

(No Model.)

A. HICKMANN.  
PNEUMATIC ACTION FOR ORGANS.

No. 442,253.

Patented Dec. 9, 1890.

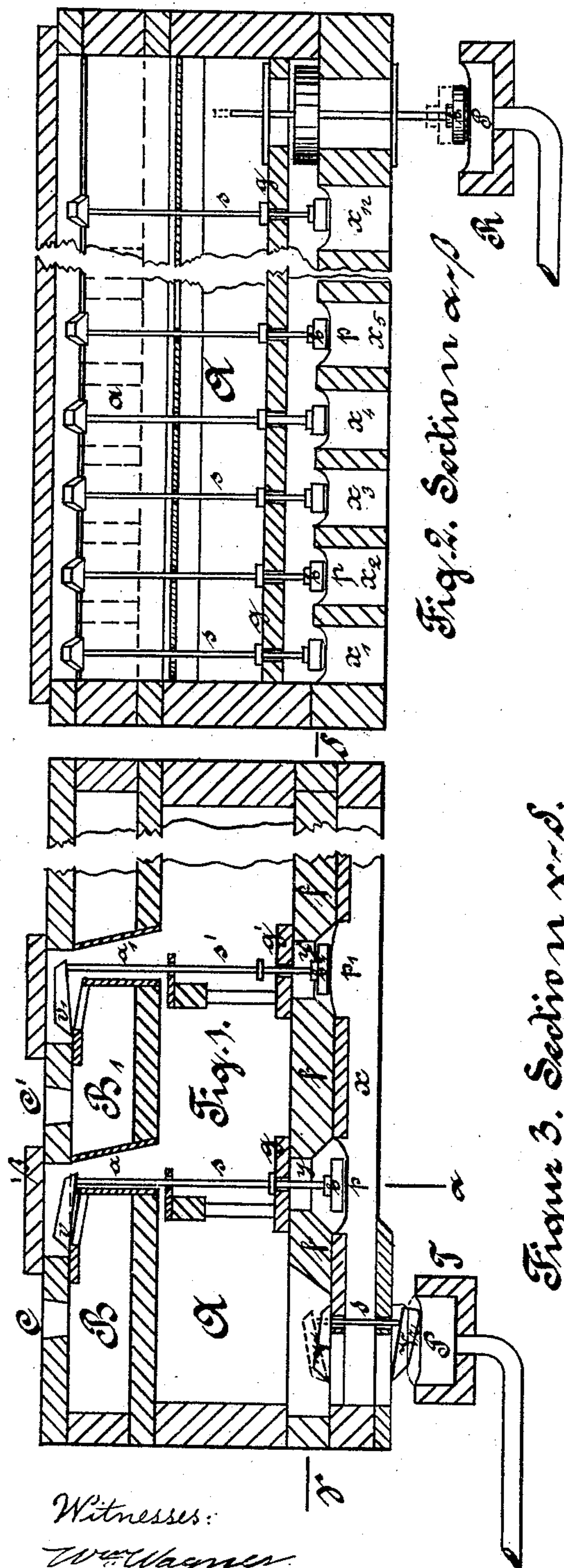


Fig. 2. Section  $\alpha-\beta$

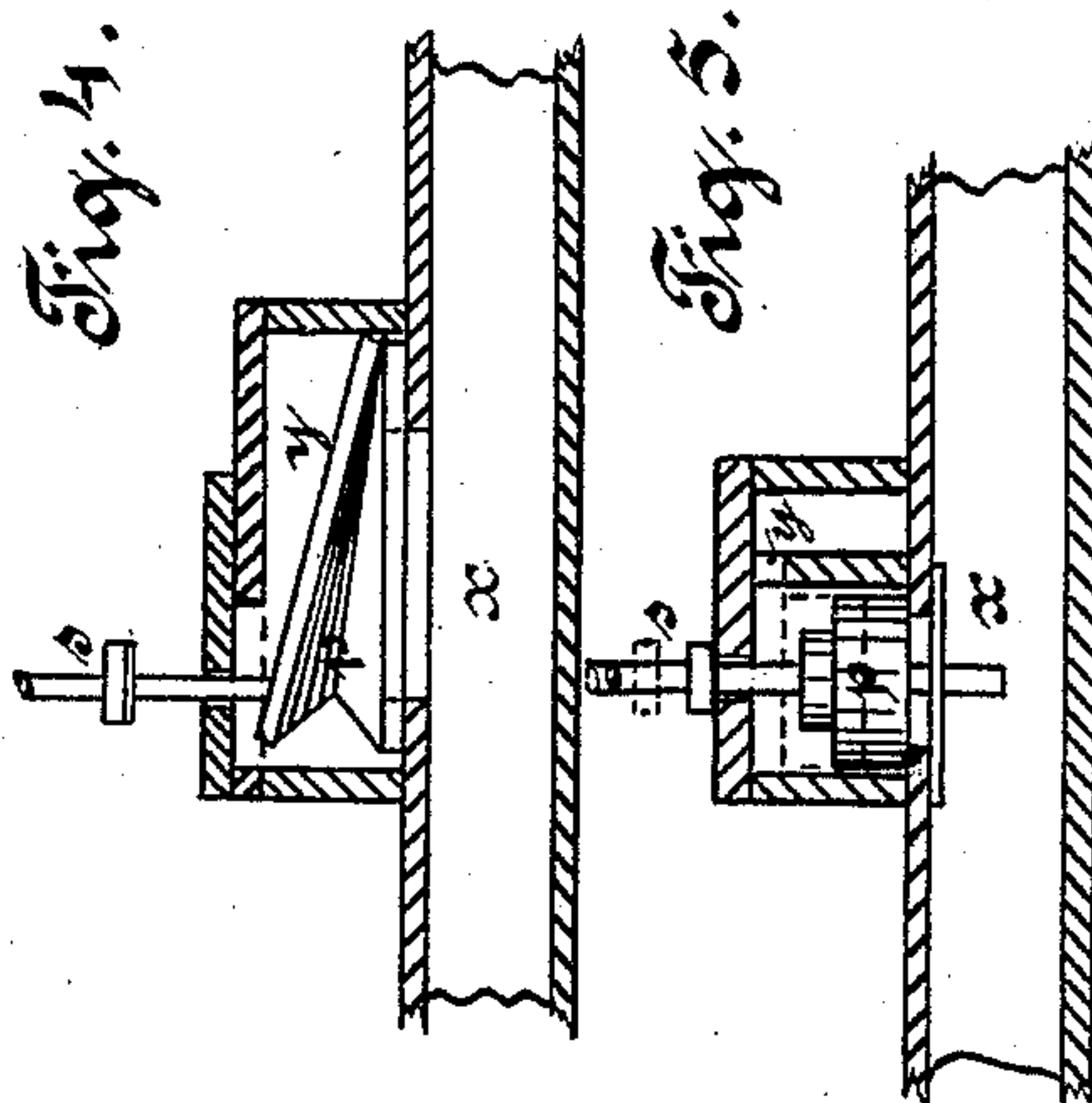


Fig. 4.

Fig. 5.

