

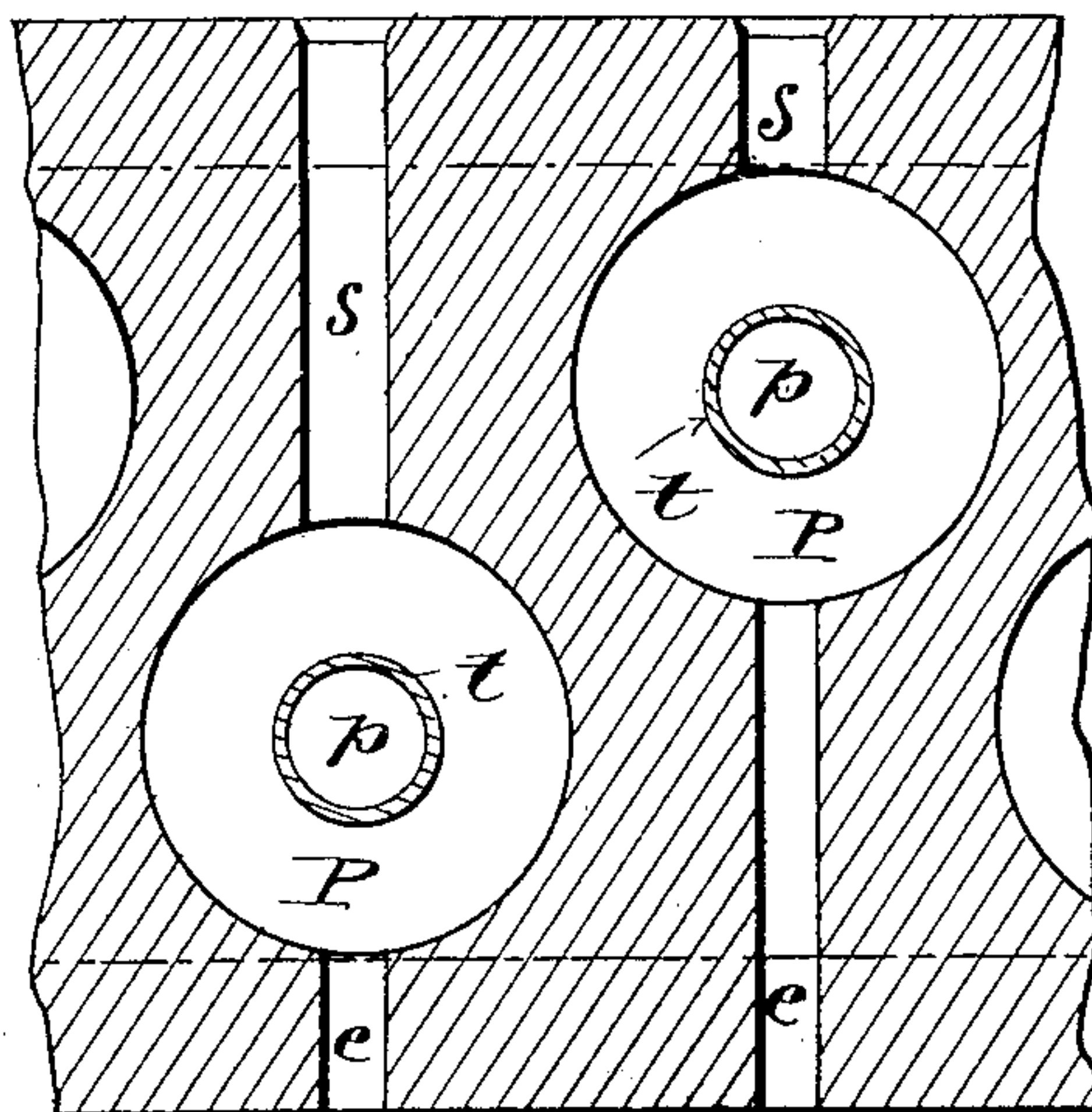
