of the valve-chest, and said cap is held in place by means of suitable screws 35, which pass through the foot portion. In this construction the cap 140 serves to hold not only the diaphragm in place but also to hold the valve-body in the wall of the wind-chest. The stem 31 of the valve is provided with a port 190, which communicates with a duct or passage 70, leading to the pipe 4, said port and passage constituting the communication between the pipe-valve and the organ-pipe through which the wind is admitted when the pipe-valve is open.

In Fig. 5, wherein a still different construction is shown, the body of the pipe-valve is designated by 11^a, and it is provided with the outwardly-projecting flange 13^a and is shaped to present the stem 31^a, which extends through the wall 32 of the wind-chest 30. The cap of the valve is designated by 14^a, and its walls 15^a overlie the flange 13^a, and the edges of the diaphragm 8^a are confined between the walls of the cap and the flange 13^a, as in the other embodiments of the invention. In this embodiment the stem 31^a is divided transversely by a suitable partition 37, to form an air-supply passage 16^a and another passage 38, which communicates, by means of a port 19^a, with a duct 7^a, leading to the pipe 4. The stem 31^a of the valve-body projects into the pipe-valve, and the lower edge 17^a of said projecting end and the front edge of the partition 31 constitute a valve-seat against which the diaphragm 8^a seats. 18 designates the pipe leading to the pneumatic. In this embodiment of the invention the edges of the walls 15^a of the cap are provided with some yielding packing material 39—such, for instance, as leather or chamois—and the edges of the diaphragm 8^a are confined between the covered edges of the walls 15^a and the flanges 13^a. The fric-

tion between the covering 39 on the edges of the cap and the material of the diaphragm is sufficient to hold the cap in place, although, if desired, the means shown in Figs. 1 and 4 may be employed for this purpose.

In all of the embodiments of my invention it will be noted that the valve is metallic and that the valve-chamber is divided transversely into two compartments by the diaphragm and that the said valve is provided with a tubular member which projects into the valve-chamber and terminates in a valve-seat against which the diaphragm seats. By making parts of the valve of metal all danger of leaks due to changes in hygrostatic conditions of the atmosphere is avoided. Further, in each embodiment of my invention the cap is made detachable from the body portion, and since each valve is a separate member or element it will be seen that the cap of any one particular valve may be removed without disturbing any of the other valves. This is important, because it provides for the repair of one valve or its adjustment without disturbing in any way any of the other valves. In some embodiments of the invention herein shown the cap is held in position on the body portion by a retainer, and in other embodiments the cap is detachably held by means of screws or by friction.

The operation of the valve will be readily understood by those skilled in the art. Normally the valve of the pneumatic controlling the pipe-valve is so arranged that wind-pressure is admitted to the compartment 9, this wind-pressure being sufficient to hold the diaphragm against its seat. When it is desired to cause any pipe 4 to speak, the pneumatic controlling the corresponding pipe-valve is operated so as to relieve the pressure in the chamber 9 of said valve, whereupon the pressure in the wind-chest 3 lifts the diaphragm from its seat, and thus opens communication between the pipe and wind-chest.

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

1. A device of the class described comprising a metallic body having an annular flange, a cap fitting said annular flange, said cap and body constituting a valve-chamber an air-supply passage leading into the valve-chamber and terminating in a valve-seat, and a diaphragm having its edges confined between the annular flange and the cap and resting against the valve-seat.

2. In a device of the class described, a metallic body having an outwardly-projecting annular flange, a cap fitting said flange, said body and cap inclosing a valve-chamber, a tubular member leading into said valve-chamber and constituting an air-supply passage, and a diaphragm confined between the annular flange and cap and adapted to seat against the end of the tubular member.

3. The combination with a wind-chest, of a metallic cylindrical chamber adjacent thereto, said chamber being formed by a body portion and a cap portion detachably mounted on the body portion, a tubular member leading from the wind-chest into the chamber and terminating in a valve-seat, a flexible diaphragm extending across the metallic chamber and dividing it into two compartments, said diaphragm seating against the valve-seat, an air-passage leading from one compartment of the valve-chamber to the organ-pipe, and a conduit connecting the other compartment of said valve-chamber to a pneumatic.

4. In a device of the class described, a backing-piece having an outwardly-projecting flange, a cap applied to said flange, a diaphragm having its edges confined between the cap and flange, and a tubular member extending through the backing-piece and terminating in a valve-seat.

5. In a device of the class described, a backing-piece having an outwardly-projecting flange, a cap applied to said flange, a diaphragm having its edges confined between the cap and flange, and a tubular member extending through the body and terminating in a valve-seat said backing-piece having a port therethrough leading to the device to be operated.

6. In a device of the class described, a metallic wind-chest, a metallic valve-chamber exterior to the wind-chest, said valve-chamber comprising a body having an annular flange and a cap fitting said flange, a diaphragm extending across the valve-chamber and having its edges confined between the cap and flange, and a tubular member extending through the body and into the valve-chamber, the end of said tubular member constituting a valve-seat, said body having a port therein leading to the device to be operated.

7. In a device of the class described, a metallic wind-chest, a valve-chamber supported thereby on each side thereof, and a valve or diaphragm within said chamber.

8. In a device of the class described, a metallic wind-chest, a plurality of valve-chambers supported thereby on each side thereof, each valve-chamber having an air-supply pas-

sage leading into the wind-chest and a port communicating with the device to be operated, and a valve controlling said air-supply passage.

9. A device of the class described comprising a metallic body, a cap detachably applied thereto, said body and cap constituting a valve-chamber, a retainer engaging the cap and holding it in place, a diaphragm dividing said valve-chamber into two compartments, and an air-supply passage leading into the valve-chamber and terminating in a valve-seat against which the diaphragm seats.

10. In a device of the class described, a valve-chamber comprising a body having a cap detachably applied thereto, a resilient retainer engaging the cap and holding it on the body, a diaphragm extending across the valve-chamber, and an air-supply passage leading into the said valve-chamber and terminating in a valve-seat against which the diaphragm seats.

11. The combination of a wind-chest with a plurality of separate valve-chambers adjacent thereto, each valve-chamber comprising a body portion and a cap detachably carried thereby, a diaphragm extending across each valve-chamber, and an air-supply passage leading from each valve-chamber to the wind-chest, the cap of each valve being separately removable.

12. In a device of the class described, a metallic wind-chest, a plurality of metallic valve-chambers adjacent thereto, each valve-chamber comprising a body having an annular flange and a cap detachably applied to said flange, a diaphragm extending across each valve-chamber, and an air-supply passage extending through each body and into the valve-chamber and communicating with the wind-chest, the cap of each valve being removable without disturbing the cap of any other valve.

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

JACOB BINNIG.

Witnesses:

LOUIS C. SMITH,
RICH'D R. GATES.