R. A. GALLY.

MUSICAL INSTRUMENT EXPRESSION CONTROLLER.

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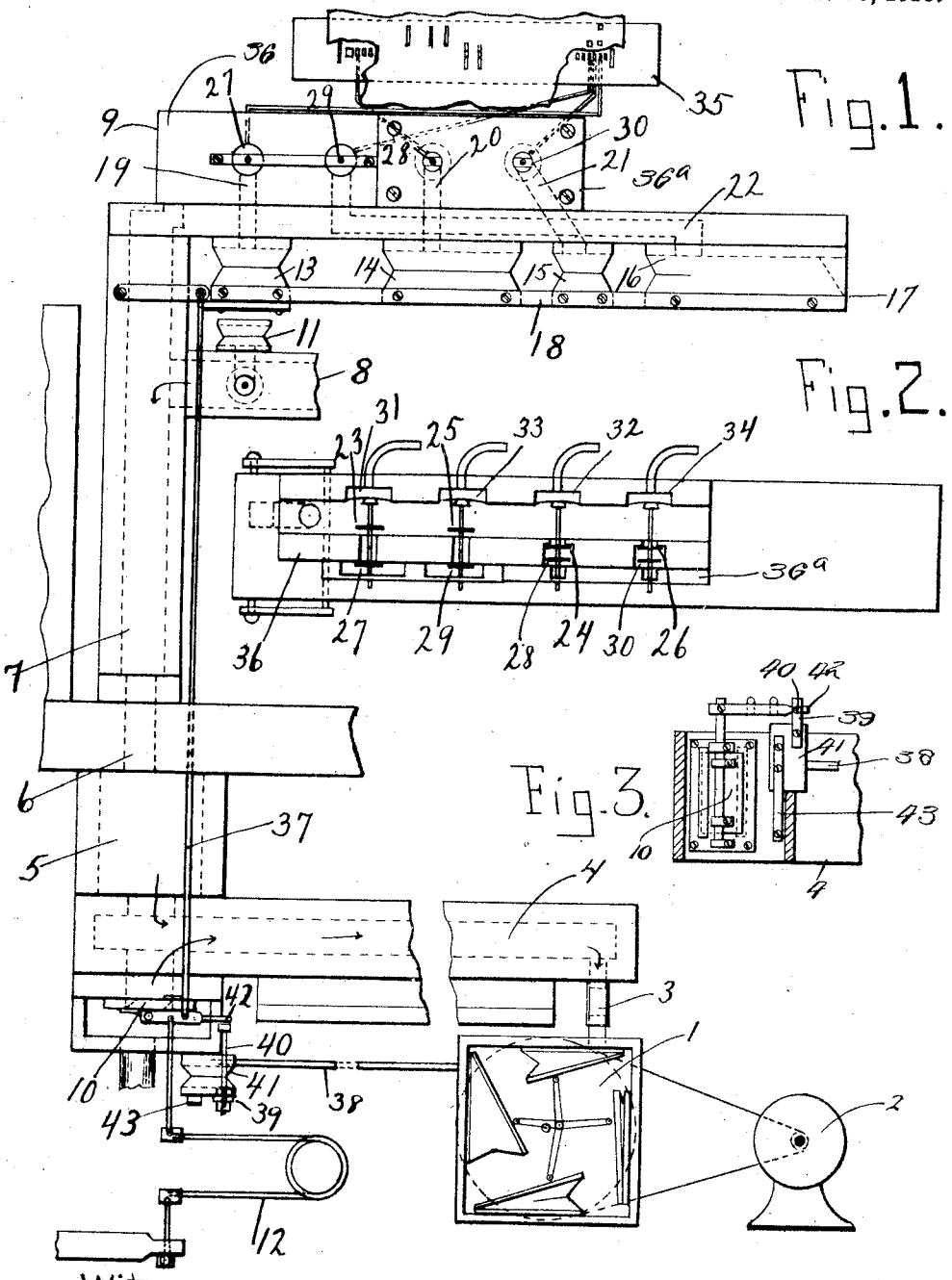
1,257,696. Patented Feb. 26, 1918.