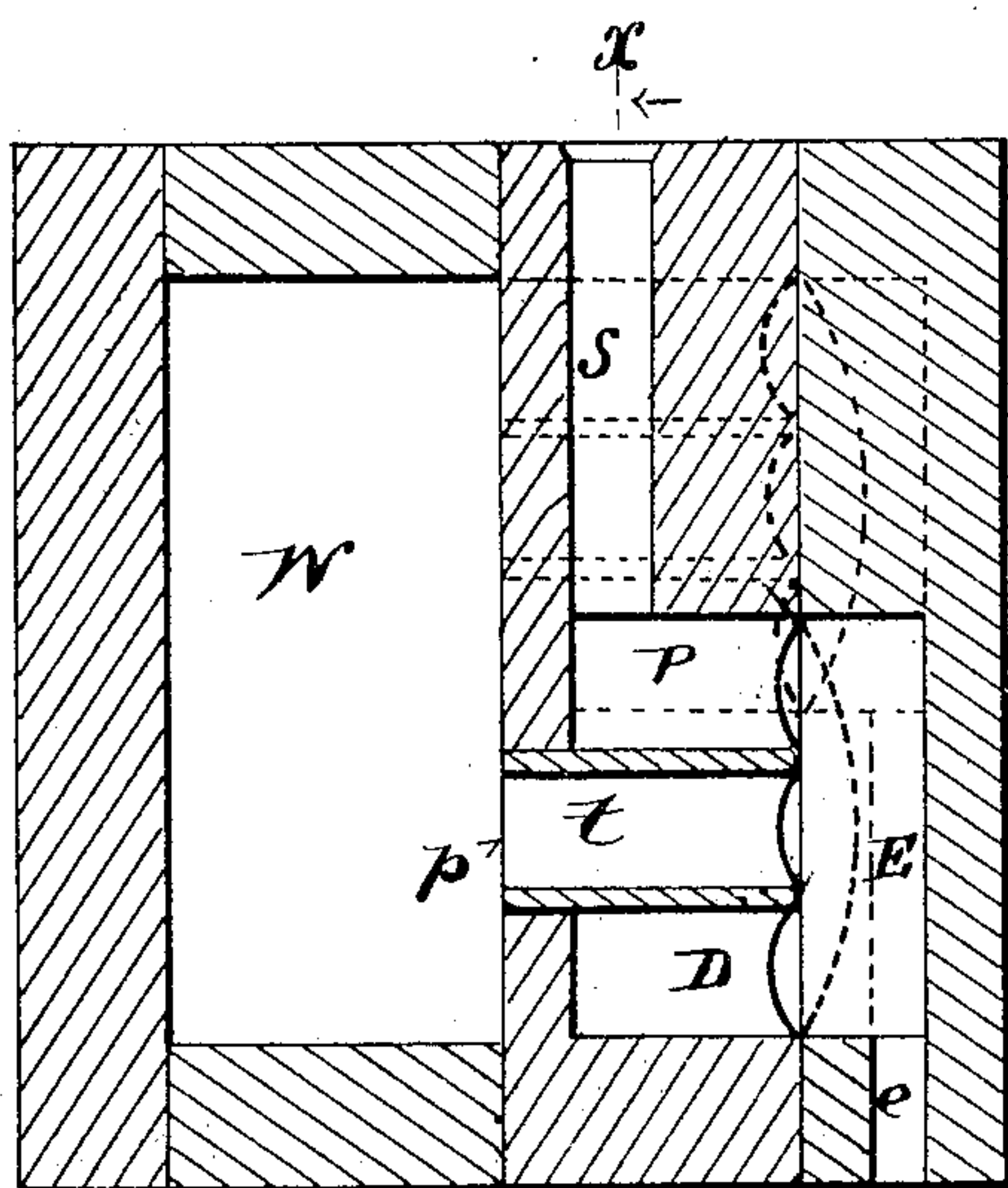
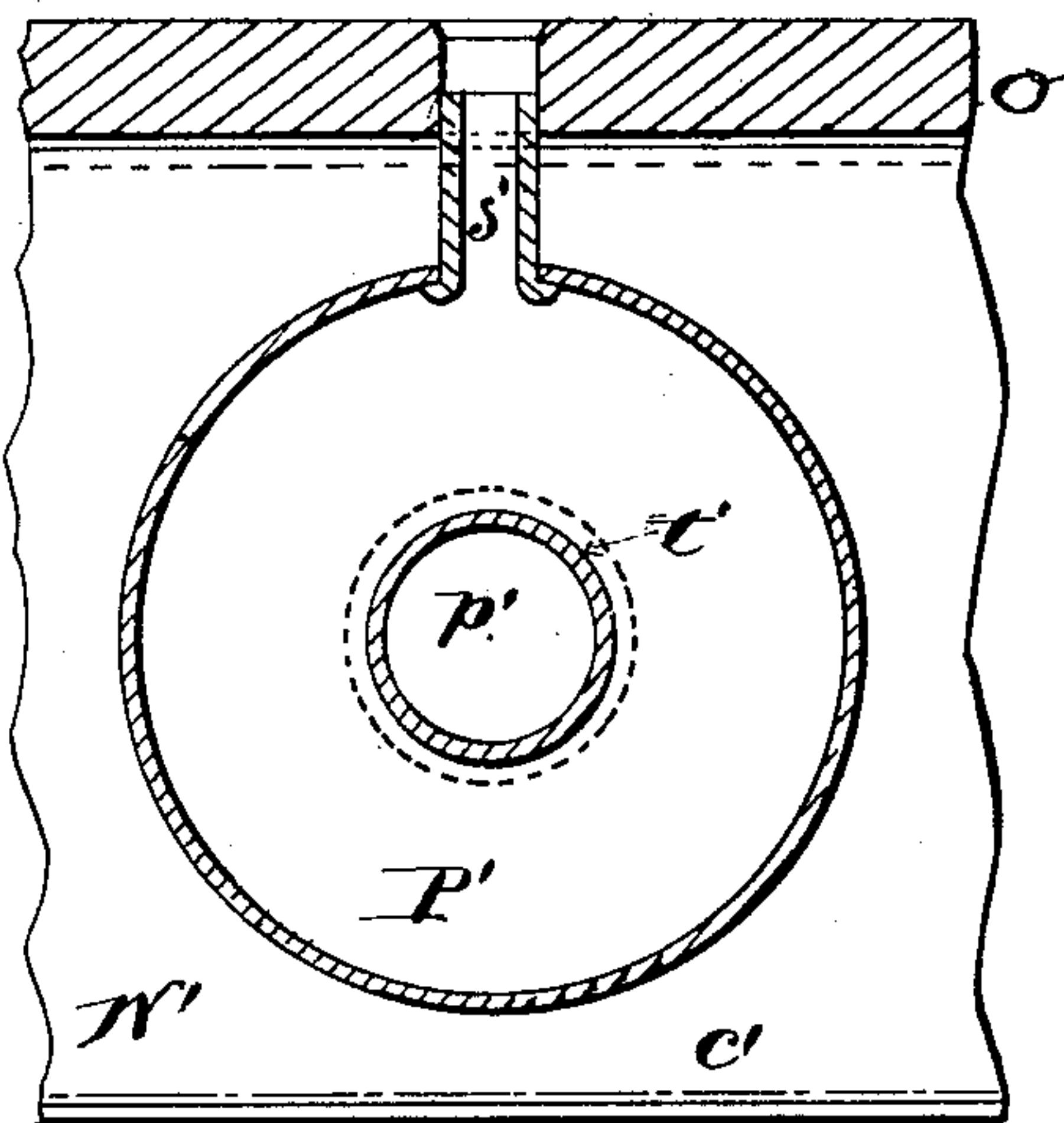
