

P. WELIN.

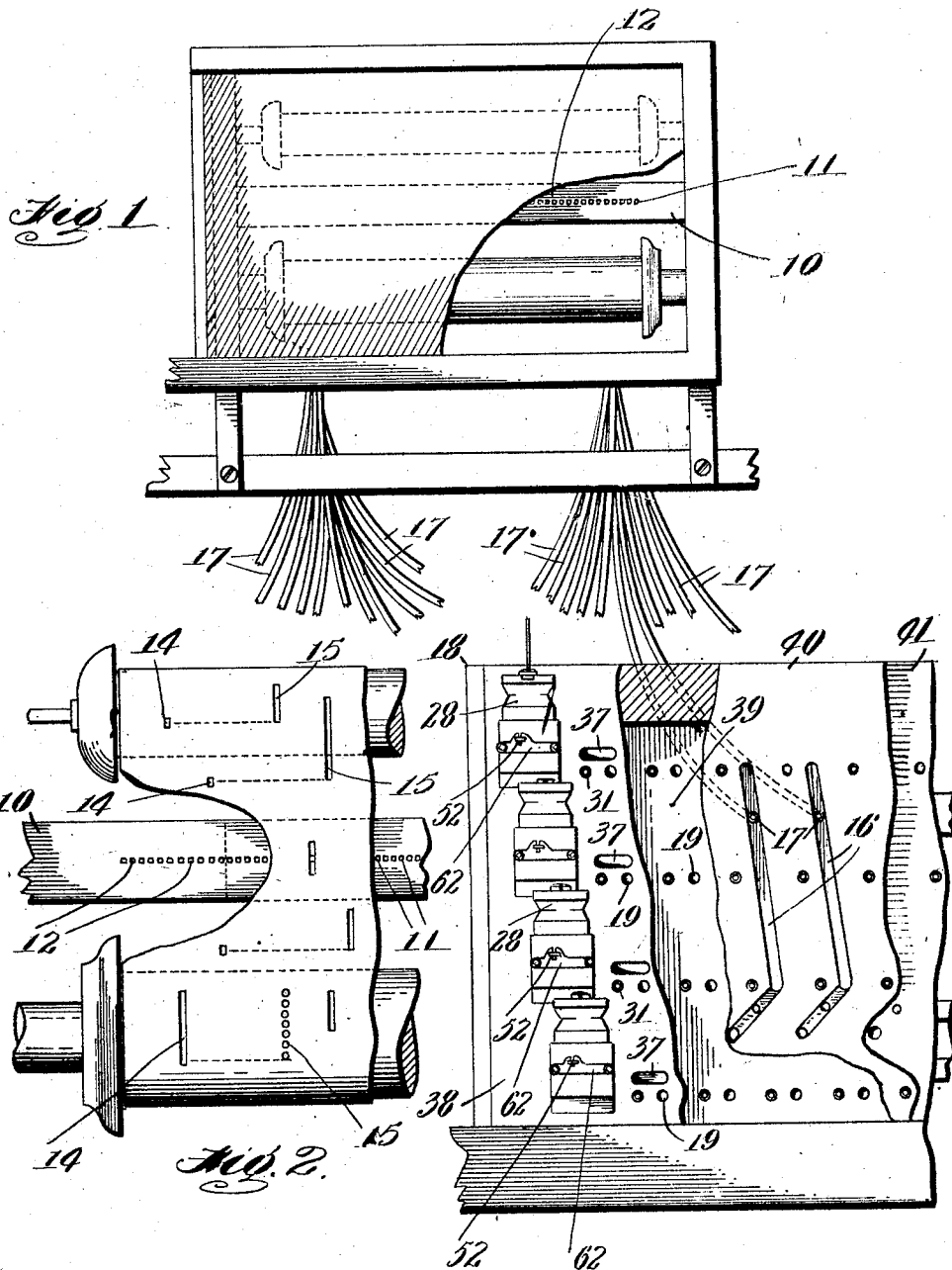
AUTOMATIC MODULATING MECHANISM FOR MUSICAL INSTRUMENTS.

