

M. S. WRIGHT.
PNEUMATIC ACTION FOR MUSICAL INSTRUMENTS.
APPLICATION FILED OCT. 31, 1904.

901,273.

Patented Oct. 13, 1908.

3 SHEETS—SHEET 1.

Fig.1.

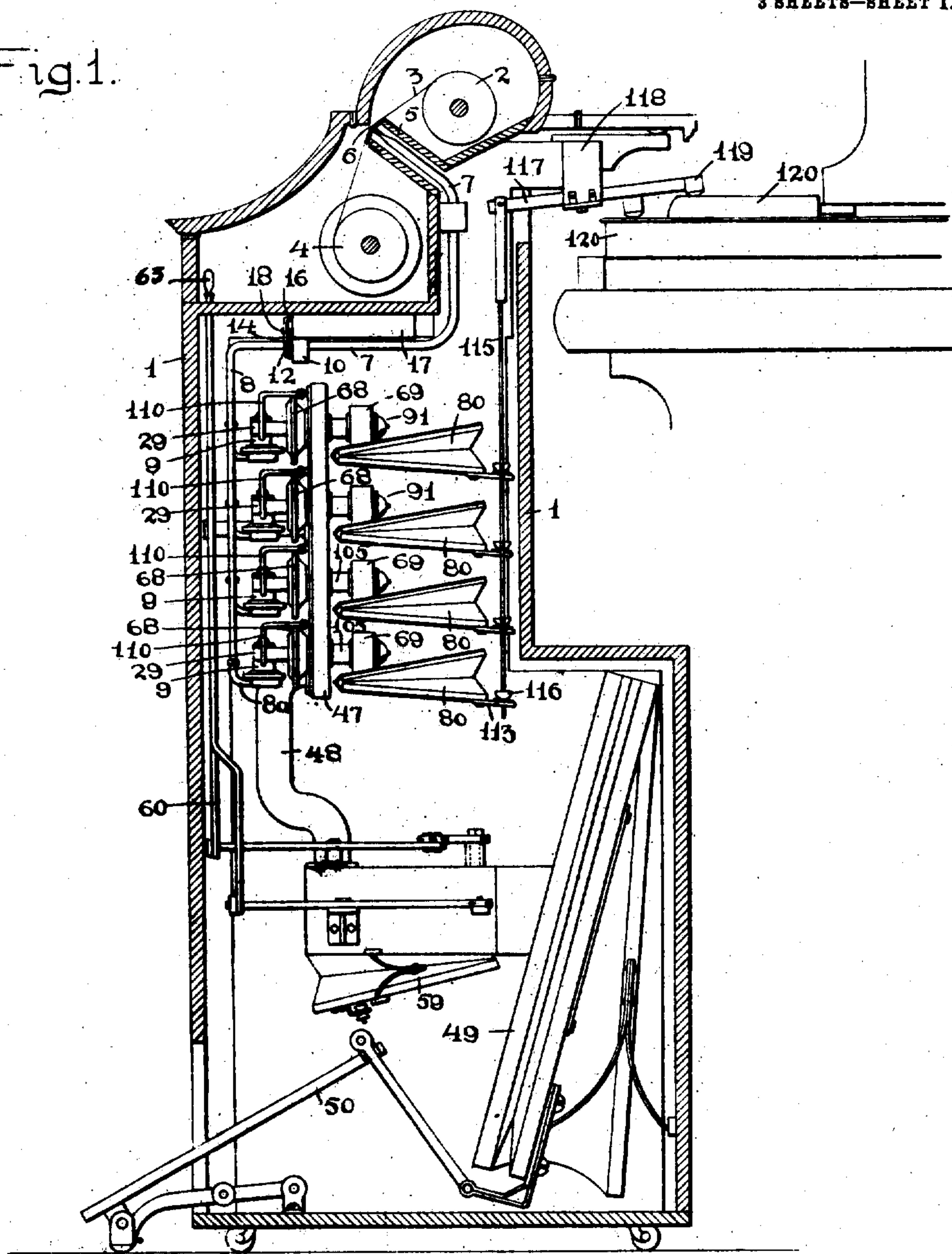
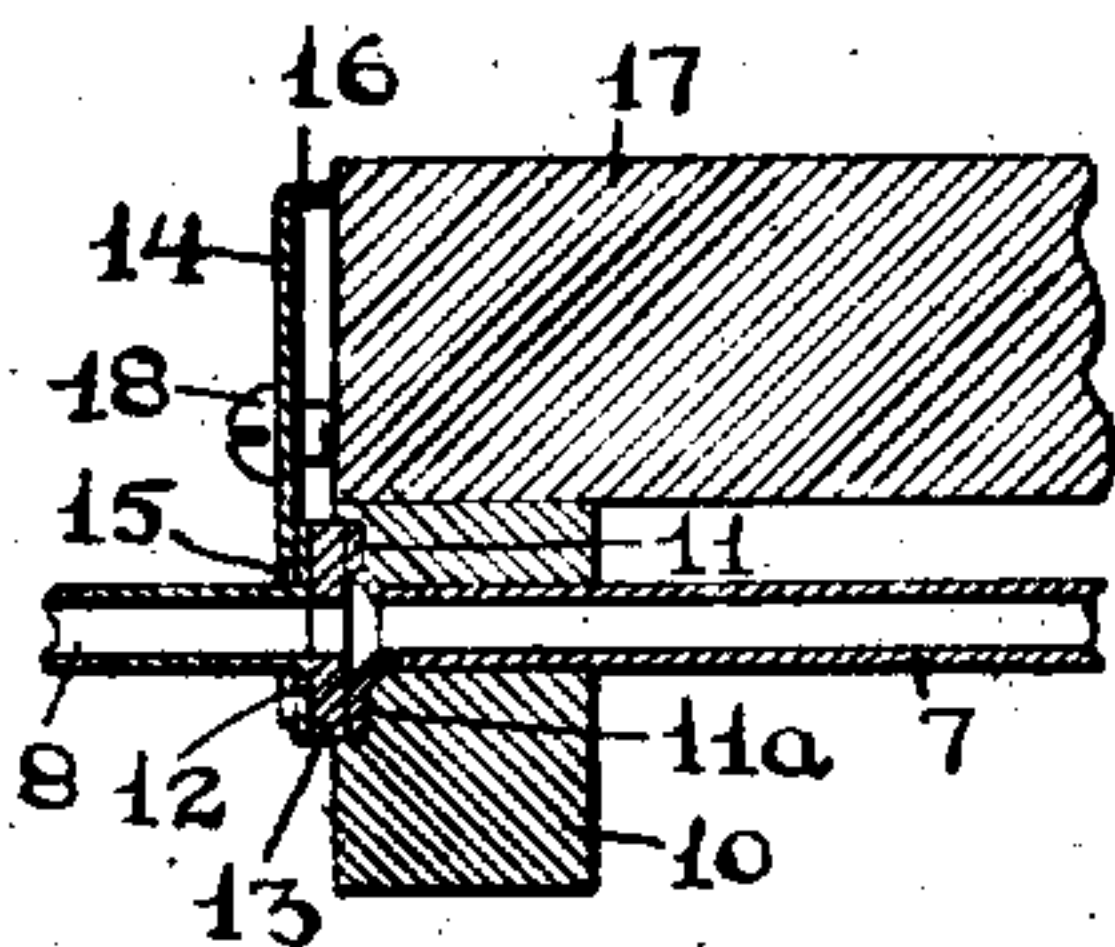


Fig.2.



Witnesses

Roy D. Tolman
Chas. H. Grew

Inventor
Morris S. Wright
By *Rufus B. Fowler*
Attorney

M. S. WRIGHT.
PNEUMATIC ACTION FOR MUSICAL INSTRUMENTS.
APPLICATION FILED OCT. 31, 1904.

901,273

Patented Oct. 13, 1908.

3 SHEETS—SHEET 2.

Fig. 3.

