

J. P. HULDER.
MUSICAL INSTRUMENT.
APPLICATION FILED MAR. 20, 1909.

963,151.

Patented July 5, 1910.

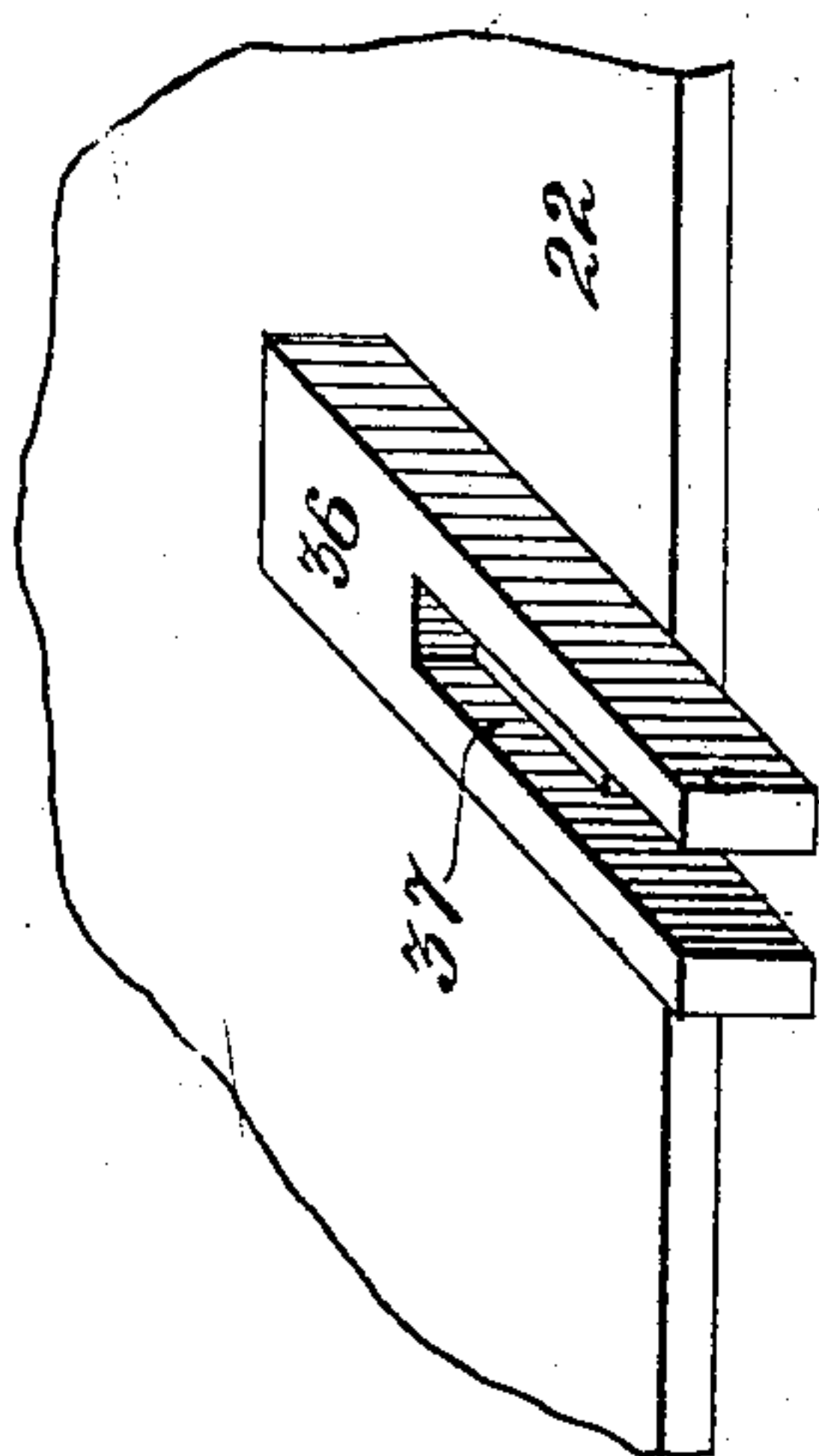


Fig. 3.