APPLICATION FILED JAN. 7, 1907.

Patented July 30, 1912.

1,034,048.

4 SHEETS-SHEET 1.



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4 SHEETS-SHEET 2.

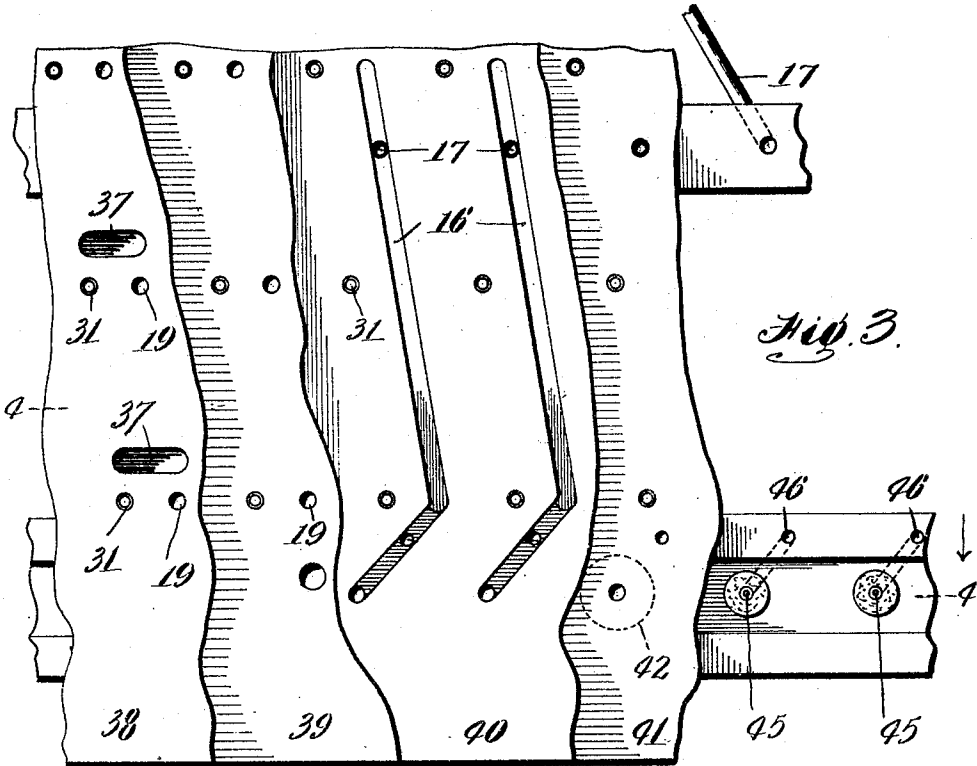


Fig. 3.

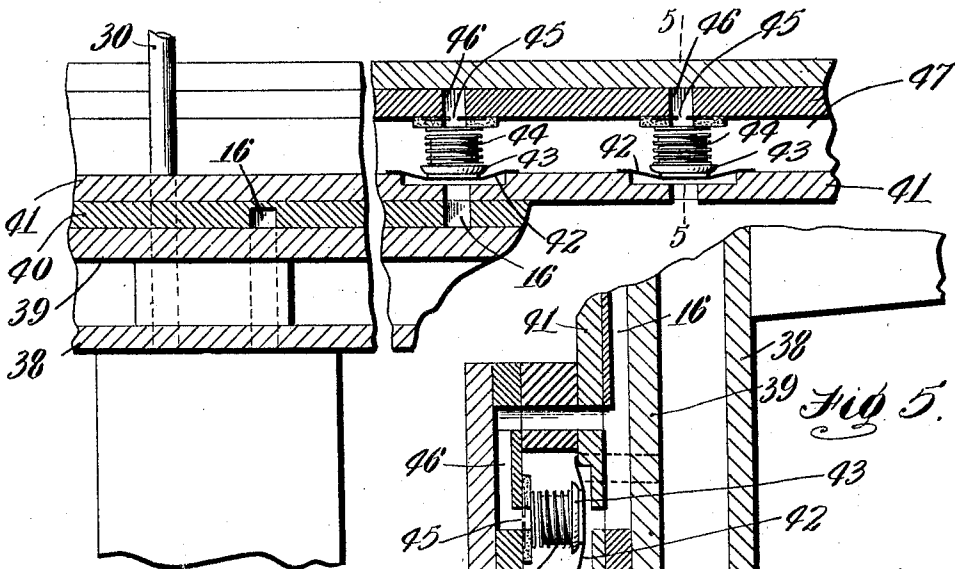


Fig. 4.