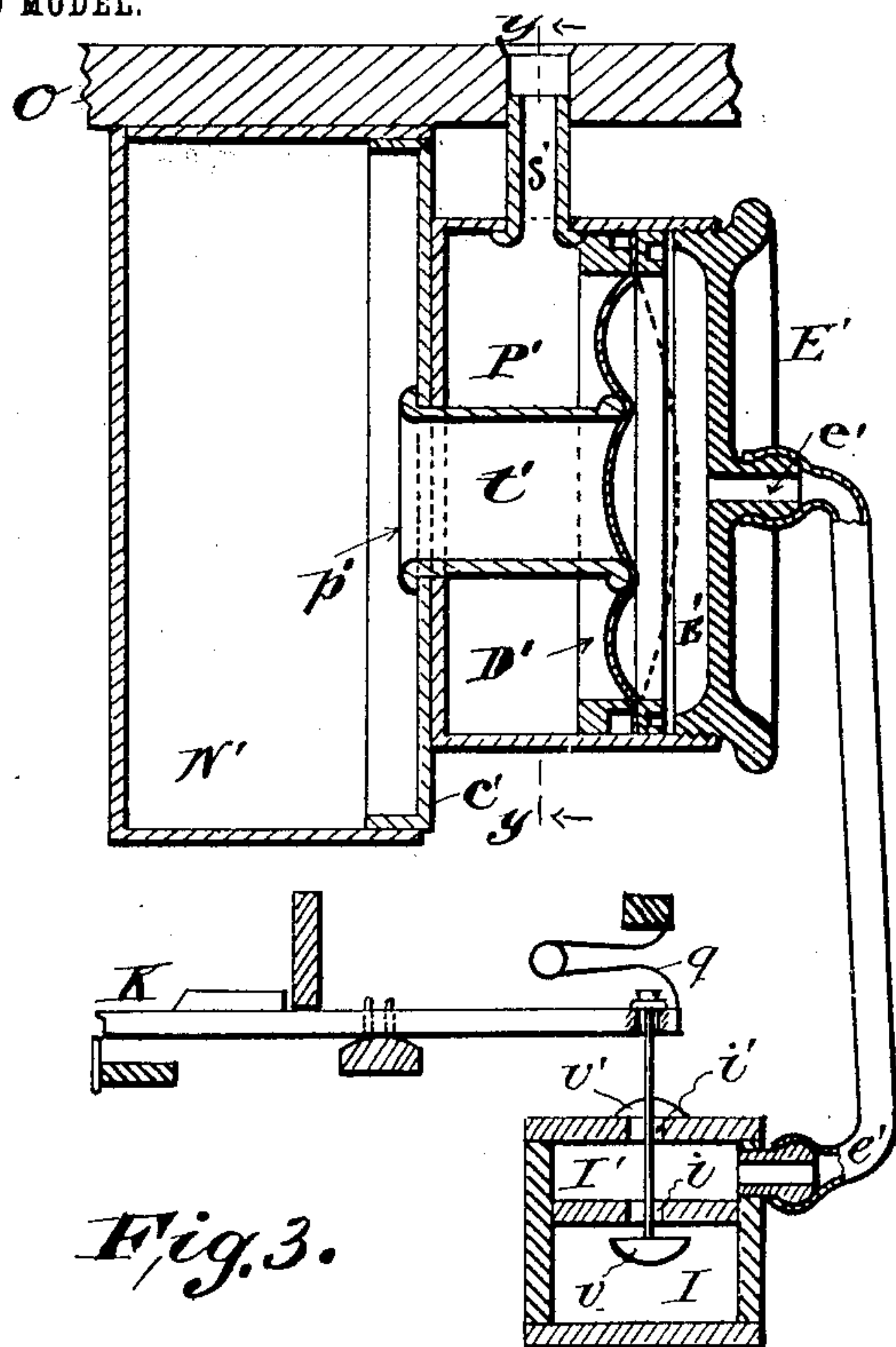
No. 750,919.