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MUSICAL-INSTRUMENT EXPRESSION-CONTROLLER.

1,257,696. Specification of Letters Patent. Patented Feb. 26, 1918.

Application filed July 9, 1917. Serial No. 179,414.

To all whom it may concern:

Be it known that I, ROBERT A. GALLY, a citizen of the United States, and residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Musical-Instrument Expression-Controllers, of which the following is a specification.

Musical instruments actuated by air, both of manual and automatic operation, have previously employed numerous means for controlling and varying the expression by changes of the tension of the air power, as the double chamber bellows of M. Gally, #214,121, April 8, 1879, and the later composite chamber air tension system of R. A. Gally, #1,101,919, June 30, 1914. The present invention presents a highly developed yet extremely simple and compact perfecting of the composite system of the said R. A. Gally patent, as also a feeder efficiency control more simply adapted to such a composite system combined with the present widely used electrically driven feeder means, a single air supply limiting valve being now employed instead of two for every pumper as in the earlier Patent #1,101,919.

A balanced vane valve is the most desirable for the air supply limiting, and preferably of the type now shown with extended lips, which is particularly shown and claimed in my separate application #178,004, filed June 30, 1917, although any other suitable valve may be used with the special composite control now claimed.

In the drawings, Figure 1 is a front view of part of a pneumatic player piano embodying the present invention; Fig. 2 is a plan view of the actuating valves and composite chambers thereof; and Fig. 3 is a plan view from beneath the valve structures of the lower left part of Fig. 1.

Air suction is derived from any suitable pumper as 1, preferably of a continuous service type having four units driven from an electric or other motor as 2. This pumper unit 1 is connected by suitable windways as pipe 3, chests 4 and 5, throat 6 and air-chest 7 to action chest 8 and expression actuating valve box 9 including two contiguous valve boards. At any convenient point of this air system is placed an air service limiting valve 10, here shown as allowing the intake of such amount of air as the pumper 1 may at any time draw in excess of the amount and tension of such air required for the desired power of operation of the striking pneumatics 11 of action chest 8, or other music actuating or controlling part of the apparatus.

A spring 12 acts to draw valve 10 closed, against which spring is the action of any one or several of the collapsible controlling air chambers, bellows or reservoirs 13, 14, 15 and 16, as may at any time be connected from their interiors to the air suction of the expression actuating valve box 9. These chambers or reservoirs 13, 14, 15 and 16 are similar to the reservoir chambers r^1, r^2, r^3, r^4, of said prior Patent #1,101,919, in which prior patent the said reservoirs acted to limit the air tension by means of valves to each pumper adapted to limit the pumper efficiency by passing the surplus air from one pumper to the other, keeping those reservoirs to their set position for the desired air tension, while in the present structure the one limiting valve 10 accomplishes the same purpose of limiting the feeder efficiency to any certain desired tension.

The collapsible expression chambers or reservoirs 13, 14, 15, 16, are bound together into a composite unit on a common hinge line 17 by bars 18 at front and rear of said chambers, the said four chambers being in successive positions in a general plane with the said hinge 17 and at various distances therefrom similarly to the general principle of the structure of #1,101,919. The present structure has these chambers 13, 14, 15 and 16, of varied widths in the direction from the hinge line, and set at varied distances one from another in that same direction, thereby enabling the most perfect ratios of degrees of air tension as these various chambers are put into action through the respective leaders 19, 20, 21 and 22 leading to the actuating valves 23, 24, 25, 26, which valves when open to the interior of the actuating valve box 9, connect the suction air of that box to those of the particular chambers 13, 14, 15 and 16 corresponding to any of the said valves so opened.

Each one of these suction valves 23, 24, 25 and 26 controlling the ports to the suction of the said chest 9 is connected to a corresponding flush valve 27, 28, 29 and 30,

and each such pair of connected valves is actuated by a corresponding pneumatic 31, 32, 33 and 34, each said pneumatic having tubular connection in any ordinary manner to the usual tracker bar 35 or any other control, as valves and finger buttons.

