

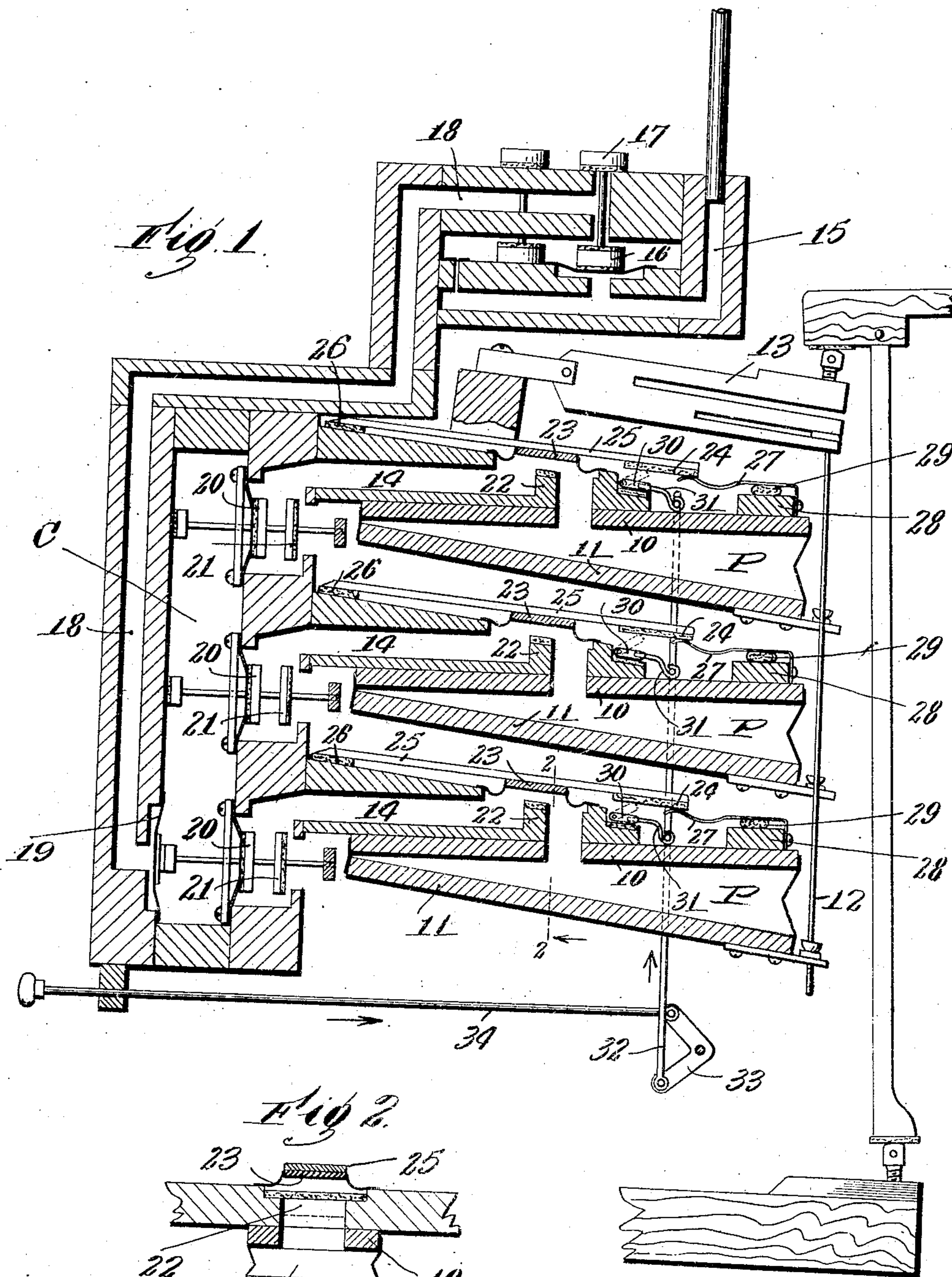
No. 889,445.

PATENTED JUNE 2, 1908.