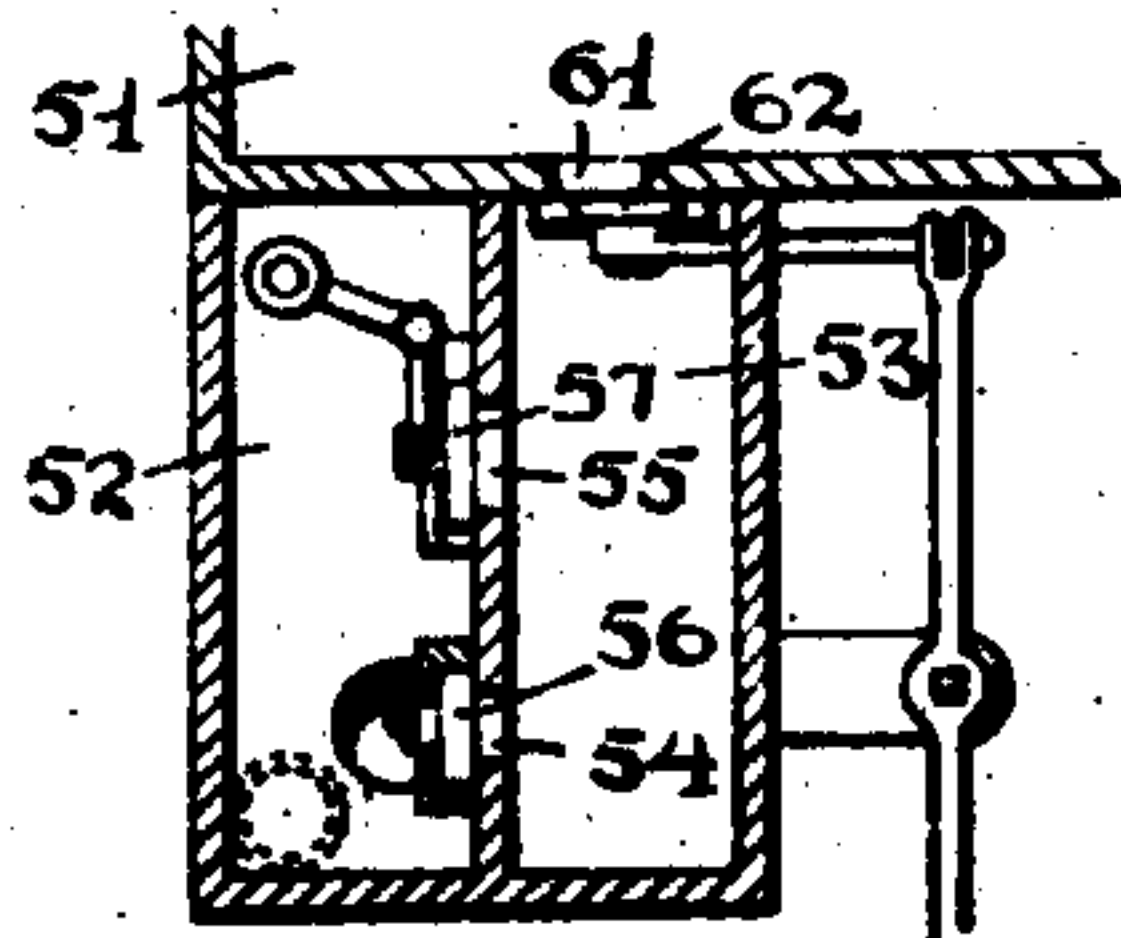
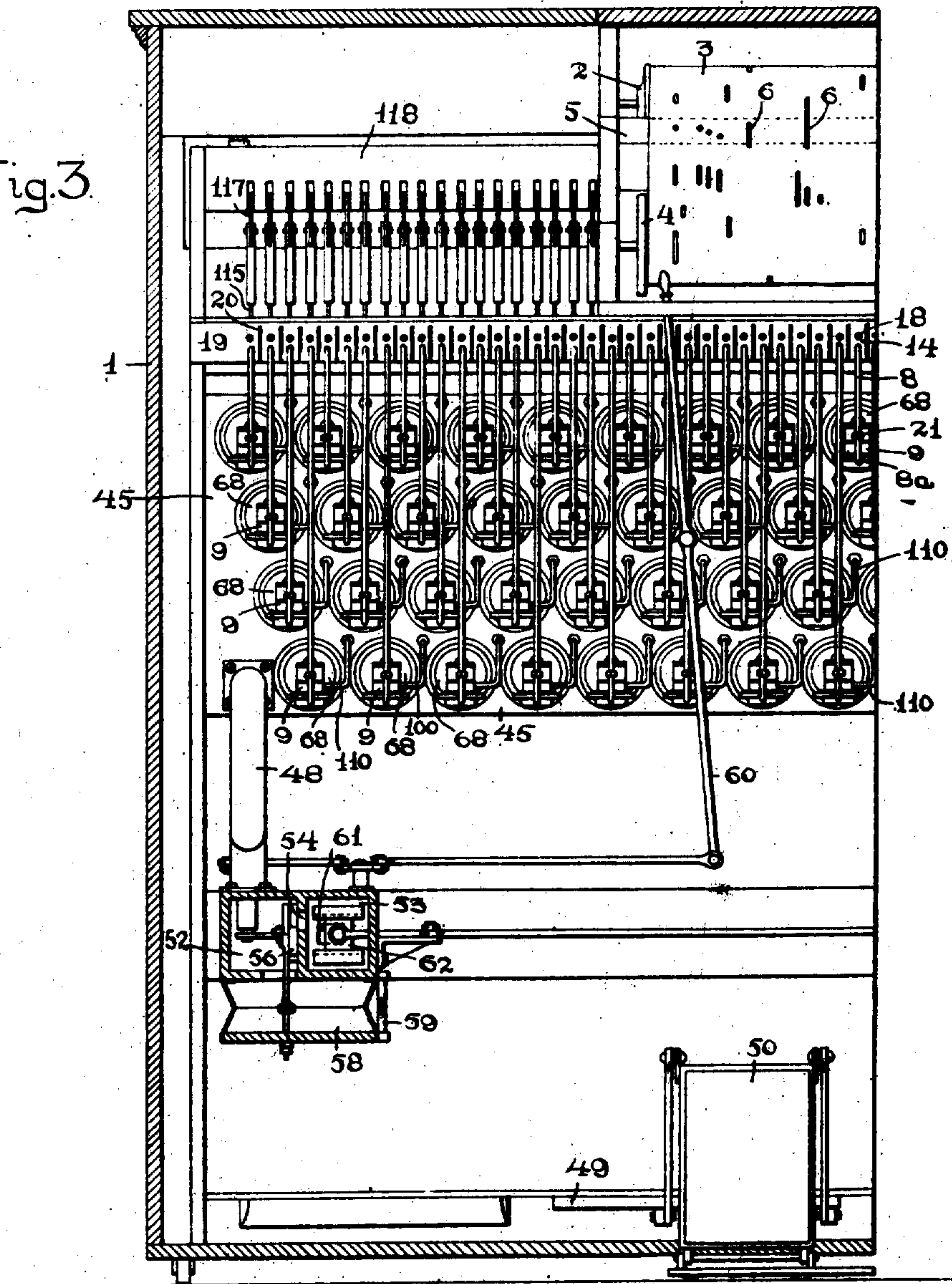


Fig. 4.

Witnesses

Roy D. Tolman.

Geo. H. Carter

Inventor
Morris S. Wright
By *Rufus B. Soules*
Attorney

M. S. WRIGHT.
PNEUMATIC ACTION FOR MUSICAL INSTRUMENTS.
APPLICATION FILED OCT. 31, 1904.

901,273.

Patented Oct. 13, 1908.

3 SHEETS—SHEET 3.

Fig. 5.

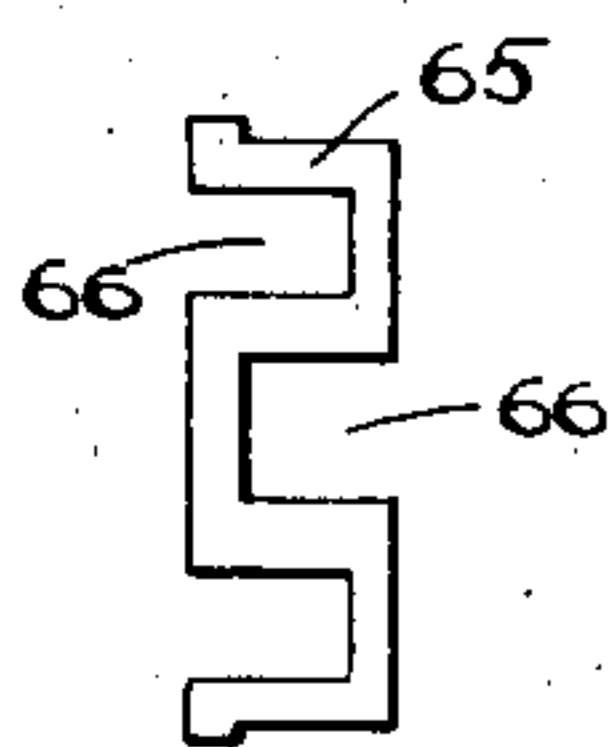
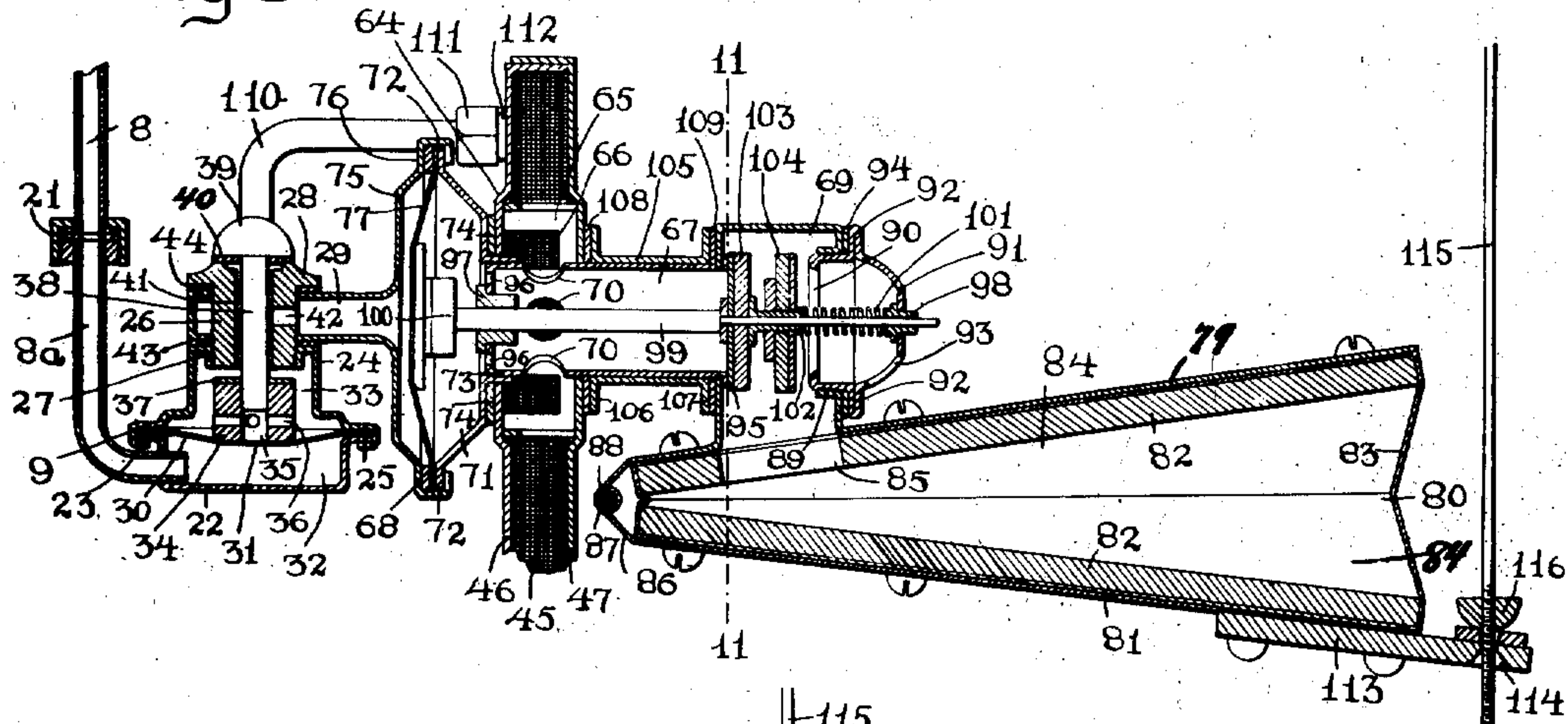


Fig. 7.