When the corresponding apertures of the tracker bar 35 are closed by a music sheet and the primaries 31, 32, 33 and 34 are inactive, the suction valves 23 and 25 are off their seats from the valve board 36 and valves 27 and 29 are at their inward position and against the outer parts of the outer valve board 36 and the suction air is then connected through the air leaders 19 and 22 to the corresponding chambers 13 and 16, which are thereby energized by the suction to pull up on the connecting wire 37 against the action of the spring 12, thus regulating the limiting valve 10 to a position to maintain a steady medium tension of air in the air chests 8 and 9.

With this same inactive condition of the primaries the suction valves 24 and 26 are closed to their seats on valve board 36 and their connected flush valves are off the outer seats, which are in the outer board 36ª, opening the outer air through leaders 20 and 21 to the chambers 14 and 15, thus allowing those chambers to move freely without impeding the action of the chambers 13 and 16.

Whenever an aperture of the tracker 35 is opened by a perforation of the music sheet and the corresponding primary pneumatic 31, 32, 33 or 34, or any combination thereof are thereby caused to move the corresponding valves forward, the air service from any such valves is reversed from suction to outer air or vice versa, and the corresponding chamber or chambers 13, 14, 15 or 16 are changed from active suction pull to idle outer air condition, or vice versa. Thus by throwing in or out of action any one or several of the chambers 13, 14, 15 or 16, numerous degrees of pull can be had against the spring 12 with corresponding opening of valves 10 and consequent limiting of the degrees of tension of air suction in the chests 8 and 9, etc.

As before stated, the air service limiting valve may be placed at any convenient point of the air system, but it is found especially convenient and desirable to place this valve 10 in the lower part of the case and connected directly to the wind inducing chests, and to have the expression controlling means in the upper part of the case adjacent the playing action and tracker, with a mechanical connection as 37 from said control means to said limiting valve 10. With this disposition of parts, the short air connection from the tracker 35 to the primaries 31, 32, 33, 34, and the close air connection of these primaries and the chambers 13, 14, 15 and 16 to each other and to the action chest 8, insures quick action of all these control elements in sympathy with the note playing pneumatics of chests 8, which quick action the mechanical connection 37 transmits to the limiting valve 10 without loss of time.

The particular sizes of the chambers 13, 14, 15 and 16, and their relative positions to each other and from the common hinge line 17, are determined by several factors, including the convenient arrangement of the valves 23 to 30 and the leaders 19 to 22 from said valves to the chambers 13 to 16, as well as the several degrees of pull required. In the structure shown herein the valve box 9 with its four actuating primaries 31 to 34 and their valves 23 to 30, is compactly built at the left of the series of four chambers, and close to the air chest 7 for quickly responsive action. The two valve units 28 and 30, etc., at the right are connected by the short leaders 20 and 21 to the chambers 14 and 15, while the valve unit 27, 23 31 has a short direct leader 19 to the chamber 13, and the valve unit 25, 29, 33 has a leader 22 carried around the rear of the two leaders 20 and 21 and connected to the chamber 16. Thus there are convenient leaders, and the two kinds of valves are kept together, the two valve units of normal suction service being at the left, 27, 29, and the two valve units of normal outer air service 28, 30, are at the right. This enables a simple construction of chest 9 and valve board 36 for these two types of valves in the two groups of two units each.

As the use of the chamber 16 nearest the hinge 17 for a low tension air control would require it to be very large owing to its having the least leverage of any, this chamber 16 has been herein chosen for the control of the highest tension air of any of the four chambers, and as the chamber 13 at the other end of the group has been connected to the other valve unit of the same type, this chamber 13 is used for the next to the highest single degree tension of air control by only one of the chambers 13 to 16, musically known as F. As high degree tension of air control by air service limiting valve 10 is attained by the small pull of a chamber as 16, the chamber 16 is made of a size that at its least advantage of the leverage is also of small power, although on account of its least leverage its size is the greatest. This chamber acting alone gives control of a high single chamber air control, musically known as FF.

As chamber 13 has so much greater leverage than chamber 16, chamber 13 is made much smaller than 16, but of such size as to have a somewhat greater power than 16, thus giving the next less high degree of air tension control, known in music as F. It will be understood that these two degrees,

F, and FF, are secured by whichever of these chambers 13 or 16 is left in connection to the air suction when the other one is cut off from the suction air and the two other chambers 14 and 15 are also without suction air and connected to the outer air.