T. DANQUARD.
PNEUMATIC ACTION FOR MUSICAL INSTRUMENTS.

APPLICATION FILED NOV. 29, 1905.

2 SHEETS—SHEET 1.



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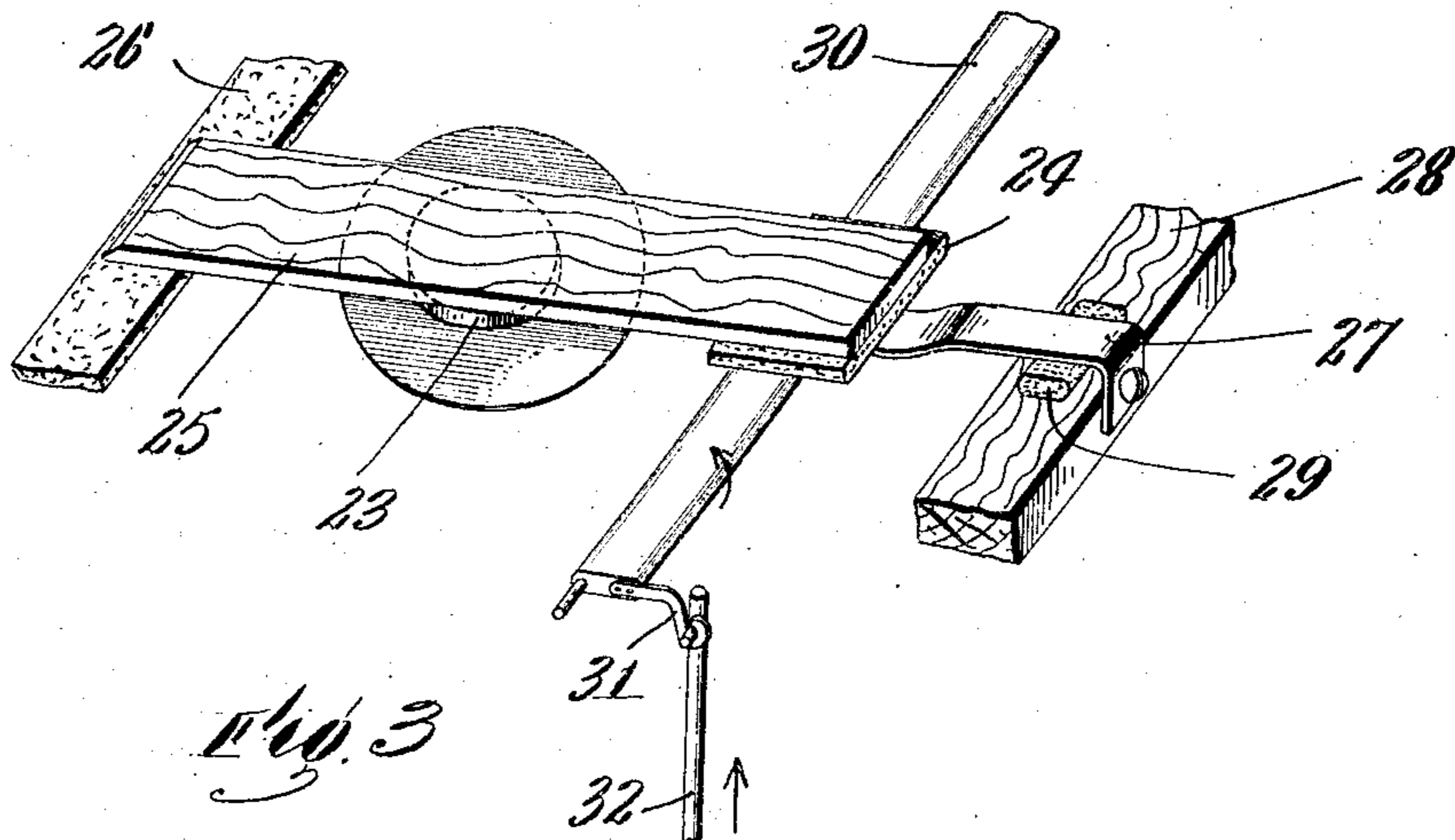