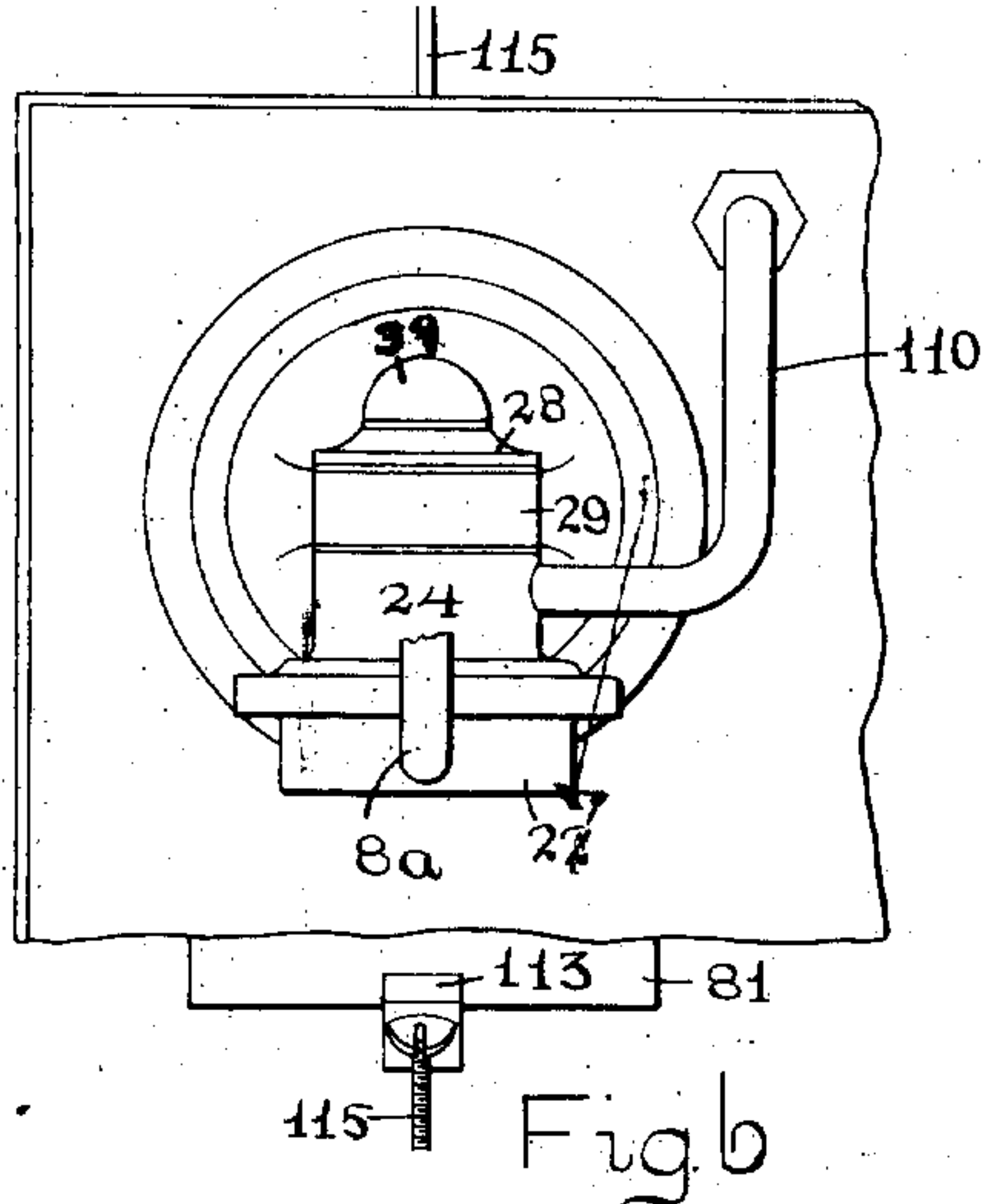


Fig. 6.

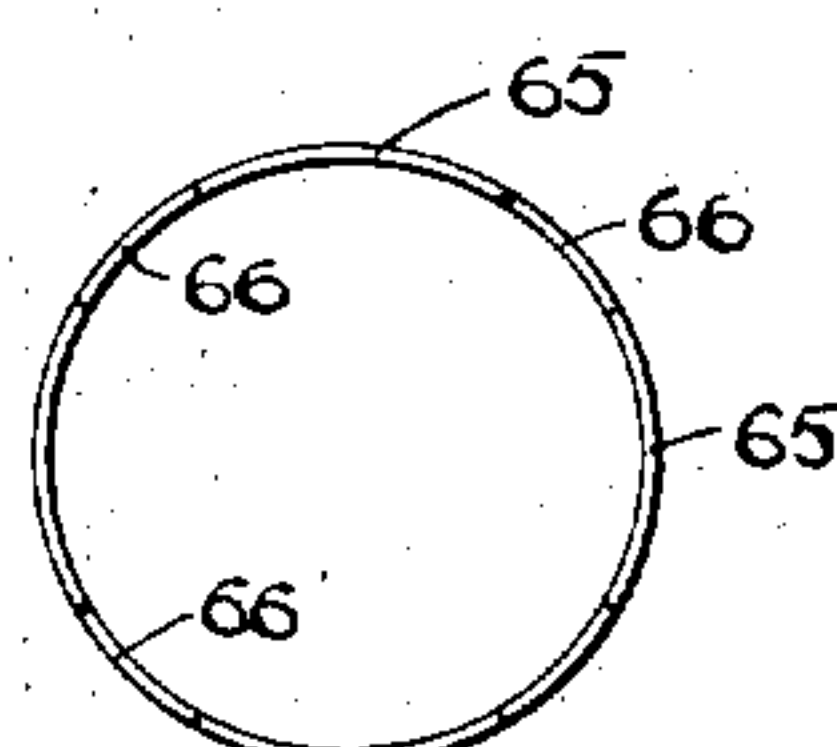


Fig. 8.

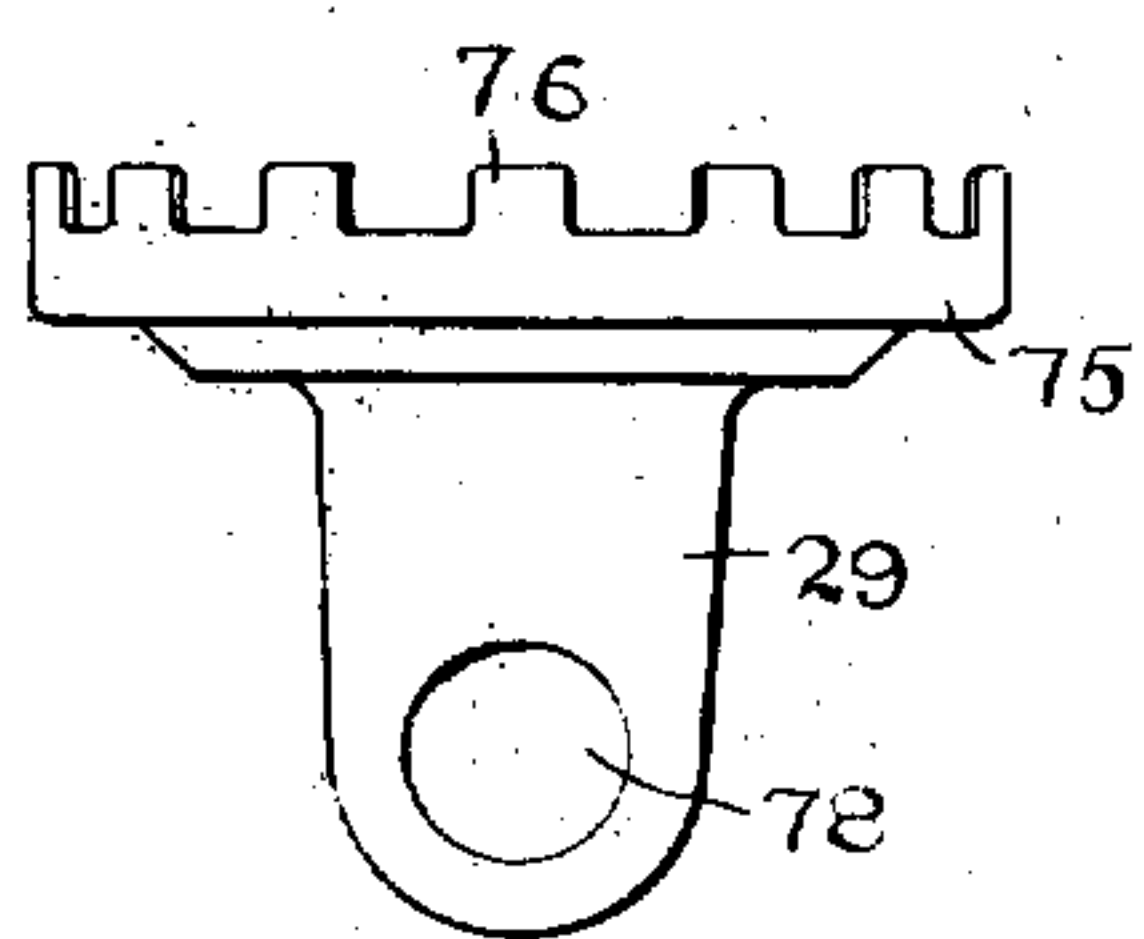


Fig. 9.

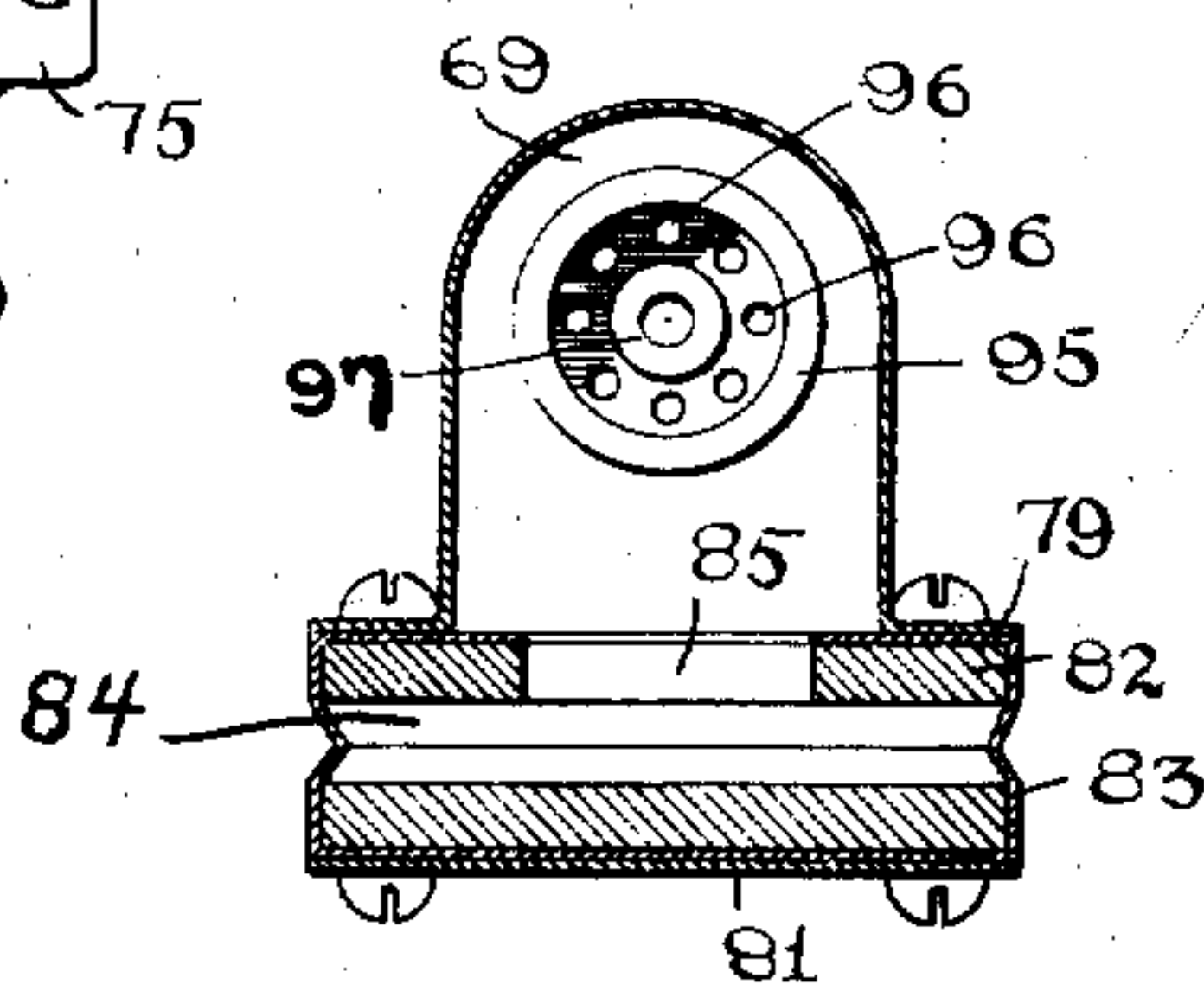


Fig. 11.