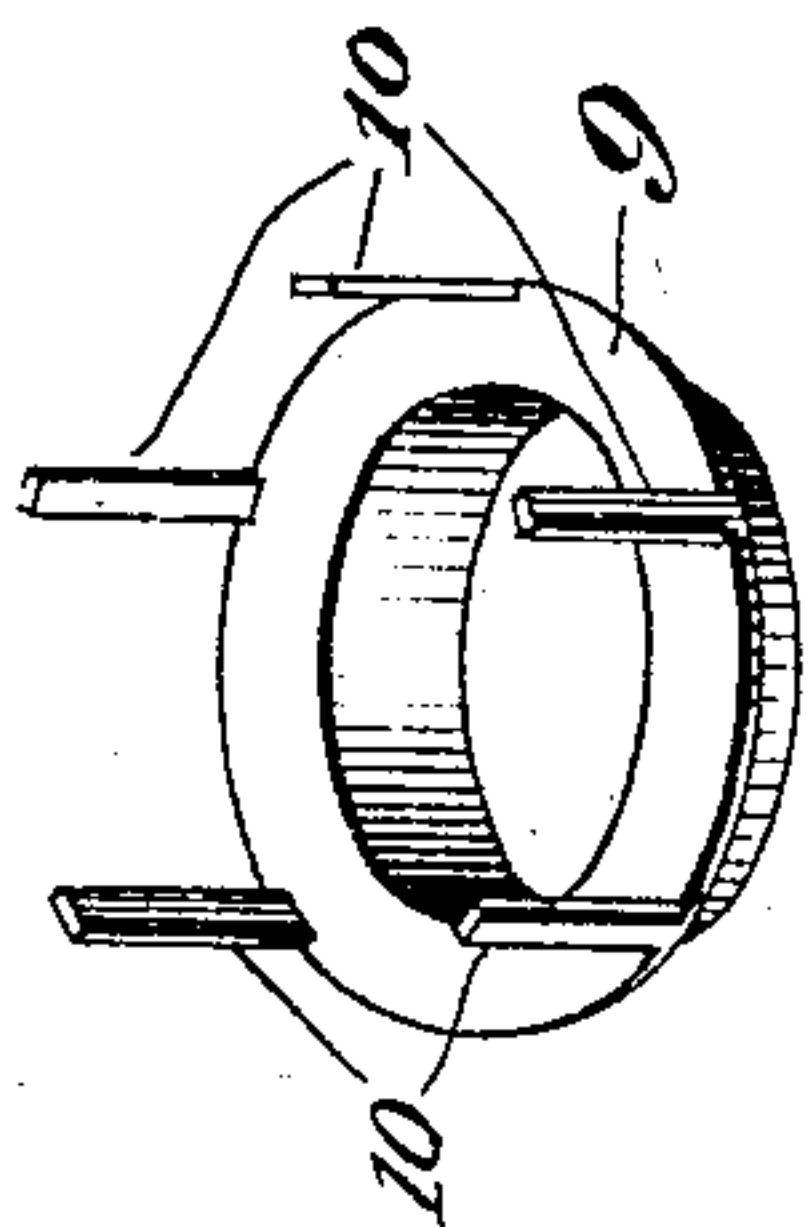


Fig. 2.