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Fig. 6.

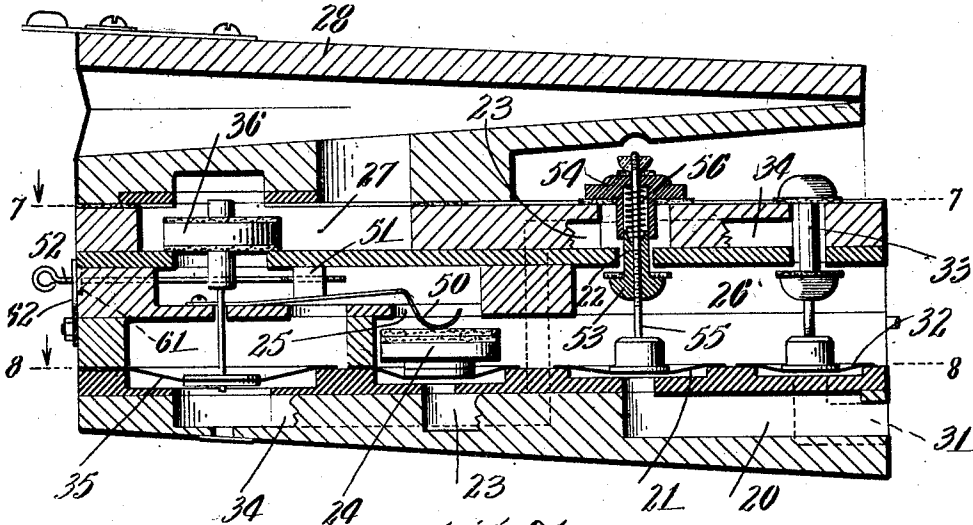


Fig. 7.

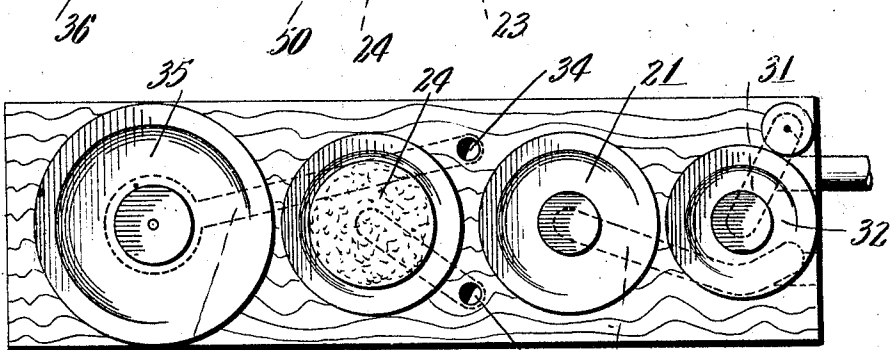
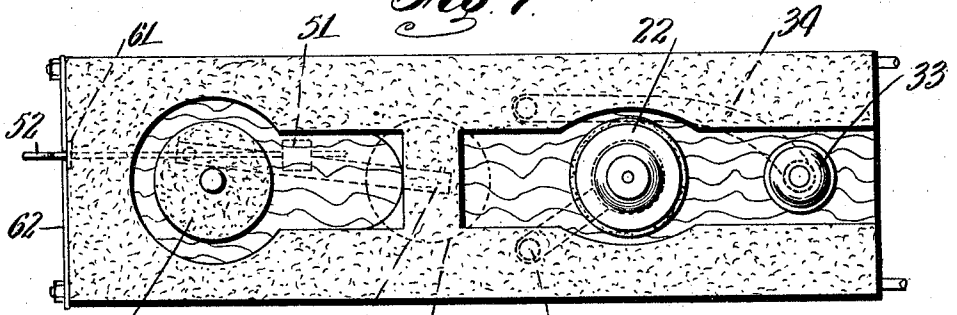


Fig. 8.