Fig. 3

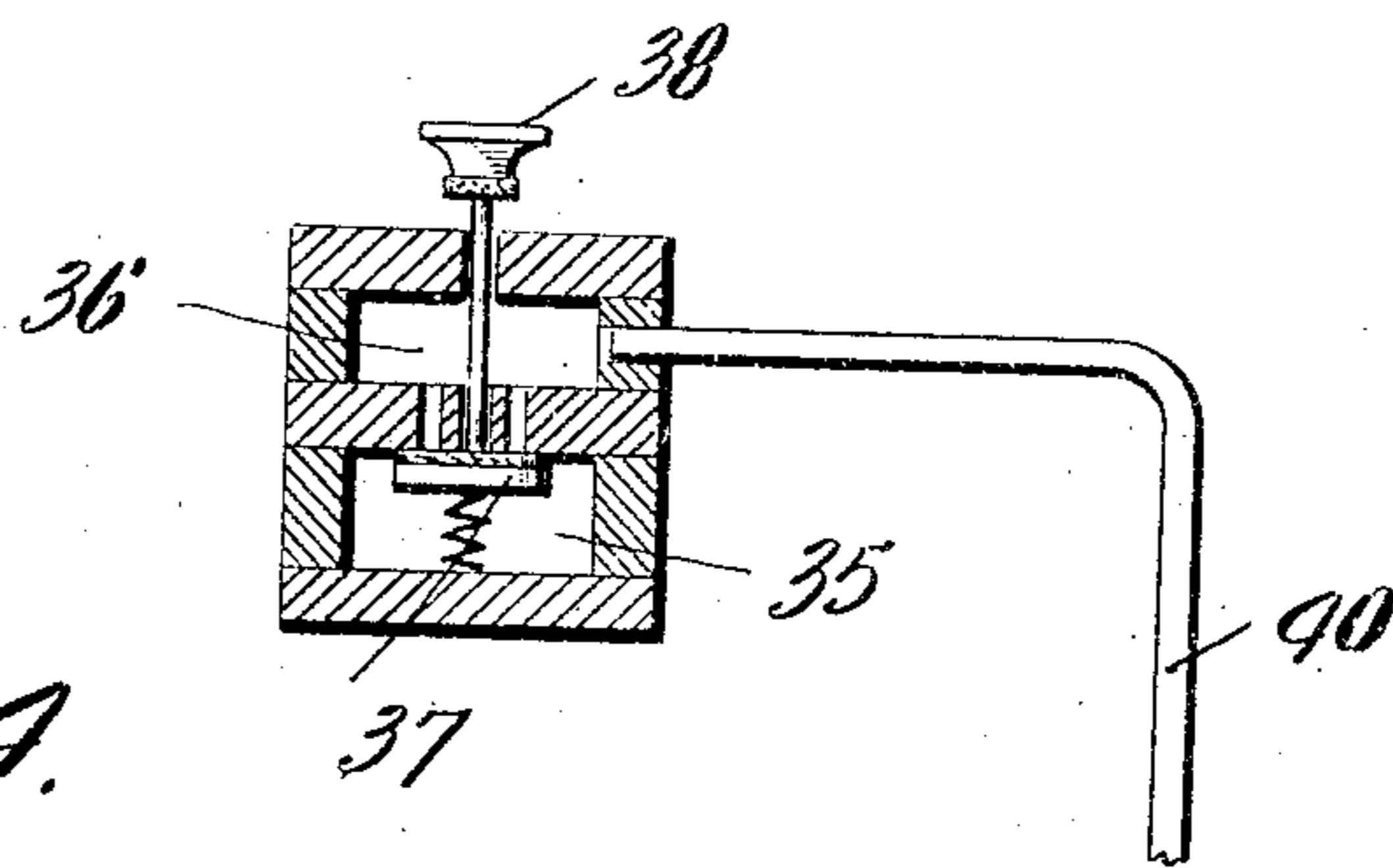