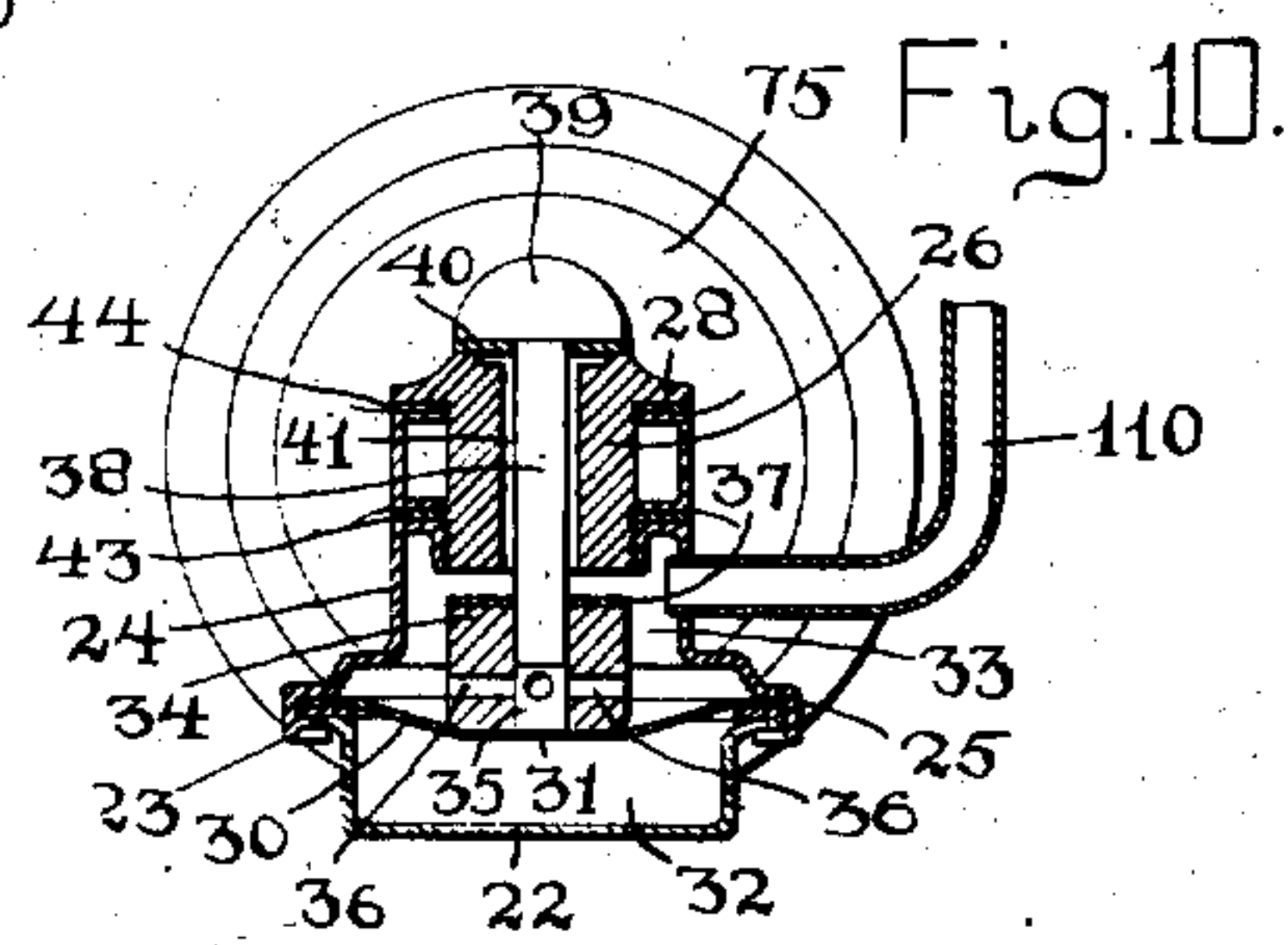


Fig. 10.

Witnesses

Roy D. Tolman.

Geo. H. Carter

Inventor

Morris S. Wright.

By Rufus B. Fowler
Attorney

UNITED STATES PATENT OFFICE.

MORRIS S. WRIGHT, OF WORCESTER, MASSACHUSETTS.

PNEUMATIC ACTION FOR MUSICAL INSTRUMENTS.

No. 901,273.

Specification of Letters Patent.

Patented Oct. 13, 1908.

Application filed October 31, 1904. Serial No. 230,657.

To all whom it may concern:

Be it known that I, MORRIS S. WRIGHT, a citizen of the United States, residing at Worcester, in the county of Worcester and Commonwealth of Massachusetts, have invented a new and useful Improvement in Pneumatic Actions for Musical Instruments, of which the following is a specification accompanied by drawings, forming a part of the same, in which—

Figure 1 represents a side view of a piano player embodying my invention, the case being shown in sectional view in order to disclose the operative mechanism. Fig. 2 is a detached view in section and on a larger scale showing the device for coupling the different sections of the pipe leading from the tracker board to the primary pneumatics. Fig. 3 is a front view of one half of the piano player with a portion of the case removed to disclose the operative mechanism. Fig. 4 is a top view of the regulating chamber shown in section. Fig. 5 is a vertical central sectional view of one of the operative mechanisms for actuating a piano key and comprising a primary pneumatic, a secondary pneumatic, and a motor pneumatic, with the valve mechanism for controlling the air passages communicating with the motor pneumatic. Fig. 6 is a front view of one of the operating mechanisms for actuating a piano key. Figs. 7 and 8 are respectively side and end views of one of the spacing rings for separating the sides of the vacuum chamber. Fig. 9 is a detached view of the sheet metal cover for the secondary pneumatic. Fig. 10 is a front view of a secondary pneumatic with its attached primary pneumatic as disclosed in Fig. 6, the same being shown in central vertical sectional view, and Fig. 11 is a detached view of the valve chamber shown in section on line 11—11, Fig. 5.

Similar reference letters and figures refer to similar parts in the different views.

The objects of my present invention are to simplify the construction and reduce the cost of this class of instruments; to enable the pneumatics and connected parts to be made of metal and thereby avoid the deteriorating effects due to atmospheric changes; to bring the primary, secondary and motor pneumatics into close juxtaposition, whereby the length of the connecting air passages is reduced and the action rendered more responsive; to form the primary, secondary and

motor pneumatics in separate and integral structures capable of being readily and individually removed in order to facilitate repairs and adjustment; to protect the valve controlled passages from dust; to secure a uniformity of air exhaustion throughout the several pneumatics and their connecting valve controlled passages. I accomplish these objects together with others not herein enumerated, by the construction and arrangement of parts as hereinafter described, the novel features being pointed out in the annexed claims.

Referring to the accompanying drawings 1 denotes the case, 2 a music roll carrying a perforated sheet 3 which is wound upon a winding roll 4 by means of a motor, such as is commonly used in instruments of this class, but not shown in the present drawings.

5 denotes a tracker board having a series of ducts, one of which is shown at 6, Fig. 1, which are alternately opened and closed by the passage of the perforated music sheet 3. The ducts 6, Fig. 1, communicate with a pipe 7 which is coupled to a pipe 8 leading to a primary pneumatic 9 and the remaining ducts of the tracker board are similarly connected by coupled pipes with other duplicate primary pneumatics. The pipe 7 is conducted through a block 10 and its end is provided with a flange 11 bearing against the bottom of a recess 11^a in the side of the block. The pipe 8 is provided with a flange 12 which is separated from the flange 11 by a gasket 13 which is inclosed in the recess 11^a and is pinched between the flanges 11 and 12 by the pressure of an elastic clamping plate 14, provided at one end with a slot 15, which incloses the pipe 8, and at the other end with a flange 16 which bears against a block 17 forming part of the framework.

Pressure is applied to the elastic clamping plate 14 to draw the flanged ends of the pipes 7 and 8 together by a clamping screw 18. The clamping plates 14 may be conveniently formed from a single long plate 19 provided with transverse slots 20, Fig. 3, leaving the clamping plates united at their flanged ends. Whenever it is desired to disconnect one of the coupled pipes 8, its clamping screw 18 is loosened, allowing the elasticity of the plate to relieve the pressure upon the flanged ends of the pipe, thereby permitting the pipe 8 to be withdrawn from the slot 15. The lower end of the pipe 8 is connected by an ordinary screw threaded union coupling 21

with a short pipe 8^a which is permanently connected with the primary pneumatic 9. The primary pneumatic 9 comprises a cup 22 having a flange 23, a body 24 having a flange 25 which is turned over to inclose the edges of the flange 23, thereby uniting the two pipes together. The primary pneumatic is attached to the secondary pneumatic by means of a hollow plug 26 having a screw threaded connection 27 with the body 24 and having a flange 28 which overlaps a hollow arm 29 integral with the cover of the secondary pneumatic. The flanges 23 and 25 clamp the edges of a flexible diaphragm 30. The diaphragm 30 divides the primary pneumatic into two chambers 32 and 33 which communicate through a vent hole 31 in the diaphragm. Resting upon the diaphragm 30 is a wooden follower 34 having a central hole 35 and radial openings 36 in order to establish a communication between the chamber 33 and the vent hole 31. The follower 34 is supplied with a valve disk 37 seating against the lower end of the hollow plug 26. Attached to the follower 34 is a valve stem 38 which extends through the hollow plug 24 and is provided with a head 39 having a valve disk 40 which seats against the upper end of the hollow plug. The valve stem 38 is smaller than the hole through the hollow plug, forming an annular space 41 which communicates at its lower end with the chamber 33, and also by means of an opening 42, with the hollow arm 29 leading to the secondary pneumatic. A gasket 43 is inserted between the body 24 of the primary pneumatic and the hollow arm 29, and a similar gasket 44 is inserted between the arm 29 and the flange 28 of the hollow plug 26 to render these joints air tight.