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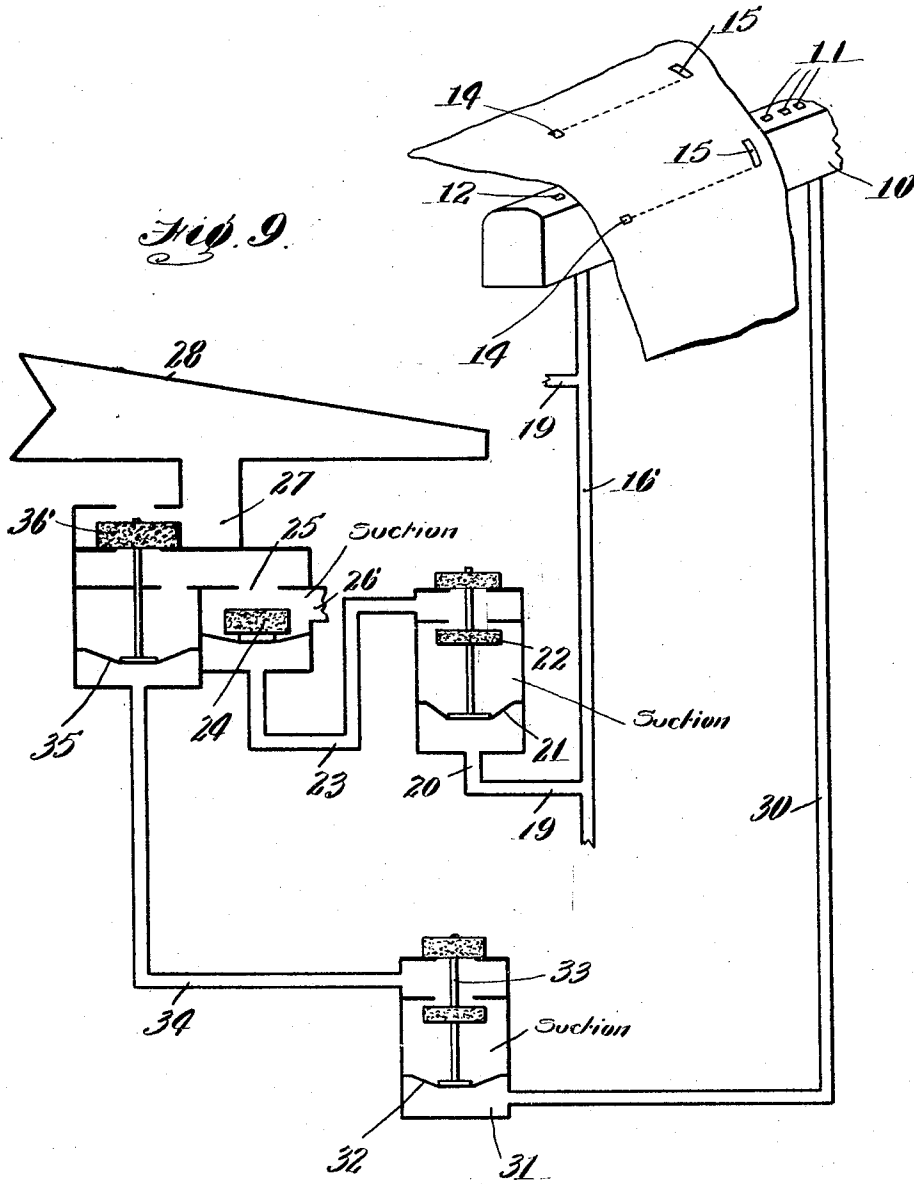
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4 SHEETS—SHEET 4.



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# UNITED STATES PATENT OFFICE.

PETER WELIN, OF NEWCASTLE, INDIANA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE KRELL AUTO-GRAND PIANO CO. OF AMERICA, OF CONNERSVILLE, INDIANA, A CORPORATION OF INDIANA.