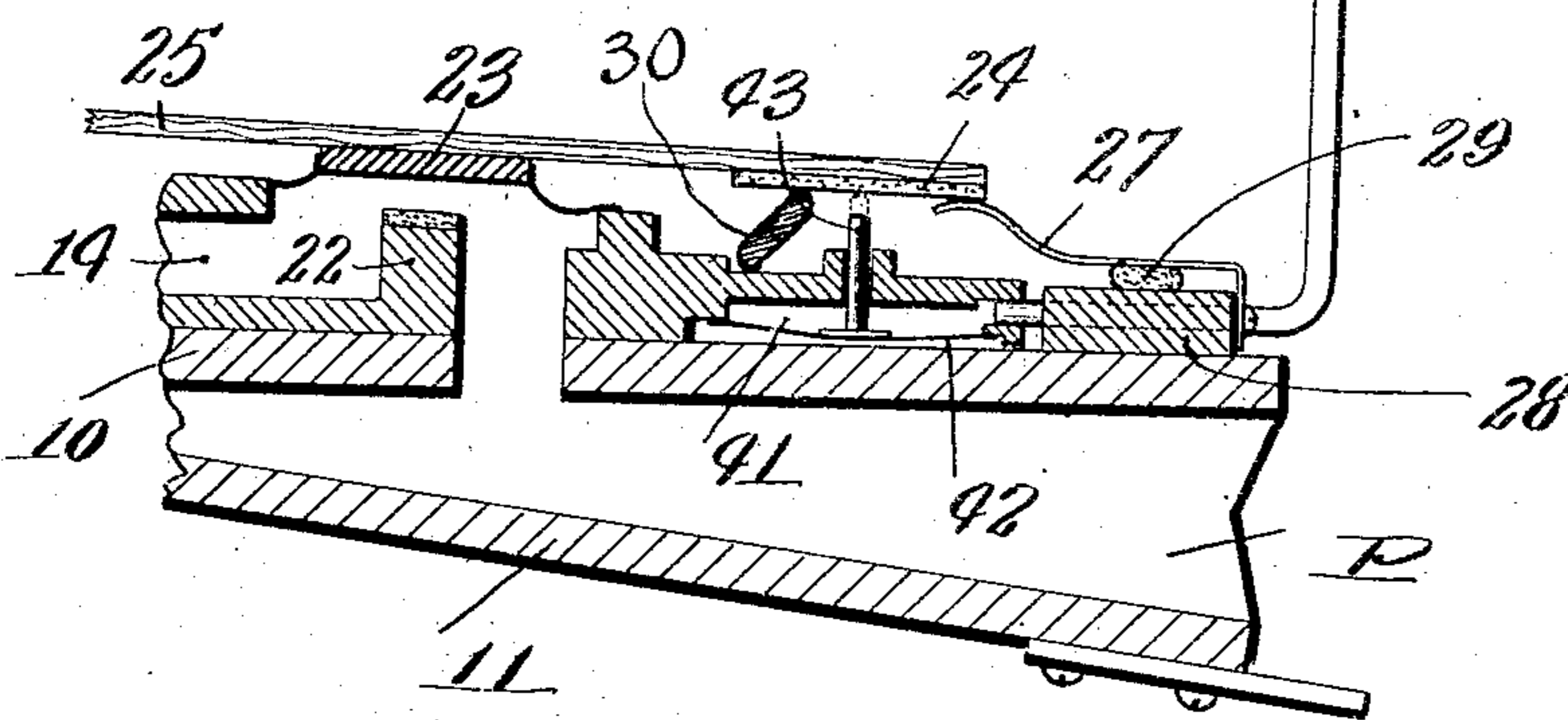