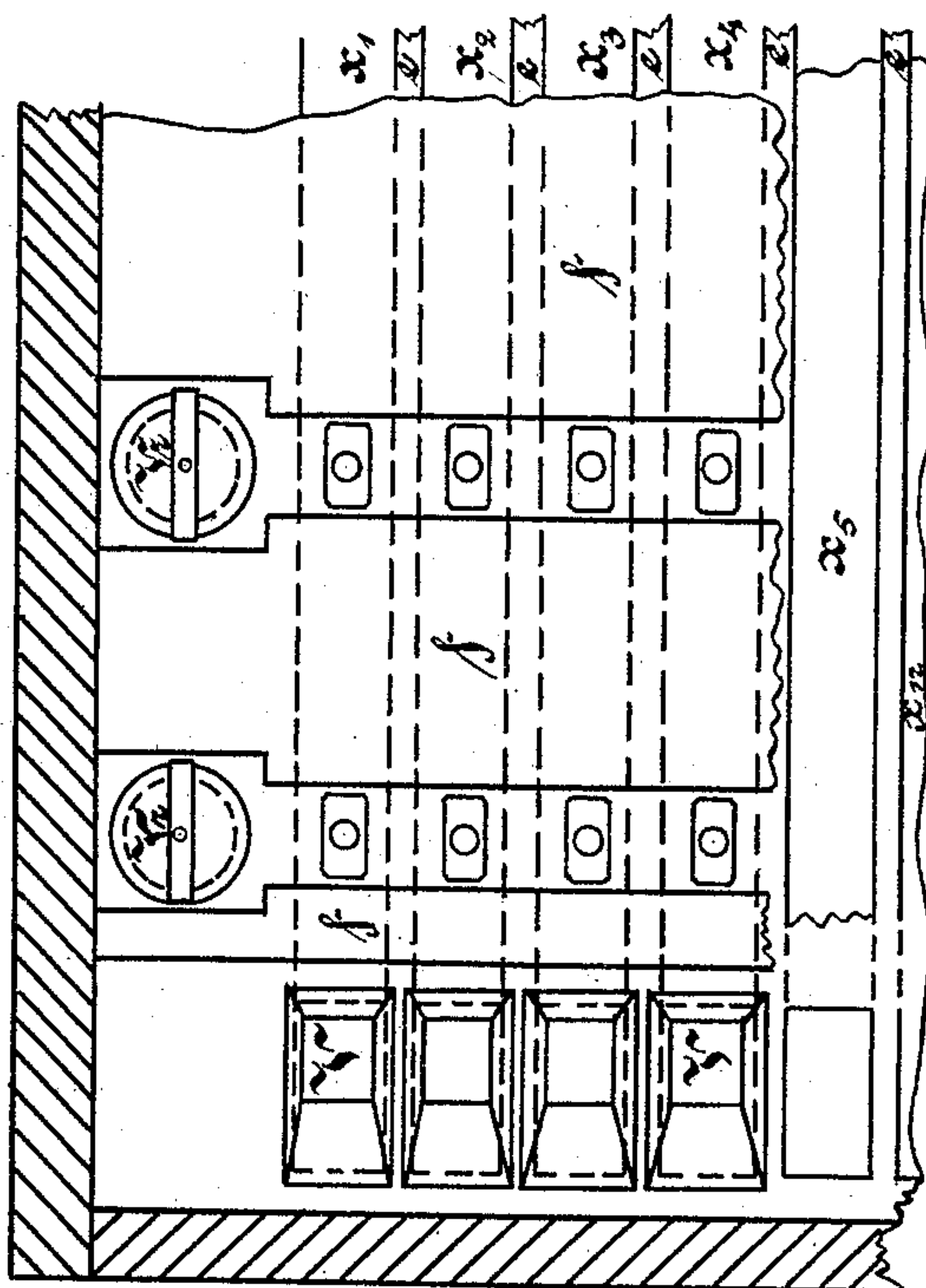


Figure 3. Section x-s.

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# UNITED STATES PATENT OFFICE.

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## PNEUMATIC ACTION FOR ORGANS.

SPECIFICATION forming part of Letters Patent No. 442,253, dated December 9, 1890.

Application filed October 12, 1889. Serial No. 326,859. (No model.)

*To all whom it may concern:*

Be it known that I, ALBIN HICKMANN, a subject of the Emperor of Germany, and a resident of Dachwig, near Erfurt, Germany, have  
5 invented new and useful Improvements in and relating to Organs and other Wind-Instruments, of which the following is a specification, reference being had to the accompanying drawings.

10 This invention relates to wind-chests of organs and other musical instruments played through the agency of compressed air, and it comprises improved means for actuating the valves or other closing or controlling devices  
15 of the said wind-chests.

The improved wind-chest constructed according to the said invention as compared with the arrangements which have heretofore been employed presents the following features—that is to say:

For operating the several pipes or groups of pipes as well as the registers, only air of the same pressure as the air for sounding the pipes is used. The effective work always  
25 takes place in the atmospheric air, and cells are provided for the registers as well as for the key, the said cells crossing each other at any desired angle and being separated at their crossing-points by diaphragms, bellows,  
30 or the like.

In the accompanying drawings, Figure 1 is a longitudinal section of the improved wind-chest; Fig. 2, a cross-section of the same on the line  $\alpha\beta$ , and Fig. 3 a plan on the line  $\gamma\delta$ . Figs. 4 and 5 are modifications.