AUTOMATIC MODULATING MECHANISM FOR MUSICAL INSTRUMENTS.

1,034,048.

Specification of Letters Patent.

Patented July 30, 1912.

Application filed January 7, 1907. Serial No. 351,086.

*To all whom it may concern:*

Be it known that I, PETER WELIN, a citizen of the United States, residing at Newcastle, in the county of Henry and State of Indiana, have invented a new and useful Automatic Modulating Mechanism for Musical Instruments, of which the following is a specification.

This invention relates to that class of music playing devices which, whether in the form of automatic pianos or the like or in the form of separate devices for playing ordinary musical instruments, are operated automatically from the music sheet and the tracker-bar.

Although this invention contains certain additional features, it is in general an improvement on the invention set forth and claimed in my prior co-pending application for an automatic playing attachment for musical instruments filed Dec. 7, 1905, Serial No. 290,749. In another co-pending application also on a pneumatic action for musical instruments filed Jan. 7, 1907, Serial No. 351,085, I have shown and broadly claimed certain improvements on the same invention.

This case relates to the same subject matter, but refers especially to that embodiment thereof in which the modulating mechanism is controlled automatically from the tracker-bar either in the piano player or the combination piano.

It also includes certain improvements in the throttle mechanism for avoiding a thumping action during the playing of the modulated notes, means for adjusting the tension of the throttling valve, and certain improvements in the bleeding mechanism, these latter features not being limited to said automatic control.

The principal objects of the invention are to provide improved modulating means controlled automatically from extra channels in the tracker-bar, to accomplish this result in a simple and convenient manner, to provide for operating such means to modulate the notes individually or in sections; also to provide improved throttling mechanism for producing the modulating effect, to prevent the secondary valve which is usually em-

ployed, from thumping during the playing of the modulating notes, to provide means for adjusting the tension of the throttling valve and generally, to improve and simplify pneumatic actions for instruments in which the operation of the entire modulating device is controlled from the tracker-bar.

While this invention is illustrated as, and preferably is, applied to an automatic musical instrument, it is to be understood that many features thereof are equally applicable to playing devices for musical instruments.

Reference is to be had to the accompanying drawings constituting part of this specification in which,

Figure 1 is a front elevation of a portion of an automatic piano constructed in accordance with this invention with parts broken away and in section. Fig. 2 is a detail elevation of a part of the tracker-bar and music winding rolls also showing a way in which the music sheet may be cut to produce the modulating effects. Fig. 3 is a front view of the channel board thereof broken away to show portions of each of the plates of which the same is made up. Fig. 4 is a sectional view on the line 4—4 of Fig. 3, showing a bleeder box connected with the channel board. Fig. 5 is a sectional view on the line 5—5 of Fig. 4. Fig. 6 is a longitudinal section of one of the valve boxes for the striking pneumatics. Figs. 7 and 8 are plans of certain portions of the device shown in Fig. 6 with the parts appearing above the lines 7—7 and 8—8, respectively, removed, and Fig. 9 is a diagrammatic view illustrating the principle on which the above described mechanism operates and also showing in a broader way the principle of the invention.

Referring first to Fig. 9, it will be seen that the tracker-bar 10 is provided with the usual channels 11 and with an additional series of channels 12. These additional channels may be of the same shape and size as the channels 11, or otherwise. The number of channels 12 may be varied within wide limits, according to the manner in which the modulating action is to take effect. In the present instance twenty-two of

these channels are employed, eleven at each end of the tracker-bar, but they may be scattered through the tracker-bar at regular or irregular intervals, as desired.

5 In order to operate from the perforated music sheet the devices which are connected with the channels 12, the sheet is shown in Fig. 2, as provided with perforations 14 which are adapted to pass over the several  
10 channels 12. These perforations are preferably made slightly in advance of the regular note perforations 15, provided the channels 11 and 12 are in alinement with each other. If the forward edges of the two sets of per-  
15 forations in the music sheet are in alinement, then the channels 12 are offset slightly from the channels 11. This is to provide for giving the throttling action a little time to place the parts in position prior to the  
20 sounding of the note.