Fig. 4



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UNITED STATES PATENT OFFICE.

THOMAS DANQUARD, OF NEW YORK, N. Y., ASSIGNOR TO THE AUTOPIANO COMPANY, A CORPORATION OF NEW YORK.

PNEUMATIC ACTION FOR MUSICAL INSTRUMENTS.

No. 889,445.

Specification of Letters Patent.

Patented June 2, 1908.

Application filed November 29, 1905. Serial No. 289,572.

To all whom it may concern:

Be it known that I, THOMAS DANQUARD, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a new and useful Pneumatic Action for Musical Instruments, of which the following is a specification.

In that class of musical instruments which are operated pneumatically, and particularly pianos, it is customary to divide the actions into sections and to provide means whereby the notes of one section of actions can be played louder or softer than the notes of the other section of actions so that the theme can be brought out and the accompaniment softened or vice versa or similar musical effects obtained.

One object of this present invention is to provide a simple and effective mechanism for this purpose. To this end, a regulating valve is arranged in the air passage of each actuating pneumatic and is connected so that when thrown into operation, the said air passage will be throttled or controlled to soften the action of the pneumatic. The throttling action of said regulating valve can be adjusted so as to get the desired effect, an adjustable spring being preferably provided for this purpose.

The throttling or controlling valve is preferably actuated by a pouch or diaphragm arranged in the air passage so that when the actuating pneumatic is called into operation, air pressure will set the controlling valve automatically in proper position. By this arrangement, when atmospheric pressure is let back into the pneumatic action, a quick recovery will take place as the controlling valve will not interfere with its operation. Means are also provided so that said throttling valve can be positively held away from its seat so as to get the full force or blow of the actuating pneumatic when shading effects are not desired. Then by dividing the actuating pneumatics into sections as is customary for collectively throwing the controlling valves of a section of actions into operation or positively throwing them out of operation, the notes controlled by the particular section of actuating pneumatics can be softened down by throwing the controlling valve into operation or can be played

full force by positively holding the said controlling valves out of operation.

Another object of this invention is to provide means whereby actions or sections of actions can be modified preferably by pneumatic means.

One convenient way for practicing the invention is shown in the accompanying two sheets of drawings.

Referring to the drawings, Figure 1 is a sectional elevation through a set of pneumatic actions with my invention applied thereto. Fig. 2 is a sectional view taken on the line 2—2 of Fig. 1. Fig. 3 is an enlarged perspective detail view illustrating the construction of the means for controlling the throttling or controlling valves, and Fig. 4 is a sectional elevation illustrating a pneumatic mechanism that may be used.

Referring to the drawings and in detail, P designates a series of actuating pneumatics. These pneumatics are usually arranged in tiers, three such tiers being shown.

The pneumatics are the same in construction and a description of the construction of one will suffice. Each pneumatic is made up of an upper board 10 and a lower board 11 hinged thereto. The boards are connected along their edges by a collapsible diaphragm as is customary. The lower board 11 is connected by a link 12 to actuate a pivoted lever 13 which bears upon or engages the wippen of the piano action. The piano action may be also played manually if desired, by means of the usual abstract and key, as illustrated.

The air passage to the pneumatic is designated by the number 14. When air is drawn out through this air passage 14 the lower board 11 of the pneumatic will be raised and the key struck. The air may be drawn from the pneumatic and let into the same by any of the common valve mechanisms employed for this purpose. The one indicated being arranged and operated as follows: 15 designates a passage which communicates with the tracker-board of the instrument. This passage controls a diaphragm connected to a double valve 16—17. When the passage is opened by the passage of a perforation of the paper over a channel of the tracker-board, atmospheric pressure will be admitted under the diaphragm and the suction on the upper