45 denotes a vacuum chamber which is inclosed by a shallow rectangular inner tray 46 and a similar outer tray 47 which forms a cover for the tray 46, the edges of the trays 46 and 47 being soldered to render them air tight. The vacuum chamber 45 is connected by a pipe 48 with air exhausting apparatus, such as is commonly used in instruments of this class, and consisting of an exhaust bellows 49 operated by a foot treadle 50, and comprising an air chamber 51 communicating with the exhaust bellows, regulating chambers 52 and 53 having communicating air passages 54 and 55, regulated by valves 56 and 57, the former being controlled by a regulating bellows 58 having a regulating spring 59, and the valve 57 being controlled by a hand lever 60. An air passage 61 connects the air chamber 51 and the regulating chamber 53 and is controlled by a valve 62 arranged to be operated by a hand lever 63 for the purpose of closing the communication at will between the air chamber 51 and regulating chamber 53 to prevent the exhaustion of air from the vacuum chamber 45.

The above named mechanism, comprising bellows, foot pedals and connected valves for maintaining a state of air exhaustion from the vacuum chamber 45, forms no part of my present invention, as it is substantially like that now in common use in instruments of this class and its construction and operation will be well understood by those conversant with this class of instruments.

The sides of the vacuum chamber 45 are offset at intervals as shown at 64, Fig. 5, in order to slightly increase the distance between the side walls of the vacuum chamber where are inclosed circular spacing rings 65 notched on opposite edges at 66 to provide space for the free movement of air. Holes are formed in the side walls of the vacuum chamber concentrically with the spacing rings 65 to receive the short pipes 67, upon one end of which I support the secondary pneumatics 68 and upon the opposite end the valve chambers 69. The pipes 67 are provided with holes 70 forming a communication between the pipes 67 and the vacuum chamber 45. The secondary pneumatic 68 consists of a cup shaped shell 71 having a flange 72 and an internally screw threaded tubular extension 73 which is screwed upon the screw threaded end of the pipe 67 with an intervening gasket 74 between the shell 71 and the side wall of the vacuum chamber. The shell 71 is provided with a cover 75 having a flange 76 which incloses the flange 72 and pinched between the flanges 72 and 76 are the edges of a flexible diaphragm 77. Integral with the cover 75 is the hollow arm 29 having a hole 78 to receive the flanged hollow plug 26 of the primary pneumatic.

Attached to the opposite end of the pipe 67 is the valve chamber 69 consisting of a sheet metal shell, preferably integral with and drawn by suitable dies from a metal plate 79 forming the upper plate of a motor pneumatic 80. The motor pneumatic 80 consists of the metal plates 79 and 81 provided with wooden linings 82, to the edges of which are attached leather or rubber cloth 83 in the form of a bellows, and inclosing an air chamber 84 communicating with the valve chamber 69 by an opening 85. The metal plates 79 and 81 are extended at the smaller end of the motor pneumatic at 86, 86, to form a tubular barrel 87 inclosing a pintle 88 by which the two sides of the motor pneumatic are hinged together in order to relieve the flexible leather connection 83 from strain. The valve chamber 69 is provided with a screw threaded opening 89 to receive an annular valve seat 90 stamped from sheet metal and integral with a cover 91 having flanges 92, and on its lower side an opening 93 for the admission of outside air to the valve chamber 69. Between the flanges 92 and the valve chamber 69 I insert a gasket 94 to prevent the admission of out-

side air to the valve chamber except through the valve seat 90 and the opening 93. One end of the pipe 67 is open and flanged upon the inner side of the valve chamber 69 to form a valve seat 95, and the opposite end of the pipe 67 is closed and provided with openings 96 forming a communication between the interior of the pipe 67 and the interior of the shell 71 of the secondary pneumatic. Wooden bushings 97 and 98 are inserted in the closed end of the pipe 67 and in the cover 91 respectively to form ways for a sliding valve stem 99 attached at one end to a follower 100 which is normally held against the flexible diaphragm 77 by a spiral spring 101 inserted between the bushing 98 and a screw threaded sleeve 102 carried by the valve stem 99. Carried by the valve stem 99 is a valve 103 normally held in contact with the valve seat 95 by the spiral spring 101. Carried by the screw threaded sleeve 102 is a similar valve 104 arranged to contact with the valve seat 90 when the valve is actuated by the flexible diaphragm 77. Inserted between the vacuum chamber 45 and the valve chamber 69 is a short spacing sleeve 105 having at its ends flanges 106, 107, which bear against gaskets 108 and 109. The three gaskets 74, 108 and 109 are all compressed by screwing the shell 71 of the secondary pneumatic upon the screw threaded end of the pipe 67. The vacuum chamber 45 communicates through a pipe 110 with the chamber 33 of the primary pneumatic, so that a vacuum is maintained in the chamber 33 corresponding with that in the vacuum chamber 45. The pipe 110 is securely soldered at one end to the body portion 24 of the primary pneumatic and its opposite end is coupled by an ordinary screw threaded coupling 111 to a short nipple 112 which is securely soldered to the tray 46 and communicates with the vacuum chamber 45. The lower side of the motor pneumatic 80 is provided with an arm 113 having a hole 114 in its free end to receive a connecting rod 115 having a button 116 resting on the arm 113 and pivoted at its upper end to one end of a key striker 117. The key striker 117 is pivoted in a fulcrum bar 118 and carries at its opposite end a head 119 adapted to depress one of the keys 120 of the piano when actuated by the motor pneumatic 80.

The operating parts of the several pneumatics and their connected valves are normally in the position shown in Fig. 5 whenever the corresponding duct of the tracker board is closed by the music sheet 3, but whenever a perforation in the music sheet allows air to enter into the chamber 32 of the primary pneumatic, the flexible diaphragm 30 is raised by the air pressure beneath it, the chamber 33 being in a state of air exhaustion through its connection by the

pipe 110 with the vacuum chamber 45. The upward movement of the flexible diaphragm 30 lifts the valve stem 38 and carries the valve disk 40 away from its seat and the valve 37 against its seat, thereby allowing outside air to pass through the annular space 41, opening 42, and hollow arm 29 into the space between the flexible diaphragm 77 and the cover 75 of the secondary pneumatic, and supplying air pressure to move the flexible diaphragm 77 to the right. This movement of the flexible diaphragm 77 slides the valve stem 99 against the tension of the spiral spring 101 to close the valve 104 and open valve 103, thereby closing the air chamber 84 in the motor pneumatic 80 to the outside air and bringing it in communication through the pipe 67 and openings 70 with the vacuum chamber 45, producing a partial vacuum in the motor pneumatic and causing it to be immediately collapsed by the pressure of the outside air against the side 81 and lifting the connecting rod 112. The closing of the duct in the tracker board by the music sheet 3 cuts off the supply of air to the chamber 32 in the primary pneumatic, and the air already contained in the chamber 32 passes through the vent hole 31 in the flexible diaphragm 30, and through the central hole 35 and radial openings 36 of the follower into the chamber 33 to be exhausted through the pipe 110 and vacuum chamber 45. When the air pressure upon opposite sides of the flexible diaphragm 30 has been equalized by the passage of air through the vent hole 31, the follower 34 and valve stem 38 are returned by gravity into the position shown in Fig. 5, closing the valve 40 and opening the valve 37, thereby allowing the air which has served to move the diaphragm 77 to be exhausted through the hollow arm 29, chamber 33 and pipe 110 into the vacuum chamber 45, thereby equalizing the air pressure upon opposite sides of the flexible diaphragm 77 and allowing the tension of the spiral spring 101 to reverse the motion of the valve stem 99, bringing it again into the position shown in Fig. 5, closing the valve 103 and opening the valve 104 to the outside air which rushes into the chamber 84 to restore the air pressure on opposite sides of the hinged side of the motor pneumatic, causing the motor pneumatic to open and the connecting rod 115 to descend by gravity, thereby reversing the movement of the key striker 117 and allowing the piano key to rise.

I employ a single common vacuum chamber which enables me to secure a uniform air exhaustion for each set of pneumatics. Each set of pneumatics is supported upon a single short pipe 67 which is inserted through the walls of the vacuum chamber, one end of the short pipe 67 being attached to the valve chamber 69 which supports the motor

pneumatic, and the opposite end being removably attached by a screw threaded connection to the secondary pneumatic 68 which is provided with an integral hollow arm 29 upon which the primary pneumatic 9 is supported. The primary pneumatic is readily removed by withdrawing the hollow plug 26 and the secondary and motor pneumatics are removed by unscrewing the secondary pneumatic from the pipe 67. By unscrewing the valve seat 90 the spring 101 can be replaced and the valves 103 and 104 removed or the valve 104 adjusted on its screw threaded sleeve 102. The cover 91 is provided with an opening 93 on its under side near the top of the motor pneumatic, thereby preventing the settling of dust within the valve chamber 69.

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

1. In a pneumatic action and in combination, a supporting frame, a tracker board mounted on the frame, a pneumatic a pipe connected at one end to a duct of the tracker board, a pipe connected at one end to said pneumatic, the opposite ends of the pipes having complementary flanges means for holding one flange in fixed position, a plate overlapping the other flange, and means mounted upon the said frame for compressing said plate against the flange.

2. In a pneumatic action, the combination of a series of air conducting pipes each formed in sections, flanges on the opposing ends of said sections, a block abutting the flanges on one section of said pipes, said block being mounted on a stationary part of the instrument whereby the same is supported in proper relation thereto, intervening gaskets between said flanges, a plate having transverse slots extending partially across the plate forming a series of elastic sections having their free ends overlapping the flanges on the other sections of said pipes, and screws held in said block for compressing said elastic plates on said flanges.

3. In a pneumatic action, the combination with a series of pneumatics, of a single vacuum chamber for said pneumatics, consisting of oppositely disposed trays having overlapping flanges, and provided with a series of holes in the opposite walls in alinement, and communicating with said pneumatics.

4. In a pneumatic action, the combination with a series of pneumatics, of a common vacuum chamber for said pneumatics consisting of a covered pan or tray having alined holes in its opposite walls for said pneumatics, and a series of spacing rings inclosed in said chamber.

5. In a pneumatic action, the combination with a series of pneumatics, of a common vacuum chamber communicating with said

pneumatics, and consisting of a covered pan or tray having alined holes in its opposite walls, with the walls of said chamber offset concentrically with said holes.

6. In a pneumatic action, the combination of a vacuum chamber having alined holes in its opposite walls, a pipe inserted in said chamber and communicating therewith, a motor pneumatic supported by one end of said pipe and a secondary pneumatic attached to the opposite end of said pipe.

7. In a pneumatic action, the combination with a vacuum chamber having alined holes in its opposite walls, of a pipe inserted in said holes and communicating with said vacuum chamber, a valve chamber attached to one end of said pipe, a motor pneumatic supported by said valve chamber, a secondary pneumatic removably attached to the opposite end of said pipe, with said valve chamber and motor pneumatic on one side of said vacuum chamber, and with the secondary pneumatic on the opposite side of said vacuum chamber.

8. In a pneumatic action, the combination with a vacuum chamber having alined holes in its opposite walls, of a pipe inserted in said holes and communicating with said chamber, a valve chamber attached to one end of said pipe, a secondary pneumatic removably attached to the opposite end of said pipe, and a flanged spacing sleeve between said valve chamber and said vacuum chamber.