Each of the channels 12 is connected with a modulating channel 16 by means of a pipe or tube 17. The modulating channels 16 are located in the channel board 18 and each  
25 one of them is connected with one or more perforations 19. In the present instance, as 22 channels 16 are used, each one is shown as being connected with three of the perforations 19. Each of the perforations 19  
30 communicates through a channel 20 with a pneumatic 21. This pneumatic operates a valve 22 which controls a channel 23. When the pneumatic is in ordinary position, the valve connects this channel with  
35 the suction chamber and when raised it connects it with the outside air, so as to raise a throttling pneumatic 24 to throttle a passage 25 through which connection is made from a suction chamber 26 through a pas-  
40 sage 27 to the striking pneumatic 28. Therefore, when one of the channels 12 is opened, the corresponding number of throttle valves are lifted ready to throttle the corresponding striking pneumatics, no other  
45 action, however, taking place until a perforation in the music sheet comes over one of the corresponding passages 11. Then an impulse will pass from the channel 11 to the ordinary note playing pipe 30 through the  
50 channel board 18. This is connected through a passage 31 with a primary pneumatic 32 which operates a primary valve 33 to cut off a connection 34 from a suction chamber in which the primary valve is lo-  
55 cated and connect the passage with the outside air. This sends an impulse to a secondary pneumatic 35 which opens a valve 36 to permit the striking pneumatic 28 to be connected with suction chamber 26 through the  
60 throttled opening 25, at the same time shutting the pneumatic 28 off from the outside air.

It is to be noted that the upper side of the pneumatic 35 is in a chamber which com-  
65 municates with the suction chamber 26 only

through the opening 25. The purpose of this construction is to prevent a thumping action which takes place on the part of the secondary valve in those constructions in which the latter is located in the main suction chamber 26. By having this passage  
70 throttled in the same manner as the passage to the striking pneumatic, this thumping action is avoided during the striking of the modulated notes. The suction chambers 26  
75 are connected with a suction chamber in the channel board 18 by means of passages 37, as shown in Fig. 1.

From the above description, it will be seen that the above mentioned objects are  
80 accomplished in a simple and efficient manner by the application of the principle of this invention.

For a more particular description of the apparatus which has been chosen for illus-  
85 trating the invention, reference is to be had to the remaining figures of the drawing.

The channel board 18 is preferably made up of a series of plates 38, 39, 40 and 41. In the front board 38 are the perforations  
90 19, 31 and 37, each set of these three perforations being connected with one of the striking pneumatic valve boxes. The section 39 contains the suction chamber which has been referred to, and which is connected  
95 with the passages 37. The section 40 contains the channel 16. The back board section 41 is perforated to receive the pipes 17 and also to connect the channels 16 with a bleeder valve box, the object of which is to  
100 restore the pneumatics 21 to their normal condition under suction after they have been disconnected from the outer air. The manner in which this is brought about will be seen by reference to Figs. 4 and 5. Each  
105 of the modulating channels is directly connected to a pneumatic 42 on which rests a valve 43 provided with a spring 44 for assisting in returning it to the position in which it occupies when there is no air under  
110 the pneumatic. At the end of the valve 43 is a perforation 45 connected with a channel 46 which communicates with the modulating channel. The chamber 47 in which the valve is located communicates  
115 with the suction chamber and is always under suction. When the end of the modulating channel in the tracker-bar is closed, the chamber 47 communicates through the passage 45 and channel 46 with the modulating  
120 channel. When an impulse of air passes into the modulating channel it operates the pneumatic 42 to close the valve and cut the modulating channel off from communication with suction and permits the impulse of air to  
125 act on the pneumatics 21 in the manner above described. As soon as the modulating channel in the tracker-bar is closed, and leakage commences to take place the spring 44 tends to push the valve 43 away from its  
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seat and restore the elements to normal condition when the channel 46 will again be connected with the suction so as to bleed the channel 16. One of these valves is of course, used for each of the channels 16.