PATENTED FEB. 2, 1904.

C. WADSWORTH, JR.
WIND INSTRUMENT.

APPLICATION FILED AUG. 15, 1901.

NO MODEL.



Witnesses:
Ch. Benjamin.
John O. Keefe

Inventor:
 Claudius Hadsworth, Jr.
 by
 A. H. Vermilyea
 his Atty

UNITED STATES PATENT OFFICE.

CLAUDIUS WADSWORTH, JR., OF BROOKLYN, NEW YORK.

WIND INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 750,919, dated February 2, 1904.

Application filed August 15, 1901. Serial No. 72,201. (No model.)

To all whom it may concern:

Be it known that I, CLAUDIUS WADSWORTH, Jr., a citizen of the United States, and a resident of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Wind Instruments, of which the following is a specification, reference being had to the accompanying drawings, forming part of the same, in which—

Figure 1 is a vertical cross-sectional view of one wind-chest of an organ and of the exhaust-chamber and connections exhibiting my invention. Fig. 2 is a sectional view on line *xx*, Fig. 1. Fig. 3 is a vertical cross-sectional view of a modified form of wind-chamber and connections, showing also some of the ordinary connections; and Fig. 4 is a vertical longitudinal view of the exhaust-chamber on line *yy* of Fig. 3, showing also a broken portion of the face of the wind-chest and a section of the overboard O.