35 A is the inner chamber of the chest, into which the air passes from the bellows. The air is admitted through passages  $a a_1 a_2$  to valves  $v v_1 v_2$  of suitable construction, and  
40 enters the chambers  $B B_1 B_2$ , which are covered by the boards  $C C_1 C_2$  for the pipes. The bottom of the wind-chest consists of cross-bars  $f$ , which have between them spaces  $y$ , covered by plates  $g g' g^2$ . Below the cross-  
45 bar  $f'$  and crossing them are arranged the bars  $e$ , so as to form channels  $x x_1 x_2 x_n$ , which extend across  $y y_1 y_2$ . These channels  $x$  are closed below by a bottom of wood, paper, or the like. Of the crossed channels  $x$  and  $y$   
50 provided in this manner, the former, according to the drawings, constitute the sounding-cells and the latter the register-cells, and they

are separated from each other at the crossing-points by diaphragms  $p p'$ , upon which bear small buffers or pistons  $b b_1 b_2$ , provided with  
55 rods  $s s_1 s_2$ , which act upon the valves  $v v_1 v_2$ .

In most cases the aforesaid cells  $x$  and  $y$  cross each other at a right angle, but they may be arranged radially or at any suitable angle. Moreover, in some cases parts of the  
60 same cell may extend in different directions. If now the register-cell  $y$  is put in communication with the atmospheric air and the sounding-cell  $x$  is filled with air from the interior of the wind-chest, the above-mentioned  
65 diaphragm will be forced into the cell  $y$ , thereby raising the buffer  $b$ , the rod  $s$ , and, by means of the latter, the valve  $v$ , so that the corresponding pipe will be sounded. If, however, air is allowed to pass from the wind-  
70 chest to the cell  $y$ , the air of the same pressure in the cell  $x$  cannot raise the diaphragm and the said valve. In this case the pipe does not sound if the key is pressed down. Accordingly all the registers whose cells are  
75 in communication with the atmospheric air will sound, while all those whose cells are filled with air from the wind-chest will not sound even if the air is admitted to the cell  $x$ . The alternate communication of the cells  $x$   
80 and  $y$  with the atmospheric air and with the interior of the chest can be effected in various manners.

In the arrangement illustrated in Fig. 1 two valves  $V$  and  $V^1$  are provided for the sound-  
85 ing-cells, which are rendered dependent on one another through the medium of rods  $d$ , the valve  $V^1$  closing the cell against the wind-chest and  $V$  closing the same against the atmospheric air.  $V_1$  is raised by the diaphragm  
90  $P$  of a pneumatic tube or device  $T$ , but in lieu thereof can be set in motion by mechanical or electrical means.

In Fig. 2 use is made, for the register-cell, of a controlling device comprising a valve  
95 which is actuated by the buffer  $b$  and the diaphragm  $P$ , and is adapted to play between the bottom plate  $c$  and the plate  $g$ , so that, according as it bears against  $c$  or  $g$ , it will put the cell  $y$  in communication with the wind-  
100 chest or with the atmospheric air.

It is evident that use may be made, instead of the above-described two devices, of any other controlling device which is known in



organ-building and by which the same object can be attained.

In lieu of the simple diaphragm *p*, any other suitable device can be employed without departing from the nature of the invention, as long as the arrangement of the crossed cells *x* and *y* is retained. In Fig. 4, for example, the cell *y* is shown enlarged, so that small bellows are acting in the same manner as the simple diaphragms.

Fig. 5 represents the arrangement of a piston which may be employed in lieu of the aforesaid bellows.

Without making any change in the arrangement of the cells, the action of the latter can be reversed by simply putting the cells *y* under the action of the key and the cells *x* under the action of the registers, inasmuch as a pressure upon the key causes the escape of the air from the cell *y*, so that the buffer or

piston *b* rises and opens the corresponding valve *v*, if the corresponding register has been drawn—that is to say, if the cell *x* has been put in communication with the interior of the wind-chest.

What I claim is—

The combination of lower chamber A with upper chamber B, passages *a a'* and valves *v v'* between said chambers, and with crossing cells *x y*, diaphragms *p* between said cells, pistons *b b'*, bearing thereon and having rods *s s'*, that operate valves *v v'*, substantially as specified.

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

ALBIN HICKMANN.

Witnesses:

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