5 In Figs. 6, 7 and 8, a construction and arrangement of the primary, secondary, modulating, and throttling valves are shown and also their connections with the striking pneumatic and the other elements. In this form the primary valve 33 is located in the suction chamber 26 instead of being a separate construction as indicated in Fig. 9. The other features, however, correspond substantially to what is shown in Fig. 9 but with certain additions. The throttling valve 24 is shown as being normally forced from its seat by a regulating spring 50, which may be so constructed as normally to hold the valve 24 in a partly closed or throttling position. As this spring is liable to lose some of its resiliency after some use, it is made with means of adjusting it. In the form shown the spring is mounted so that the stationary arm of it is at an angle with respect to the adjacent wall of the passage in which it is located and between this inclined arm and the wall is located a sliding block 51 which obviously will regulate the spring to give more or less pressure to the throttle valve. For the purpose of moving the block back and forth and adjusting its position, a screw 52 is provided extending outside of the pneumatic so that it can be readily reached for operation. This screw is held in adjusted position by a plate 61, which in turn is held by a clamp 62 secured by the bolts which hold the valve-boxes.

40 The valve 22 is shown as of a differential character. That is, its two valve members, 53 and 54, are movable independently of each other although they are movable together also. The member 53 is adjustably mounted on the valve stem 55 but the member 54 is freely slidable thereon. A spring 56 normally holds said members apart. The action is first to positively close the valve member 53 and later open the valve member 54 so that connection of the passage 23 with the suction will be closed before the passage is connected to the outside air. Such a valve may be used in place of valve 33 and in various other places. It will be seen therefore that the construction shown in Figs. 1 to 8 inclusive constitutes a practical, efficient and simple embodiment of the principles diagrammatically illustrated in Fig. 9, and that additional features of the invention are also shown therein.

60 While I have illustrated and described a particular form in which my invention may conveniently be embodied, I am aware that modifications may be made therein without departing from the spirit of the invention

as expressed in the claims. Therefore, I do not wish to be limited to the particular form shown but

What I do claim and desire to secure by Letters-Patent is:—

1. In a music playing device, the combination of a tracker having note channels and supplementary channels, a striking pneumatic, a suction chamber, a passage between the suction chamber and striking pneumatic, means controlled from a note channel of the tracker for closing or opening said passage to the suction chamber to operate said striking pneumatic, a modulating device in said suction chamber for restricting and controlling said passage, and means controlled from a supplementary channel of the tracker for operating said modulating device.

2. In a music playing device, the combination with a striking pneumatic, of a suction chamber, a connection between the suction chamber and striking pneumatic, a valve for controlling said connection, a pneumatic in constant unrestricted communication with said connection for operating said valve, a throttle valve for partially closing said connection, and a pneumatic in the suction chamber for operating the throttle valve, said throttle valve being operated independently of the first named valve.

3. In a music playing device, the combination with a tracker-bar having note channels and a supplementary channel and a striking pneumatic, of a source of air tension, a passage between said source of air tension and said striking pneumatic, a valve for controlling said passage, means connected with one of the note channels for controlling said valve, a throttle valve between the source of air tension and the first named valve for partially closing said passage between said striking pneumatic and the source of air tension, and means controlled by said supplementary channel for operating the throttle valve independently of the first named valve.

4. In a music playing device, the combination with a tracker-bar having note channels and supplementary channels and a striking pneumatic, of a source of air tension, a passage for connecting said striking pneumatic with said source of air tension, a valve for closing and opening said passage, a throttle valve for partially closing said passage, a pneumatic for operating the throttle valve, means controlled by one of said supplementary channels for operating the last named pneumatic to partially close the throttle valve, and resilient means for opposing the closing motion of said pneumatic, the first named valve being located between the striking pneumatic and the throttle valve.