9. In a pneumatic action, the combination with a vacuum chamber consisting of a covered metallic pan or tray, a series of motor pneumatics on one side of said vacuum chamber, and a series of corresponding secondary pneumatics on the opposite side of said vacuum chamber, and a pipe connecting said motor and secondary pneumatics and communicating with said vacuum chamber.

10. In a pneumatic action, the combination with a vacuum chamber, of a valve chamber outside said vacuum chamber, valves in said valve chamber, a motor pneumatic attached to said valve body, a tube attached to said valve chamber and entering said vacuum chamber, a flanged spacing sleeve on said tube, gaskets between said flanged sleeve and said vacuum chamber and said valve chamber, and a secondary pneumatic operatively connected with said valves, and having a screw threaded connection with said tube.

11. In a pneumatic action, the combination with a motor pneumatic having inclosing metallic plates, one of which is movable of a valve chamber integral with one of said inclosing metallic plates and communicating with said motor pneumatic, a striker rod having connection with the movable plate, a vacuum chamber, a communicating

air passage between said valve chamber and said vacuum chamber, and an air passage admitting outside air to said valve chamber.

12. In a pneumatic action, the combination with a vacuum chamber, of a motor pneumatic associated therewith a secondary pneumatic outside of and adjoining said vacuum chamber and communicating therewith, of a hollow arm extending from said secondary pneumatic and a primary pneumatic supported by said hollow arm and communicating therewith, all of said parts being of sheet metal.

13. In a pneumatic action, the combination with a motor pneumatic and secondary pneumatic comprising a metallic shell and a metallic cover therefor, of a hollow arm extending from said cover and a primary pneumatic supported by said arm and communicating therewith.

14. In a pneumatic action, the combination with a vacuum chamber, of a secondary pneumatic outside said vacuum chamber and supported thereby, a hollow arm extending from said secondary pneumatic and having a hole therethrough, a primary pneumatic comprising a metallic shell, having a screw thread and a hollow flanged plug passing through said hollow arm and engaging said screw thread, whereby said primary pneumatic is attached to said hollow arm.

15. In a pneumatic action, the combination of a vacuum chamber consisting of a covered pan or tray, a motor supported by said vacuum chamber on one side thereof, a secondary pneumatic supported by said vacuum chamber and on the opposite side thereof, and a primary pneumatic supported by said secondary pneumatic.

16. In a pneumatic action, the combination with a motor pneumatic and a vacuum chamber, of a valve chamber between said motor pneumatic and said vacuum chamber, an air passage between said valve chamber and the outside air, and a cup shaped cover for said air passage having a restricted opening in its side adjacent said motor pneumatic whereby the settling of dust within said valve chamber is prevented.

17. In a pneumatic action for musical instruments, a tracker board, a pneumatic, a conduit communicating at one end with the tracker board, a supporting member for the opposite end of said conduit, a conduit communicating at one end with said pneumatic and at its opposite end with said first mentioned conduit, and means secured to a stationary part of the instrument for supporting and retaining the same in juxtaposition to said first mentioned conduit.

18. In a pneumatic action, a tracker board, a pneumatic, a conduit communicating at one end with said tracker board, a supporting member for the opposite end of said conduit, a conduit communicating at

one end with said pneumatic and at its opposite end with said first mentioned conduit, flanges on the opposing ends of the conduits, and means mounted on a stationary part of the instrument for engaging the flange of the pneumatic conduit and retaining the last mentioned conduit in juxtaposition to said first mentioned conduit, whereby is provided a continuous passage from the tracker board to the pneumatic.

19. In a pneumatic action, a tracker board and a pneumatic in combination with a conduit establishing communication therebetween and comprising sections, a supporting block for one of said sections having an aperture therethrough, and a recess in one of its sides connecting with said aperture, the end of one of said sections being mounted in said aperture of the block and having a flanged terminal resting in the recessed portion thereof, and the opposing end of the cooperating section having a complementary flange, and means mounted on a stationary part of the instrument for supporting said opposing end of the cooperating section.

20. In a pneumatic action for musical instruments, a tracker board and a pneumatic, in combination with a conduit establishing communication therebetween and comprising sections, a supporting block for one of said sections having an aperture therethrough, and a recess in one of its sides connecting with said aperture, the end of one of said sections being mounted in said aperture of the block and having a flanged terminal resting in the recessed portion thereof, and the opposing end of the cooperating section having a complementary flange, a gasket interposed between the respective flanges, and means for retaining the respective flanges in contact including an overlapping clamping plate, a stationary support on the instrument, and holding means mounted on said support and engaging said plate at a point removed from the respective sections.

21. In a pneumatic action, a tracker board and a series of pneumatics, in combination with a conduit establishing communication between the same, there being one conduit for each pneumatic the conduit comprising two sections, flanges on the opposing ends of the sections, a support for one of said sections adjacent the flange thereof, and means for retaining the opposing end of the complementary section in juxtaposition to the first mentioned section including a plate, common to and engaging each flange of the complementary sections, a support therefor, comprising a stationary part of the instrument, means for securing the plate to the support at a point spaced from the respective conduits, and a supporting flange on the plate arranged to abut said support.

22. In a pneumatic action, a tracker board

and a pneumatic, in combination with a conduit establishing communication between the same, the conduit comprising two sections, flanges on the opposing ends of the sections, a support for one of said sections adjacent the flange thereof, and means for retaining the opposing end of the complementary section in position relative to the first mentioned section, including a clamping plate having a slotted edge engaging over the complementary section of the conduit, the wall of the plate adjacent the sides of the slot engaging the flange of said section, means for securing the plate to a stationary part of the instrument, and a supporting flange on the plate arranged to abut said stationary part.

23. In a pneumatic action for musical instruments, the combination with a pneumatic, of an air conducting tube in two sections communicating with the pneumatic, flanges on the opposing ends of said sections, a plate having a supporting flange at one edge, and an open slot inclosing one section of the tube at its opposite edge, and means for securing said flange to the instrument and for compressing the slotted edge of said plate against the other of said flanges.

24. In a pneumatic action, the combination with a series of pneumatics, of air conducting tubes one for each pneumatic each in two sections, one of which communicates with one of said pneumatics, a connection between said sections comprising flanges on the opposing ends thereof, an interposed gasket between said flanges, means for holding one of said flanges from movement, a plate having a supporting flange at one edge, and a plurality of open slots each inclosing one section of each pipe at its opposite edge, and means for compressing the slotted edge of said plate against the other of said flanges.

25. In a pneumatic action for musical instruments, a supporting frame, a tracker board having a duct therein, a conduit connecting with the latter at one end, means for supporting the opposite end of the conduit to said frame, a pneumatic, a conduit connecting with the pneumatic at one end, and means for supporting the opposite end thereof whereby the same may register with and form a continuation of the tracker board conduit, the said means including a flange on the pneumatic conduit, a movable plate engaging over said flange, and means for pressing said plate against the flange and securing it to the said supporting frame.

26. In a pneumatic action for musical instruments, the combination of a supporting frame, a tracker board having a series of ducts therein, a series of conduits connecting with the latter at one end, means for supporting the opposite ends of the said conduits to said frame, a series of pneumatics, a series of conduits one for each pneumatic, connected with the pneumatics at one end,

and a single means for supporting the opposite end thereof whereby the same may register with and form continuations of the conduits of the tracker board, the said means including flanges on the pneumatic conduits, and a movable plate extending longitudinally of the frame and having a plurality of slots engaging over the respective flanges of the conduits, and means for pressing said plate against the flanges and securing it to said supporting frame.

27. In a pneumatic action, the combination of a vacuum chamber, a primary pneumatic, and a secondary pneumatic said pneumatics being independently formed and separable as an independent unit and having independent communication with the vacuum chamber.

28. In a pneumatic action, the combination of a vacuum chamber, a series of primary pneumatics and a series of secondary pneumatics the primary and secondary pneumatics having independent communication with the vacuum chamber, the primary and secondary pneumatics being formed of independent metallic construction and removably connected together.

29. In a pneumatic action for musical instruments, the combination of a single vacuum chamber, a plurality of primary pneumatics, a plurality of secondary pneumatics, the primary and secondary pneumatics constituting complete pneumatics separable one from the other, a communication between said pneumatics, communication between the secondary pneumatics and said vacuum chamber, and independent communication between the primary pneumatics and a branch of said vacuum chamber.

30. A pneumatic action for musical instruments having a tracker board and a secondary pneumatic, in combination with a primary pneumatic interposed therebetween and comprising a cup section having communication with the tracker board and a flange at the upper end thereof, a body portion having a complementary flange at its lower end bent to form a return bend adapted to fit over and interlock with the flange of the cup section, a removable connection between the primary and secondary pneumatics including a conduit establishing communication between the body portion of said primary pneumatic and said secondary pneumatic, a motor pneumatic, and a vacuum chamber having communication with each of said pneumatics.

31. A pneumatic action for musical instruments having a tracker board and a secondary pneumatic, in combination with a primary pneumatic removably connected to the secondary pneumatic and comprising a cup section having communication with the tracker board and a flange at the upper end thereof, a body portion having a comple-

mentary flange at its lower end bent to form a return bend adapted to fit over and interlock with the flange of the cup section, the secondary pneumatic having a cover, an integral hollow extension on said cover forming a conduit establishing communication between said secondary pneumatic and a part carried by the body portion of the primary pneumatic, a motor pneumatic and a vacuum chamber interposed between the motor pneumatic and the other pneumatics.

32. A pneumatic action for musical instruments having a tracker board and a secondary pneumatic, in combination with a primary pneumatic interposed therebetween and comprising a cup section having communication with the tracker board, and a flange at the upper end thereof, a body portion having a complementary flange at the lower end thereof bent to form a return bend adapted to fit over and interlock with the flange of the cup section, and a connection establishing communication between the secondary pneumatic and the body portion of the primary pneumatic comprising a hollow block carried by said body portion, and an integral hollow extension on the secondary pneumatic communicating with said block, and sleeved thereon.

33. A pneumatic action for musical instruments having a tracker board and a secondary pneumatic, in combination with a primary pneumatic interposed therebetween and comprising a cup section having communication with the tracker board and a flange at the upper end thereof, a body portion having a complementary flange at the lower end thereof bent to form a return bend adapted to fit over and interlock with the flange of the cup section, and a connection establishing communication between the secondary pneumatic and the body portion of the primary pneumatic comprising a hollow block carried by said body portion, and an integral hollow extension on the secondary pneumatic communicating with said block, and sleeved thereon, the block having a flange overlapping said sleeved portion of the extension.

34. A pneumatic action for musical instruments having a tracker board and a secondary pneumatic, in combination with a primary pneumatic interposed therebetween and comprising a cup section having communication with the tracker board, and a flange at the upper end thereof, a body portion having a complementary flange at the lower end thereof bent to form a return bend adapted to fit over and interlock with the flange of the cup section, and a connection establishing communication between the secondary pneumatic and the body portion of the primary pneumatic comprising a hollow block carried by said body portion, and an integral hollow extension on the second-

ary pneumatic communicating with said block, and sleeved thereon, the block having a flange overlapping said sleeved portion of the extension, and the body portion of the primary pneumatic having a flange upon which rests the lower portion of said sleeved portion of the extension, and gaskets interposed between the said flanges and the respective upper and lower surfaces of said sleeved portion.