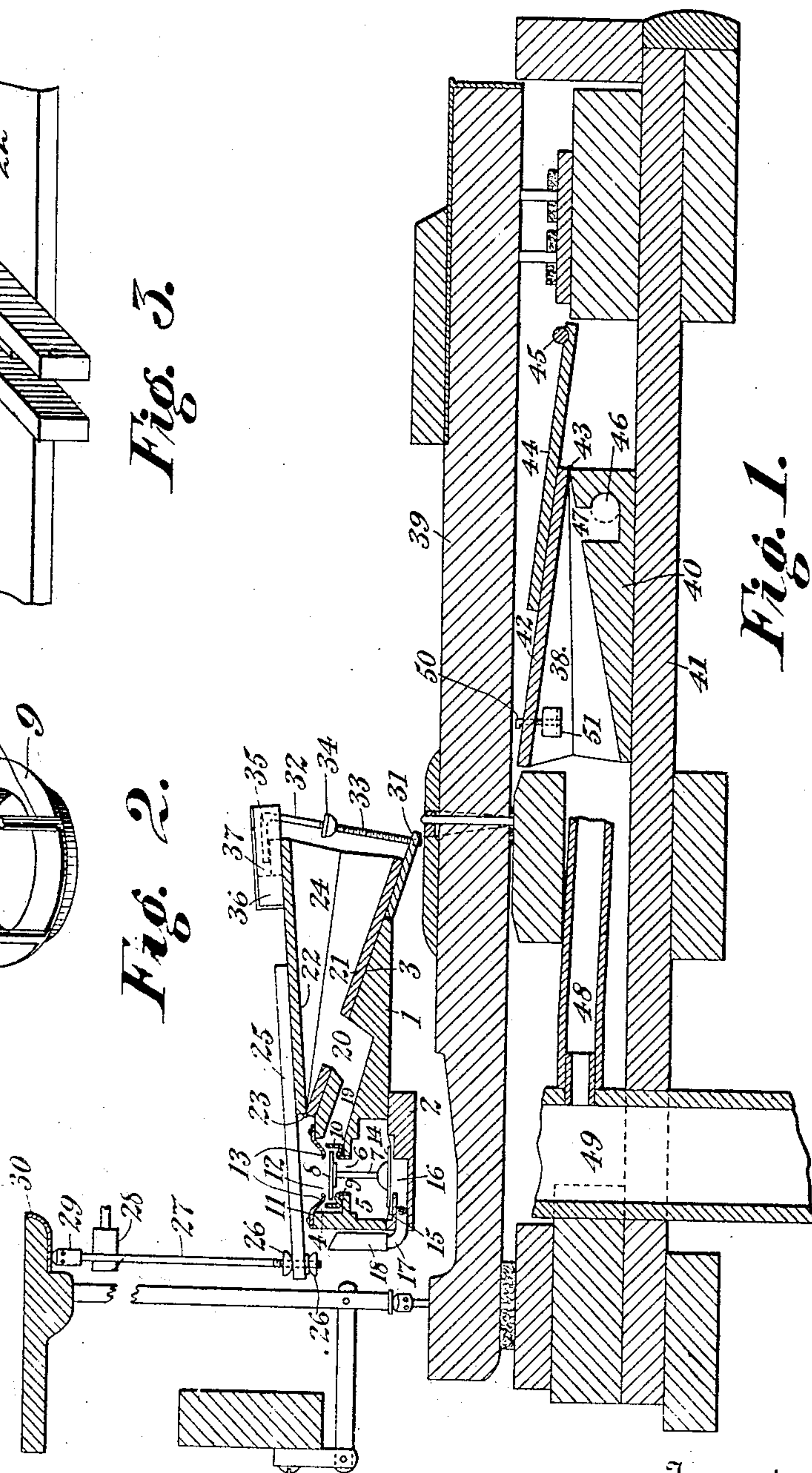


Fig. 1.

Witnesses:
Alfred L. M. Orellana
Gertrude K. Orellana

Inventor
Joseph P. Hulder
By his Attorney
Hester & Dillenhofer

UNITED STATES PATENT OFFICE.

JOSEPH P. HULDER, OF NEW YORK, N. Y., ASSIGNOR TO LUDWIG & COMPANY, A CORPORATION OF NEW YORK.

MUSICAL INSTRUMENT.

963,151.

Specification of Letters Patent.

Patented July 5, 1910.

Application filed March 20, 1909. Serial No. 484,628.

To all whom it may concern:

Be it known that I, JOSEPH P. HULDER, a citizen of the United States, and a resident of New York, county of New York, and State of New York, have invented certain new and useful Improvements in Musical Instruments, of which the following is a full, clear, and exact specification.

My invention relates to improvements in manual and mechanically operated pianos and has reference particularly to that type of instrument having a pneumatic player mechanism.

The objects of my invention are to simplify the construction of the pneumatic action of player pianos, to construct such action with few packing parts, and to provide means for obtaining a simple and efficient adjustment and regulation of its striking pneumatics.

I attain the objects specified, as well as others which I have not enumerated, by means of the construction and arrangement of parts hereinafter described, and shown in the accompanying drawings in which—

Figure 1 is an elevation in section through one of the manual keys to show my pneumatic action co-acting with the piano action, and also one of the sustaining pneumatics. Fig. 2 is a detail view in perspective of the valve seat; and Fig. 3 is a detail view in perspective of the guide block.