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5. In a music playing device, the combination of a striking pneumatic, a valve for controlling the operation of the same, a suction chamber, a throttling valve for controlling the communication between the suction chamber and first mentioned valve, a spring for normally holding the throttling valve away from its seat, and means for adjusting the tension of said spring. 70
6. In a music playing device, the combination of a striking pneumatic, a source of air tension, a passage from the striking pneumatic to the source of air tension, a throttling valve in said passage for throttling it, a spring for normally forcing said valve from its seat, means for operating said valve, and means for adjusting the tension of said spring comprising a movable block engaging the spring. 75
7. In a musical instrument, the combination of a striking pneumatic, a suction chamber connected therewith, a valve for throttling the connection between said suction chamber and striking pneumatic, a spring for normally holding said valve away from its seat, said spring having a shank inclined with respect to the wall of the passage in which it is located, and a block movable along the wall of said passage for adjusting the tension of said spring. 80
8. In a music playing device, the combination of a striking pneumatic, a suction chamber connected therewith, a valve for throttling the connection between said suction chamber and striking pneumatic, a spring therefor having a shank located at an angle with respect to the wall of the passage in which it is located, a block movable between said shank and passage for regulating the tension of the spring, and a screw for adjusting the position of said block. 85
9. In a music playing device, the combination of a striking pneumatic, a suction chamber connected therewith, a valve for throttling the connection between said suction chamber and striking pneumatic, a spring for said valve having a shank located at an angle with respect to the wall of the passage in which it is located, a block movable between said shank and passage for regulating the tension of the spring, a screw for adjusting the block, a nut on the screw, and a clamp for holding the nut in adjusting positions. 90
10. In a music playing device, the combination of a striking pneumatic with a valve box having a suction chamber connected with said pneumatic, a valve for controlling the connection between said pneumatic and suction chamber, a screw for regulating said valve, a plate on the screw, means for transmitting motion of the screw to said valve, a clamping device for clamping the plate against the valve box, and means for holding the clamping device. 95
11. In a music playing device, the combination of a tracker having note and modulating channels, a source of air tension, a striking pneumatic, a passage for connecting said pneumatic with the source of air tension, means in said passage for opening and closing said passage, means communicating with said passage and controlled from said note channels for operating said opening and closing means, means in said source of air tension for restricting the passage of air through said passage, and means controlled from said modulating channels for operating the restricting means. 100
12. In a music playing device, the combination of a tracker having note and modulating channels, a series of striking pneumatics, a source of air tension, a passage connecting each of said striking pneumatics with the source of air tension, means in each of said passages for opening and closing each of said passages, said means being controlled from the note channels of the tracker, means in said source of air tension for restricting the passage of air through one of the passages, and means controlled from each of said modulating channels in the tracker for operating a plurality of said restricting means. 105
13. In a music playing device, the combination of a tracker having note and modulating channels, a series of striking pneumatics, a passage connecting each of said striking pneumatics with a source of air tension, means for opening and closing each of said passages, said means being controlled from the note channels of the tracker, and means in each of said passages for restricting the flow of air therethrough, each of said modulating channels controlling a plurality of said restricting means. 110
14. In a music playing device, the combination of a valve operating pneumatic, a channel for conducting air to said pneumatic, a suction chamber normally connected with said channel, and a bleeding device normally connected with the suction chamber and comprising a valve adapted to be closed by the pneumatic when the air passes through the channel to disconnect said channel from the suction chamber. 115
15. In a music playing device, the combination of a valve, a pneumatic for operating said valve, a modulating channel connected with said pneumatic, a suction chamber, a passage through which said suction chamber is normally connected with said modulating channel, a valve serving to close said passage, and means for closing the valve when air is admitted to the modulating channel. 120
16. A bleeder for a musical instrument, comprising an air channel, a chamber connected with a source of air tension, a pneumatic in said chamber, a valve resting on the pneumatic, said chamber having a passage 125
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connected with said air channel and adapted to be closed by said valve, and means for connecting the other side of the pneumatic with said channel.

- 5 17. In a musical instrument, the combination of a tracker-bar having modulating channels and note channels, a striking pneumatic, means controlled from one of the note channels for operating said pneumatic, a  
10 throttling valve adapted to control the operation of said striking pneumatic, means controlled from one of the modulating channels

for operating said throttling valve, a spring for normally holding said valve away from its seat, and a screw for adjusting the tension of said spring.

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

PETER WELIN.

Witnesses:

ALMA E. YAGER,  
EDWIN B. PFAU.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."