35. In a pneumatic action for musical instruments, the combination with key striking instrumentalities, of a pneumatic operatively associated therewith, and including connected hollow sections separated from one another by an apertured diaphragm, a block connected to one of said sections and having an opening extending longitudinally there-through, a follower resting upon the diaphragm and having central and radial openings therein establishing communication between the two chambers formed by said diaphragm, a valve stem extending loosely through said hollow block and connected with said follower, and valve disks mounted upon said stem arranged to respectively close the open ends of said block.

36. In a pneumatic action, the combination with a motor pneumatic, of a primary pneumatic, a secondary pneumatic, and an integral hollow arm extending from said secondary pneumatic and having communication with the primary pneumatic.

37. In a pneumatic action, the combination with a motor pneumatic of a primary pneumatic comprising a metallic body portion, a secondary pneumatic comprising a metallic body portion, and a hollow arm extending between said primary and secondary pneumatics and connected therewith.

38. In a pneumatic action, the combination with a motor pneumatic of a primary pneumatic comprising a metallic body, a secondary pneumatic comprising a metallic body and an integral hollow arm extending from said secondary pneumatic and supporting the primary pneumatic with which it communicates.

39. In a pneumatic action, the combination with a motor pneumatic, of a primary pneumatic, a secondary pneumatic, and a connection between said primary and secondary pneumatics including a hollow block carried by said primary pneumatic, and an integral hollow extension on the secondary pneumatic communicating with said block, and sleeved thereon.

40. In a pneumatic action, the combination with a primary pneumatic, of a secondary pneumatic, and a connection between said pneumatics including a hollow block carried by said primary pneumatic, and an integral hollow extension on the secondary pneumatic communicating with said block and sleeved thereon, the block having a flange overlap-

ping said sleeved portion of the extension, and a motor pneumatic.

41. In a pneumatic action, the combination with a primary pneumatic, of a secondary pneumatic, a connection between said pneumatics including a hollow block carried by said primary pneumatic and an integral hollow extension on the secondary pneumatic communicating with said block and sleeved thereon, the block having a flange overlapping said sleeved portion of the extension, the primary pneumatic having a flange upon which rests the lower portion of said sleeved portion of the extension, and gaskets interposed between said flanges and the respective upper and lower surface of said sleeved portion.

42. In a pneumatic action, a pneumatic, a vacuum chamber therefor, consisting of oppositely disposed trays having overlapping flanges, one of said trays having an opening communicating with said pneumatic.

43. In a pneumatic action, a pneumatic, a vacuum chamber therefor, consisting of oppositely disposed trays having overlapping flanges, one of said trays having an opening therein communicating with said pneumatic, and means for spacing the opposite walls of the trays.

44. In a pneumatic action, a pneumatic, a vacuum chamber therefor, consisting of oppositely disposed trays having overlapping flanges, one of said trays having an opening communicating with said pneumatic, and a spacing ring within said chamber.

45. In a pneumatic action, the combination with a series of pneumatics, of a common vacuum chamber for said pneumatics consisting of a covered pan or tray, alined holes in its opposite walls for said pneumatics, and means within the chamber for spacing said walls.

46. In a pneumatic action, the combination with a pneumatic, of a vacuum chamber therefor consisting of a covered pan or tray having an opening therein for said pneumatic, and a spacing ring within said chamber.

47. In a pneumatic action, the combination with a pneumatic, of a vacuum chamber communicating therewith and consisting of a covered pan or tray having an opening in one of the walls thereof, the walls of said chamber being offset, and a spacing ring within said offset portions.

48. In a pneumatic action, the combination with a pneumatic, of a vacuum chamber communicating therewith and consisting of a covered pan or tray having an opening in one of the walls thereof, the walls of said chamber being offset, and a spacing ring within said offset portions having a series of openings therethrough.

49. In a pneumatic action, the combination with a pneumatic, of a vacuum chamber

communicating therewith and consisting of oppositely disposed inclosing walls, and a spacing ring within said chamber having a series of openings therein.

50. In a pneumatic action, a pneumatic, a vacuum chamber communicating therewith, consisting of oppositely disposed walls having peripheral overlapping flanges secured to one another, and a spacing ring within said chamber.

51. In a pneumatic action, a pneumatic, a vacuum chamber communicating therewith and consisting of oppositely disposed inclosing walls, and a spacing ring within said chamber having a notched edge.

52. In a pneumatic action, a pneumatic, a vacuum chamber communicating therewith, and consisting of oppositely disposed inclosing walls, and a spacing ring within said chamber, the opposite edges of said ring being alternately notched.

53. In a pneumatic action, the combination of a pneumatic, a vacuum chamber communicating therewith, and consisting of oppositely disposed walls having peripheral overlapping flanges secured to one another, and a spacing ring within said chamber, the opposite edges of said ring being alternately notched.

54. In a pneumatic action, the combination with a motor pneumatic, of a vacuum chamber, a secondary pneumatic outside the same and communicating therewith, a cover for the pneumatic having an integral hollow arm extending therefrom, and a primary pneumatic supported by said hollow arm and communicating therewith.

55. In a pneumatic action, the combination with a vacuum chamber, of a motor pneumatic, a secondary pneumatic outside the vacuum chamber and communicating therewith, the same comprising a cup section having a flange thereon, and a cover having a complementary flange secured to said first mentioned flange, a hollow arm extending from said cover, and a primary pneumatic detachably supported by said hollow arm and communicating therewith.

56. In a pneumatic action, the combination with a vacuum chamber, of a motor pneumatic, a secondary pneumatic outside the vacuum chamber and communicating therewith, the same comprising a cup section having a flange thereon, and a cover having a complementary flange bent to form a return bend adapted to fit over and interlock with the flange of the cup section, a hollow arm extending from said cover, and a primary pneumatic supported by said hollow arm and communicating therewith.

57. In a pneumatic action, the combination with a vacuum chamber, of a motor pneumatic, a secondary pneumatic outside the vacuum chamber and communicating therewith, comprising a cup section having

a flange thereon, and a cover having a complementary flange bent to form a return bend adapted to fit over and interlock with the flange of the cup section, a gasket interposed between said flanges, a hollow arm extending from said cover, and a primary pneumatic supported by said hollow arm and communicating therewith.

58. In a pneumatic action, the combination with a vacuum chamber, of a motor pneumatic, a secondary pneumatic outside the vacuum chamber and communicating therewith, comprising a cup section having a flange thereon and a cover having a complementary flange bent to form a return bend adapted to fit over and interlock with the flange of the cup section, a gasket interposed between said flanges, an integral hollow arm extending from said cover, and a primary pneumatic supported by said hollow arm and communicating therewith.

59. In a pneumatic action, the combination with a vacuum chamber, comprising oppositely disposed metallic walls, one of which has an opening therein, of a secondary pneumatic communicating therewith through said opening and comprising a cup section having a flange at its smaller end fitted within said opening and an independently formed detachable flange at its opposite end, a cover having a complementary flange secured to said last mentioned flange of the cup section, a hollow arm extending from said cover, and a primary pneumatic supported by said hollow arm.

60. In a pneumatic action, the combination with a vacuum chamber, comprising oppositely disposed metallic walls, one of which has an opening therein, of a secondary pneumatic communicating therewith through said opening and comprising a cup section having a flange at its smaller end fitted within said opening, a gasket mounted upon said flange and interposed between the cup shaped portion of the pneumatic and the opposing walls of the vacuum chamber, a cover for said pneumatic, a hollow arm extending from said cover, and a primary pneumatic supported by said hollow arm.

61. In a pneumatic action for musical instruments, the combination of a vacuum chamber, a primary pneumatic and a secondary pneumatic, said pneumatics being independently formed and constructed of metal, means for mounting said secondary pneumatic to one side of the vacuum chamber, means for mounting the primary pneumatic on a part carried by the secondary pneumatic, and each of which pneumatics has communication with the vacuum chamber, a valve chamber upon the opposite side of the vacuum chamber and communicating therewith, and a motor pneumatic communicating with the valve chamber and connected thereto.

62. In a pneumatic action, the combination

with a vacuum chamber, of a valve chamber upon one side thereof, a tube connected to the valve chamber and communicating with the vacuum chamber and a pneumatic adjoining the opposite side of the vacuum chamber and having communication with the latter, through said tube.

63. In a pneumatic action, the combination with a series of motor pneumatics, a series of valve chambers communicating with said motor pneumatics, a series of secondary pneumatics, a vacuum chamber adjoining and having communication with said secondary pneumatics and each having communication with said valve chamber through a tube connected to the latter, the vacuum chamber being located between the secondary pneumatics and valve chambers and without the same.

64. In a pneumatic action, the combination with a vacuum chamber, of a valve chamber arranged without said vacuum chamber, a tube connected to said valve chamber and communicating with said vacuum chamber, and a spacing sleeve on said tube.

65. In a pneumatic action, the combination with a vacuum chamber, a valve chamber arranged without said vacuum chamber, a tube connected to said valve chamber and communicating with said vacuum chamber, and a spacing sleeve having flanged terminals arranged to engage opposing surfaces of said chambers.

66. In a pneumatic action, the combination with a vacuum chamber, of a valve chamber arranged without said vacuum chamber, a tube connected to said valve chamber and communicating with said vacuum chamber, a spacing sleeve having flanged terminals arranged to engage opposing surfaces of said chambers, and gaskets interposed between said flanges and opposing surfaces.

67. In a pneumatic action, the combination with a vacuum chamber, of a primary pneumatic, a secondary pneumatic, and a motor pneumatic, a metallic valve chamber connected to the motor pneumatic and arranged without the vacuum chamber, and a tube connecting respectively with the valve and vacuum chambers and secondary pneumatics.

68. In a pneumatic action, the combination with a vacuum chamber, of a pneumatic, a metallic valve chamber connected to the pneumatic and arranged without the vacuum chamber, and a tube having a flange at one end overlapping the inner wall surrounding an opening in the valve chamber, and having at its opposite end a screw threaded connection with the pneumatic.

69. In a pneumatic action, the combination with a vacuum chamber, of a pneumatic, a metallic valve chamber connected to the pneumatic and arranged without the vacuum chamber, and a tube having a flange at one end overlapping the inner wall surrounding

an opening in the valve chamber and connecting at its opposite end with the vacuum chamber, and a valve in the valve chamber, the flanged end of said tube constituting a
5 seat for said valve.

70. In a pneumatic action, the combination of a vacuum chamber of a pneumatic, a metallic valve chamber connected to the pneumatic and arranged without the vacuum
10 chamber, and a tube having a flange at one end overlapping the inner wall surrounding an opening in the valve chamber and connecting at its opposite end with the vacuum chamber, a cover for the valve chamber hav-
15 ing an inwardly extended flange, and a pair of valves in the valve chamber, the flanges on said cover and tube acting as seats for the respective valves.