One or more wind chests—preferably three—arranged in approximately horizontal tiers are placed in the instrument. I construct these wind chests preferably in two parts, namely: a valve board part (1), and a pouch board part (2) fastened to the base of the valve board in any suitable manner. In using the term "board" to designate these parts, I do not necessarily limit myself to parts made of wood, as any other suitable material may be used in their construction.

The valve board (1) is formed with an extended portion which projects toward the front of the instrument and has its upper surface (3) beveled or inclined. A series of valve chambers (4)—one of which is shown in the drawing—is suitably formed in the upper surface of the valve board adjacent to its beveled extension.

In the base of the valve board, and extending continuously below all of the valve chambers, is an exhaust chamber (5) which

communicates with each of said valve chambers respectively through an opening (6) formed in the part of the valve board between the valve chambers and the exhaust chamber.

The exhaust chamber is suitably connected with means for exhausting the air therefrom, such as is ordinarily used in instruments of this class, but not shown in the accompanying drawings.

A puppet valve adapted to control the passage of air from and to the striking pneumatic is seated in each of the valve chambers. This valve comprises the valve stem (7) provided at its upper end with a disk-shaped valve head (8) which is seated normally on an annular valve seat (9).

The valve seat is constructed with a plurality of vertical fingers or projections (10) spaced apart around the outer edge and adapted to guide the head of the valve when it is raised from its seat.

To the upper surface of the valve board, above the valve chambers, is suitably fastened a plate (11) having a circular opening (12), the edge of the plate surrounding the said opening being formed in a depressed lip (13) located directly above the valve head and arranged to act as a valve seat for the upper surface of said valve head when the valve is raised from its seat (9) to a position against said lip.

The foot of the valve stem is provided with a disk-shaped follower (14), to the outer edge of which is fastened a flexible diaphragm (15) separating the exhaust chamber from an air chamber (16) formed in the pouch board. Each of these chambers communicates through a bent pipe (17) and a suitable tube (18) with a primary pneumatic, of the type ordinarily used, but not shown in the accompanying drawings.

A series of air passages or channels (19) are formed in the extension of the valve board, with their axes approximately parallel to the inclined surface thereof, and each having its upper or rear end entering one of the valve chambers (4), and its lower or forward end communicating with the interior of one of the striking pneumatics through a port (20) and an aperture formed in the stationary wall (21).

In the normal position of the player mechanism the striking pneumatic is in direct communication with the outer air through

the channel (19) and the opening at the top of the valve chamber. In this position the puppet valve will be seated on (9) and the chamber (16) will be in connection through the tube (18) with the air tension normally maintained in the primary pneumatic.

Whenever a perforation in the music roll opens the corresponding vent in the tracker board, air will be drawn into the primary pneumatic causing its valve to operate so as to admit air into the chamber (16) of the secondary pneumatic. The combined action of the air tension in chamber (5) and the air pressure in chamber (16) on the pouch of the secondary pneumatic will raise the secondary valve (8) from its seat (9) to its seat (13) and thereby shut off the outer air communication of the striking pneumatic and establish a passage between it and the exhaust chamber so that the contained air may be exhausted.

On the beveled surface of the valve board is mounted a series of striking pneumatics, one of which is shown in the drawing, having their open ends facing to the front of the instrument. The stationary wall (21) of each of said pneumatics is fastened to the inclined surface of the valve board. The movable wall (22) is suitably fastened to the rear end of the stationary wall by means of a hinge (23). A flexible covering or bellows (24) unites the two walls and completes the construction of the striking pneumatic.

The movable wall carries a lever arm (25) which extends rearwardly beyond the hinge and is suitably connected at its free end by means of adjustable stops (26) to the lower end of a pitman (27) which is arranged to move vertically in a guide rail (28).

The upper end of the pitman is provided with a capstan head (29) on which rests the wippen (30) of one of the tone producing actions. As there is no positive connection between the pitman and the wippen the mechanical operation of the instrument is entirely independent of its manual operation.