My invention relates especially to organs in which the wind whose escape causes the pipes to speak is forced into a chest whose outlet is controlled by a diaphragm-valve forming one side of an exhaust-chamber and held to its seat by air-pressure, upon the diminution of which the pressure of air in the wind-chest will force the diaphragm from its seat and escape to the sound-pipes, the exhaust of the exhaust-chamber being effected by devices such as are shown in Fig. 3 and described hereinafter; and said invention consists in the construction of the diaphragm-valve, the exhaust-chamber, and the connections and their arrangement relative to the wind-chest and each other in such manner that the valve is more easily and surely closed, is more sensitive to the changing pressure of the exhaust-chamber, is more easily constructed and kept in operative condition, and is more durable than in the ordinary systems.

W is the wind-chest, shown in Fig. 1 as an ordinary wooden box glued tightly together. It is filled in any convenient manner, usually through a pipe leading into the end. (Not shown.) Adjacent to the wind-chest I construct a cylindrical chamber divided into two parts by a flexible diaphragm D. This chamber may be readily constructed by boring into

the wood forming the wall of the wind-chest and into a corresponding piece and fitting said pieces together, with the edges of the diaphragm clamped between said pieces, as shown, the joint being preferably some distance from the end walls of the said cylindrical chambers. The parts of the chamber adjacent to the wind-chest I term the "supply-passage" and the part on the opposite side of diaphragm D as the "exhaust-chamber" E. I also prefer to so proportion the wind-chests and the said chambers that by staggering them, as shown in Fig. 2, I may place two exhaust-chambers in a space not greater than the height of the wind-chest; but that is a feature which makes no part of my present invention.

Concentric with the circular wall of that part of the chamber called the "supply-passage" I form a passage *p* through the wall common to the chamber and the wind-chest, and in it I prefer to seat a cylindrical tube *t*, here made of paper glued fast, one end of which constitutes the valve-seat for the diaphragm-valve.

From the exhaust-chamber E an exhaust-passage *e* leads mediate to the outer air, and from the supply-passage P an air-passage *s* leads to a pipe or other sound-producing element of the instrument. The passage *e* connects with a tube like tube *e'*, (shown in Fig. 3,) leading to an exhaust-valve whose operation is controlled by means of a stem connected with a key K or some other controlling device. This tube *e* is also an inlet-tube, and so is its counterpart *e'* in Fig. 3, and the valve which permits the exhaust also governs the inlet. The double chamber I I' (shown in Fig. 3) has a tube (not shown) leading into part I, through which air is forced into that chamber. Then when the valve is as shown the air passes up through passage *i* into chamber I' and thence by passage *e'* to the exhaust pressure-chamber E', since it cannot escape to the outer air because the valve *v'* covers the passage *v'*, leading to the outer air, and is held down by the spring *q*. Now it is manifest that if the wind-chest is filled with air of a given pressure and the exhaust-chamber with air of a greater pressure that the surplus pressure acting upon

diaphragm D will hold the diaphragm against its seat on the inner end of tube t and no air can pass through passages P and s to the pipe, but when the exhaust-valve is opened the air will escape from chamber E, and the pressure therein will be reduced. As soon as it reaches a point below that in the wind-chest the pressure in the latter will force back the diaphragm, the air will escape through passages P and s , and the pipe will speak.

The forms of exhaust-chamber heretofore employed and the forms of diaphragm used in them, as well as the form and arrangement of the passages, have been such that the diaphragm was to a considerable extent insensitive. At times air would leak through, and the instrument would cipher, and at other times it would not act rapidly enough to produce the proper succession of notes in proper time. Again, dust and dirt or other substances from the pipes would fall upon the diaphragm and interfere with its proper seating. Moreover, the former devices were difficult to construct. The cylindrical form of my chamber is one most easily constructed, and it permits the use of a circular diaphragm, which form is the best for uniform and perfect action. The circular valve-seat concentric with the wall of the cylindrical chamber insures the perfect seating of the valve and the absence of leaking, and consequent ciphering, as well as a more sensitive action than can otherwise be attained. The projecting of the tube t into the cylindrical chamber insures that anything falling through passage s will not intervene between the valve and its seat, there being ample space for clearance below the tube and between its end and the wall of the chamber, and the arrangement of the passage s parallel but not in line with the diaphragm prevents the burdening of the diaphragm with anything falling through said passage.