side thereof will raise the double valve 16—17, allowing atmospheric pressure to pass into channel 18. Channel 18 controls a diaphragm 19 to which a double valve 20—21 is connected. The valve 20 controls the flow of air from the passage 14 into the suction chest C and the valve 21 controls the flow from the atmosphere into said passage 14. When atmospheric pressure is admitted into channel 18, valve 20 is opened and valve 21 is closed. This sucks or draws the air out of the pneumatic through the passage 14 into the suction chest C. When the opening in the tracker-board is closed, the double valve 16—17 drops to normal position shown, exhausting the pressure in channel 18 which restores the double valve 20—21 to the normal position, shown, cutting off the exhaust from the pneumatic and connecting the same with the atmosphere, thus allowing the pneumatic to return to its normal position. The air passage 14 is interrupted by a partition 22 secured on the top of which is a piece of felt or other suitable material to form a valve-seat. A controlling valve 23 is arranged to cooperate with said valve-seat. This controlling valve is secured to a pouch or diaphragm arranged around an opening in the air passage 14, and in fact it constitutes part of the wall of said passage. The outside of said pouch is exposed to the atmospheric air, whereby the position of the valve will be controlled by the air tension in the passage 14, or in the wind-chest C, and when the tension is high, the passage will be restricted. The valve 23 is also connected to a bar 25 which is hinged to a piece of felt 26. The outer or free end of the bar is provided with a piece of felt 24 engaging the under side of which is a spring 27 secured to a bar or strip 28 on top of the pneumatic. The spring 27 is bent into L-shaped form so as to push up on the end of the bar 25. A piece of felt 29 is arranged under the spring 27 so that the tension or leverage thereof which opposes the downward movement of the bar 25 can be adjusted. By adjusting this piece of felt it will be seen that when the air is exhausted through the passage 14 and the pneumatic called into action, the controlling valve 23 will be brought down toward its seat and will choke or regulate the air passage 14 so that the suction from the pneumatic will be regulated according to the degree of suction in the suction chest. In other words, the pneumatic will have an easy soft action which will be practically the same for all pressures in the suction chest. Thus, when these controlling valves are applied to a section of actions as shown, this section of actions will be played softly no matter what the pressure is in the suction chest which is employed to actuate the other pneumatics not having such con-

trolling valves or not having such controlling valves in operation. When this damping or softening action is not desired, the controlling valves are thrown out of operation. This can be done by the following mechanism.

A registering bar or controller 30 is arranged on top of the pneumatic in position to engage the pieces of felt 24 on the free ends of the bars 25. One of these bars is provided for each tier of the particular section of actions. These bars are pivoted so that they can turn and act practically as cams or levers under the outer ends of said bars 25.

Arms 31 are connected to the ends of the registering bars or controllers 30 and these arms are connected to a common link 32 which may be actuated by bell-crank lever 33 and a rod 34 having a button on its end and extending to a convenient position to be manipulated by the operator or player. This mechanism thus provides a means for collectively throwing the controlling valves of the particular section of actions into and out of operation. It is preferred that there be two such sections of actions, one representing the bass and the other the treble. When the registering bars are turned to operative position, as shown in dotted lines in Fig. 1, the throttling valves are kept away from their seats and will have no effect, as the air passages 14 are left free and open by this positive holding of the controlling valves in inoperative position.

In some cases, it may be desirable to provide pneumatically operating means for throwing the controlling valves into and out of operation and a suitable mechanism for this purpose is illustrated in Fig. 4. In this arrangement, 35 designates a chamber which is connected with the suction or exhaust chest and arranged on top of the same is another chamber 36; the two chambers being connected by small ports. A valve 37 which is held up by a spring, covers these ports. This valve is located in convenient position to be manipulated by the operator or player and a button 38 is arranged on the rod thereof. The valve stem fits loosely in the upper partition and a piece of felt is placed under the button so that when the button is in its raised position, atmospheric pressure can flow in around the upper chamber around the valve-stem and so that when the button is in its depressed position, this flow will be stopped.

The upper chamber 36 is connected by a pipe 40 to a chamber 41 arranged on the top of each pneumatic. Arranged in each of these chambers is a diaphragm 42 which has a projecting stem 43 which engages the free end of the bar 25. Each chamber 41 is con-

connected to the atmosphere below the diaphragm 42. When the parts are in their normal position, the button 38 will be up and atmospheric pressure will be admitted to each of the chambers 41, whereby the diaphragm 42 and plunger 43 will not affect the regulating valve 23.