To control the expansion of the striking pneumatic, as well as to secure an accurate alinement of its walls, I provide the stationary wall with a lug (31) which projects beyond the opening end of the striking pneumatic. Regulating screws (32)—one for each of the striking pneumatics—are adjustably fastened at their threaded ends (33) to the lug. These regulating screws carry stops or buttons (34) which are adapted to be adjusted so as to arrest the downward motion of the movable wall at any required point. The heads (35) of said screws are bent at approximately right angles to their shanks so as to cooperate with the guide block (36) as a stop to arrest the upward motion of the movable wall at any predetermined point.

To the movable wall of each of the pneumatics is securely fastened a guide block (36) having a slotted portion (37) which extends beyond the regulating screw. The slot is made sufficiently wide to permit the guide block to move or slide upon the regulating screw so as to keep the movable wall in alinement with the stationary wall. The regulation afforded by means of this screw and button permits the striking pneumatic, as well as the lever arm actuated and carried by it, to be accurately adjusted to the requirements of the piano action, while the movement of the guide blocks upon the fixed screws causes the parts to move in exact alinement.

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

1. In a pneumatic action for musical instruments, the combination with a striking pneumatic, of a puppet valve board having a beveled extended part; a valve chamber; and a channel formed in the extended part in a direction parallel to its beveled top, communicating at one end with the valve chamber and at its opposite end with the striking pneumatic.

2. In a pneumatic action for musical instruments, a puppet valve board comprising a beveled extended part provided with a port in its beveled surface and a channel formed in said extended part approximately parallel to its beveled surface communicating with said port.

3. In a pneumatic action for musical instruments, a wind chest comprising a puppet valve board having a beveled extended part provided with a series of ports in its beveled surface; an exhaust chamber; a series of valve chambers communicating with the exhaust chamber; and a series of channels formed in the extended part, in a direction approximately parallel to its beveled top, each communicating at one end with a valve chamber and at its opposite end with one of said ports.

4. In a pneumatic action for musical instruments, the combination with a series of striking pneumatics, of a wind chest comprising a puppet valve board having a beveled extended part upon which are mounted the striking pneumatics; an exhaust chamber; a series of valve chambers communicating with the exhaust chamber; and a series of channels formed in the extended part approximately parallel to its beveled surface, each communicating at one end with a valve chamber and at its opposite end with a striking pneumatic.

5. In a pneumatic action for musical instruments, the combination with a tone producing action, of a wind chest comprising a puppet valve board having a beveled extended part; a channel formed in said extended part, diagonally to its base in a di-

rection approximately parallel to its beveled top; a striking pneumatic with its stationary wall fastened to the beveled surface of said extended part; an aperture formed
 5 through the stationary wall and opening into said channel; a hinged movable wall; a lever arm fastened to the movable wall and extending rearwardly beyond the hinge and engaging the lower end of a pitman; a pit-
 10 man having its upper end engaging the wippen of a tone producing action; and means for adjusting the engagement of the lever arm with the pitman.

6. In a pneumatic action for musical in-
 15 struments, a striking pneumatic comprising movable and immovable walls; a lug secured to one wall; a regulating screw adjustable in said lug; a stop movably mounted on said screw; a guide block fastened to the other
 20 wall and provided with a slotted portion extending beyond the regulating screw and adapted to accommodate it in said slot.

7. In a pneumatic action of a musical in-
 25 strument, a device for regulating and alining the movable and immovable walls of a

striking pneumatic, comprising a striking pneumatic; a stationary lug fastened to the immovable wall; a regulating screw adjustable in the lug; a stop adjustable on said
 30 screw adapted to arrest the downward motion of the movable wall; and a slotted guide block carried on the movable wall, slidable on the regulating screw and adapted to receive the head thereof so as to arrest
 35 the upward motion of the movable wall.

8. In a pneumatic action for musical instruments, a striking pneumatic having a movable and an immovable wall; means for regulating the pneumatic comprising an ad-
 40 justable member adapted to limit the expansion of the pneumatic, and a stop, movable on said member, to limit the contraction; and means for alining the movement
 45 of the walls with respect to each other, comprising a guide slidable on said adjustable member.

JOSEPH P. HULDER.

Witnesses:

LAURA H. MACDOWELL,
 MICHAEL J. OWENS.