Other advantages of the construction and arrangement shown will readily suggest themselves to any one acquainted with the building and operation of such instruments.

The modification shown in Figs. 3 and 4 is one adapted for using metal in the construction. The wind-chest W' , which, as well as the other parts, is to be supported upon a suitable frame, is shown as a metal box with a cover c' , which may be soldered or otherwise secured in place after the tube t' has been seated. The exhaust-chamber E' and supply-passage are also constructed as a cylindrical metal box secured to a wind-chest and the tube t' as a tin cylinder, one of whose edges is turned down upon the inner face of the wind-chest and the other rolled over, that there may be presented a smooth seat for the diaphragm D'. An inwardly-extending flange is provided and an annular follower, between which the edges of the diaphragm may be secured, and a cap with an exhaust connection

c' is screw-threaded into the barrel of exhaust E' to close it and provide for the permitted exhaustion of the air when desired. The whole presents a complete device conveniently constructed and effective in operation, with the special advantages mentioned in discussing the other figures.

I have said that I construct a cylindrical chamber. The point really aimed at is a circular base for holding the diaphragm that a circular tube may be arranged concentric therewith to get the perfect action that ensues, and as a convenient means of so doing I prefer a cylindrical chamber; but the form of the chamber is not of so much moment if other means than its walls be used for holding the diaphragm, though the given form would still be the most convenient, economical, and durable.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a wind instrument, the combination of a wind-chest, a cylindrical chamber adjacent thereto divided by a flexible diaphragm, a tube leading from one to the other, with a circular mouth, arranged concentric with a wall of the adjacent chamber, an exhaust-chamber, a circular diaphragm closing one side of the exhaust-chamber and having its seat upon the mouth of the tube, an exhaust-passage from the exhaust-chamber on one side of the diaphragm and an air-supply passage from the chamber on the opposite side of said diaphragm, located between the wall of the wind-chest and the plane of the mouth of said tube, and offset from the plane of the latter.

2. In a wind instrument, the combination of a wind-chest, an adjacent chamber divided by a flexible diaphragm, a circular piece holding the edges of said diaphragm, a tube leading from the wind-chest to a point within the adjacent chamber and provided with a circular mouth concentric with the circular diaphragm-holding piece, an air-supply passage on the same side of the diaphragm as the tube's mouth, but offset from the plane of the latter and an exhaust-passage leading from the chamber on the opposite side of said diaphragm.

3. In a wind instrument, the combination of a wind-chest, an adjacent chamber divided by a flexible diaphragm, a tube leading from the wind-chest to a point within the adjacent chamber and provided with a circular mouth concentric with the circular diaphragm-holding piece, an air-supply passage from the chamber on the same side of the diaphragm as the tube's mouth, extending parallel with the diaphragm but offset from the plane of the tube's mouth, and an exhaust-passage leading from the chamber on the opposite side of said diaphragm.

4. In a wind instrument the combination of a metal wind-chest, having a cover, an adjacent metal chamber divided by a diaphragm

secured therein by a circular clamp, a metal tube leading through the wall of the wind-chest and provided with a circular mouth opening within the adjacent chamber concentric with the diaphragm-clamp and at a point within the limit of movement of the diaphragm, an air-supply passage leading from said chamber on the same side as the tube-mouth and an exhaust-passage leading from the chamber on the opposite side of said diaphragm.

5. In a wind instrument the combination of a metal wind-chest having a cover, an adjacent metal chamber divided by a diaphragm, an inwardly-extending flange within said chamber, an annular follower clamping said diaphragm in position, a metal tube leading

through the wall of the wind-chest and provided with a circular mouth opening within the adjacent chamber, concentric with the diaphragm-clamp and at a point within the limit of movement of the diaphragm, an air-supply passage leading from said chamber on the same side as the tube-mouth, a screw-threaded cap closing the exhaust-chamber and provided with an exhaust-passage, all substantially as set forth.

Signed at New York, in the county of New York and State of New York, this 17th day of July, A. D. 1901.

CLAUDIUS WADSWORTH, JR.

Witnesses:

A. G. N. VERMILYA,
LOUIS N. ROWLEY.