For ordinary playing, the bars 30 are moved so as to hold all the valves 23 in raised or inoperative position. When one section, for example, either the treble or bass, is to be modulated or softened, all the bars 30 of that section, three in the present instance, each operating part of the valves in one tier, are turned to the flat position so that all the valves 23 of that section will come into operation. Then the button 38 controlling the particular section of actions to be accented or played loud, is depressed. This exhausts the chambers 41 of the particular section of actions, which lifts the plungers 43 and thereby holds the valves 23 of the particular section of actions out of position, allowing the full action of these pneumatics without any modification, thereby accenting the particular section of actions.

Many other mechanisms may be devised for throwing the controlling valves into operation and for throwing the same out of operation.

The details herein shown and described may be greatly varied by a skilled mechanic without departing from the scope of my invention as expressed in the claims.

Having thus fully described the invention, what I claim is:—

1. In a musical instrument, the combination of an actuating pneumatic, a passage therefrom, a pouch or diaphragm constituting part of one wall of said passage and having one side constantly exposed to the atmospheric air, whereby the position of the pouch will be controlled by the air tension in said passage, and means operated by the pouch for controlling the flow of air along said passage.

2. In a musical instrument, the combination of a suction chest, an actuating pneumatic, a passage connecting said chest and pneumatic, a pouch or diaphragm constituting a part of one wall of said passage and having its outside constantly exposed to the atmospheric air, whereby the position of said pouch will be controlled by the air tension in said passage, and a valve carried by said pouch and adapted to control the flow of air along said passage from the pneumatic to the suction chest.

3. In a musical instrument, the combination of an actuating pneumatic having a passage therefrom, a partition in said passage, a pouch located over said partition, a valve connected with said pouch and adapted to

regulate the flow of air over said partition, a movable support for said valve, and means for regulating the normal position thereof.

4. In a musical instrument, the combination of an actuating pneumatic, a valve for regulating the supply of air therefrom, a movable support for said valve, a spring for regulating the normal position of the support, and means for regulating the tension of the spring.

5. In a musical instrument, the combination of a plurality of actuating pneumatics, a regulating valve for each pneumatic, resilient means for supporting each of said valves in open position, pneumatically controlled means for positively opening said valves, and manually operated means for positively opening a plurality of valves simultaneously.

6. In a music playing device the combination of pneumatic actions a regulating valve for controlling the flow of air from each pneumatic action, manually operated means for operating the valves of a section or series of actions, and pneumatically controlled means for operating said valves.

7. In a musical instrument, the combination of a pneumatic action, a regulating valve controlling the flow of air from said action, and a registering bar for holding the regulating valve in inoperative position, which bar can be adjusted to allow the valve to come into operation.

8. In a musical instrument, the combination with pneumatic actions, of a regulating valve controlling the flow of air from each action, means for holding the regulating valves in inoperative position, said means being divided into parts for regulating the bass and treble independently, and a plurality of pneumatically operated means, for holding said valves in inoperative position.

9. In a musical instrument, the combination of a pneumatic action, a regulating valve controlling the flow of air from said action, a registering bar for holding the regulating valve in inoperative position which bar can be adjusted to allow the valve to come into operation, and pneumatically operating means for additionally holding the regulating valve in inoperative position.

10. In a musical instrument, the combination of a pneumatic action, a regulating valve controlling the flow of air from said action, a registering bar for holding the regulating valve in inoperative position which bar can be adjusted to allow the valve to come into operation, a diaphragm, and plungers for additionally holding the regulating valve in inoperative position.

11. In a musical instrument, the combination of a pneumatic action, a regulating valve controlling the flow of air from said action,

a registering bar for holding the regulating valve in inoperative position which bar can be adjusted to allow the valve to come into operation, a diaphragm, plungers, and a
5 valve and connections for allowing the suction to act on the diaphragm for additionally holding the regulating valve in inoperative position.

In testimony whereof I have hereunto set my hand, in the presence of two subscribing 10 witnesses.

THOMAS. DANQUARD. [L. S.]

Witnesses:

WM. J. KEELEY,
WM. P. COLLINS.