71. In a pneumatic action, the combination of a vacuum chamber formed of metal, a metallic valve chamber to one side of the vacuum chamber, a tube connecting the valve chamber to the vacuum chamber, a pneu-
20 matic formed of metal arranged upon the opposite side of the vacuum chamber and adjoining the same and having communication therewith through said tube, and an auxiliary pneumatic carried by the first
25 pneumatic.

72. In a pneumatic action, the combination with a vacuum chamber, of a pneumatic upon one side of said chamber, a valve chamber connected to the opposite side of the
30 same and consisting of a sheet metal shell having a tube extending through the vacuum chamber and communicating with the pneumatic, and a pneumatic connected to said
35 shell.

73. In a pneumatic action, the combination with a vacuum chamber, of a primary pneumatic, and a secondary pneumatic upon
40 one side thereof, a motor pneumatic upon the opposite side thereof, and a metallic valve chamber communicating respectively with said motor pneumatic and vacuum chamber, and consisting of an integral projection of
45 said motor pneumatic.

74. In a pneumatic action, the combination with a vacuum chamber, of a pneumatic upon one side thereof, and communicating
50 therewith, a motor pneumatic upon the opposite side thereof, a metal valve chamber consisting of an integral projection of said motor pneumatic, and a tube establishing
55 communication between the motor pneumatic, valve chamber and vacuum chamber, the tube having an apertured end communicating with the first mentioned pneumatic.

75. In a pneumatic action, the combination of a pneumatic, a metallic valve chamber communicating therewith and consisting
60 of an integral projection thereof, the valve chamber having a screw threaded opening, a valve in the valve chamber, and a seat for
65 said valve threaded into said opening.

76. In a pneumatic action for musical instruments, the combination of a vacuum chamber, of a primary pneumatic and secondary pneumatic, the primary pneumatic being supported by the secondary pneumatic
70 which latter is mounted on one side of the vacuum chamber, a motor pneumatic upon the opposite side of the vacuum chamber, a valve chamber consisting of an integral projection of said motor pneumatic and a tube
75 establishing communication between the motor pneumatic valve chamber and vacuum chamber, the tube having an apertured end communicating with the first mentioned pneumatic.

77. In a pneumatic action, the combination with a vacuum chamber, of a primary pneumatic and a secondary pneumatic connected together and arranged at one side of the vacuum chamber, the said pneumatics
80 having independent communication with the vacuum chamber, a motor pneumatic upon the opposite side of the vacuum chamber, a metallic valve chamber connected to said motor pneumatic, and a tube establishing
85 communication between the motor pneumatic and valve chamber, said tube extending into the vacuum chamber and having apertures intermediate its ends communicating with the vacuum chamber, and an aper-
90 tured terminal communicating with the secondary pneumatic.

78. In a pneumatic action, the combination with a vacuum chamber, of a metallic valve chamber having an opening therein, a
100 valve within the valve chamber, and a cover for said opening stamped from sheet metal and having an integral annular valve seat for said valve, a metal tube extending from the valve chamber to a point within the
105 vacuum chamber and having apertured portions communicating therewith and a pneumatic connected to said tube.

79. In a pneumatic action, the combination of a metallic vacuum chamber, a sec-
110 ondary pneumatic formed of metal adjoining one wall of the vacuum chamber and having communication therewith a primary pneumatic formed of metal and secured to an extension of said secondary pneumatic
115 and a motor pneumatic arranged upon the opposite side of the vacuum chamber and having communication therewith.

80. In a pneumatic action, the combination with a vacuum chamber, of a metallic
120 valve chamber connected therewith and having an opening, a valve within said chamber, a sheet metal cover for said opening stamped to form an upset flange overlapping the outer wall surrounding said opening, and an
125 inner annular flange constituting a seat for said valve.

81. In a pneumatic action, the combination with a vacuum chamber, of a metallic
130 valve chamber communicating at one end

therewith and open at its opposite end, the wall adjacent said opening being bent to form a return bend having a screw threaded portion, a cover fitted into said opening and having complementary threads, a flange on said cover overlapping the outer wall surrounding said opening, and a gasket interposed between said wall and flange.

82. In a pneumatic action, the combination with a vacuum chamber of a metallic valve chamber communicating at one end therewith and open at its opposite end, the wall adjacent said opening being bent to form a return bend, and a cover fitted into said return bent portion.

83. In a pneumatic action, the combination with a vacuum chamber of a metallic valve chamber communicating at one end therewith and open at its opposite end, the wall adjacent said opening being bent to form a return bend, a valve in the valve chamber, a cover fitted into said return bent portion, a flange on the cover overlapping the outer wall surrounding said opening, and a flange extending beyond said return bent portion and constituting a seat for the valve.

84. In a pneumatic action for musical instruments, the combination with a valve chamber, of an integral motor pneumatic communicating therewith and having collapsible sides connected by flexible material, of metal plates attached to said sides extending beyond the sides and inclosing a pintle by which said sides are hinged together and a striker rod having connection with and movable by one of said plates.

85. In a pneumatic action for musical instruments, the combination of a valve chamber and an integral pneumatic operatively connected therewith, comprising a pair of metal plates, wooden linings for said plates, and a flexible connection connecting the edges of said linings, and a striker rod with means for connecting the same to one of said plates to move therewith.

86. In a pneumatic action for musical instruments, a metallic valve chamber and an integral pneumatic including a pair of hinged metallic plates, and a striker rod having a connection with one of the said plates.

87. In a pneumatic action for musical instruments, and in combination, key striking instrumentalities, and a metallic valve chamber and an integral pneumatic operatively associated therewith including a pair of hinged metallic plates, wooden linings for said plates and a flexible connection between the plates.

88. In a pneumatic action for musical instruments, and in combination, a pneumatic, comprising oppositely disposed hinged members, one of which is relatively station-

ary and a valve chamber formed by an extension of said stationary member, and key striking instrumentalities carried by the other member.

89. In a pneumatic action for musical instruments, and in combination, key striking instrumentalities, a pneumatic operatively associated therewith, comprising oppositely disposed hinged members, one of which is relatively stationary, and a valve chamber formed by an integral extension of said stationary member.

90. In a pneumatic action, the combination of a vacuum chamber, a motor supported by said vacuum chamber on one side thereof, a secondary pneumatic supported by said vacuum chamber and on the opposite side thereof, and a primary pneumatic supported by said secondary pneumatic.

91. In a pneumatic action, the combination of a vacuum chamber consisting of a covered pan or tray, a primary pneumatic, a valve chamber supported on the rear surface of said vacuum chamber, and a secondary pneumatic supported on the front surface thereof.

92. In a pneumatic action for musical instruments the combination of a vacuum chamber, a secondary pneumatic, means for removably supporting the same on the wall of the vacuum chamber, a motor pneumatic with means for supporting it in operative position, and a primary pneumatic constructed of a complete unit and removably carried by the secondary pneumatic.

93. In a pneumatic action for musical instruments, the combination with a vacuum chamber, of a primary pneumatic element, a secondary pneumatic element both of which elements communicate with the vacuum chamber and are of independent construction, and means for securing the said elements to the same side of the vacuum chamber.

94. In a pneumatic action for musical instruments, the combination of a vacuum chamber, of a primary pneumatic, and a secondary pneumatic each formed as independent elements, means for detachably securing the pneumatic together and means for removably supporting one of said pneumatics on the vacuum chamber, and a motor pneumatic operatively associated with said pneumatics.

95. In a pneumatic action for musical instruments, the combination with a vacuum chamber, of a primary and secondary pneumatic removably secured together, a supporting connection between the same and the vacuum chamber, and a striking pneumatic independently secured to the vacuum chamber.

96. In a pneumatic action for musical instruments, the combination with a vacuum

chamber, of a primary and secondary pneumatic removably secured to one side of the chamber, and a striking pneumatic removably secured to the opposite side of the chamber.

97. In a pneumatic action for musical instruments, the combination with a vacuum chamber, of a primary and secondary pneumatic, independently and removably secured at one side of the vacuum chamber and supported by the vacuum chamber, a striking pneumatic independently secured to the opposite side of the vacuum chamber, and an interposed valve.

98. In a pneumatic action for musical instruments, the combination with a vacuum chamber, of a primary and a secondary pneumatic comprising independent structures, means for removably securing both together and to the vacuum chamber, a striking pneumatic independently secured to the vacuum chamber, and an interposed valve.

99. In a pneumatic action for musical instruments, the combination with a vacuum chamber, of a removable primary pneumatic and an independently removable secondary pneumatic, said pneumatics being connected to one another and having communication with the vacuum chamber, and a striking pneumatic supported independently of said other pneumatics and communicating with the vacuum chamber.

100. In a pneumatic action for musical instruments, the combination with a vacuum chamber, of a primary and secondary pneumatic removably secured together, a supporting connection between the same and the vacuum chamber, and a striking pneumatic independently secured to the vacuum chamber.

101. In a pneumatic action for musical instruments, the combination with a vacuum chamber, of a primary and secondary pneumatic removably secured to one side of the chamber, and a striking pneumatic removably secured to the opposite side of the chamber.

102. In a pneumatic action for musical instruments, the combination with a vacuum chamber, of a primary and secondary pneumatic, independently and removably secured at one side of the vacuum chamber and supported by the vacuum chamber, a striking pneumatic independently secured to the op-

posite side of the vacuum chamber, and an interposed valve.

103. In a pneumatic action for musical instruments, the combination with a vacuum chamber, of a primary and a secondary pneumatic, means for removably securing the same to the vacuum chamber, a striking pneumatic independently secured to the vacuum chamber, and an interposed valve, the primary and secondary pneumatic having independent communication with the vacuum chamber.

104. In a pneumatic action for musical instruments, the combination with a vacuum chamber, of a removable primary pneumatic and an independently removable secondary pneumatic, said pneumatics having communication with the vacuum chamber, and a striking pneumatic supported independently of said other pneumatics and communicating with the vacuum chamber.

105. In a pneumatic action for musical instruments, a vacuum chamber, a plurality of co-acting pneumatic elements formed as independent units and removably secured together and to the vacuum chamber, and a striking pneumatic element formed as an independent unit and secured to the vacuum chamber.

106. In a pneumatic action for musical instruments, the combination with a vacuum chamber, of a plurality of co-acting pneumatic elements formed as independent units and removably secured to one another and to the vacuum chamber and communicating therewith, and a striking pneumatic element formed as an independent unit and secured to the vacuum chamber.

107. In a pneumatic action for musical instruments, the combination with a vacuum chamber, of a plurality of co-acting pneumatics formed as independent units and communicating with the vacuum chamber, means for detachably securing the pneumatics in place, and a striking pneumatic formed as an independent element and communicating with the vacuum chamber, and means for securing the striking pneumatic in place.

MORRIS S. WRIGHT.

Witnesses:

RUFUS B. FOWLER,
HENRY WOOD FOWLER.