Medium degree of air tension control is attained by the two chambers 13 and 16 being in connection to the air suction through their leaders 19 and 22 and valves 23 and 25 so long as the corresponding apertures of the tracker 35 are closed by a music sheet, or the equivalent finger controlled buttons and valves are not opened, either one or both such well known controls being suitable therefor. Such medium degree of air tension gives the musical degree of MF, thus securing the average tone power without the use of any perforation in the music sheet or pressure of the button for ordinary playing of dance or other rolls in which the expression perforations have not been included, and also saving a large proportion of the expression control perforations required in prior structures for expression control, where the unperforated expression part of the sheet controls the lowest or highest degree of power, the medium degrees from such devices requiring a constant use of perforations which weaken the sheet, or necessitate the use of ratchet feed controls of slow action, or "locking actions" that are complicated to keep in order as well as to arrange the expressions therefor in the music sheets. In the present structure the normal medium tones require no expression perforations and all softer or louder effects are quickly secured by the minimum amount of change, either up or down. This system also enables a music sheet to be easily perfected when introducing the expression perforations, as an over high tension can be modified by adding a reducing degree perforation without pasting out the high perforation already in, as will be understood from the details herein described.

The chambers 14 and 15 are now to be determined as to their size for the low degrees of air tension control and it must be kept in mind these low degrees of control are to be attained by the addition of the chambers 14 or 15 to the already active chambers 13 and 16 so that the resultant low tensions will be from the resultant total area and pull of a chamber 14 or 15 added to the area and pull of 13 and 16. Chamber 15 has less leverage and area than 14, and thereby when connected to the air suction serves to reduce the air tension to a less amount than when chamber 14 is so connected, chamber 14 being farther from the hinge 17 than chamber 15, and also of greater area. Chamber 15 added to 13 and 16 will give a musical degree of P, while chamber 14 added to 13 and 16 will give the musical degree of PP, and both chambers 14 and 15 added to 13 and 16 will give an even softer musical degree, approximately PPP, although it is found in practice that the use of both chambers 14 and 15 added to 13 and 16 does not make anything like the proportionate reduction than does the addition of either one alone of the chambers 14 and 15, owing, probably to the very low air tensions then reached, and that the last added chambers are so small compared to those already connected to the air suction.

If either chamber 13 or 16 alone is in connection with the suction, the adding of either chamber 14 or 15 will somewhat reduce the degree of tension from the F or FF effect.

Accent and touch effects can be secured by short duration throwing out of service of either or both chambers 13 or 16 from their normal active condition from the air suction, or either one of the chambers 13 or 16 can be thrown out for accent in addition to the increased degree of air tension caused by the other one of these two chambers 13 or 16 having been already thrown out of action from the suction. Also, such accenting can be done either when the chambers 14 and 15 are inactive, or when either one or both of them are in action for soft degrees P, PP, or PPP, the cutting out of chambers 13 or 16, or both, then serving to give delicate accent to those degrees. Contrariwise, when the normal MF degree is the one controlled by activity of 13 and 16, or when higher degrees are thrown in by disconnecting either 13 or 16 from the air suction, either chamber 14 or 15 can be thrown into service to subdue the high degrees for a brief or long period.

When both chambers 13 and 16 are thrown out of connection to the air suction there would be nothing to oppose the spring 12 and it would close the valve 10 and result in an uncontrolled maximum tension limited only by the capacity of the air suction means, as the pumper 1, less the consumption of air by the playing apparatus. The result would be to overstrain the pumper 1, motor 2, and the whole apparatus, besides giving an uncertain degree of crashing effect on the loudest playing of varied numbers of notes struck at one time. A maximum air service control is therefore provided which consists of a chamber or bellows 41 which is connected to the air suction by a duct or tube 38. An extension arm 39 and rod 40 are connected to the moving member of the bellows 41, the rod 40 being in position to assure an opening movement of the valve 10 when said rod 40 contacts the arm or extension 42 of the said valve. A spring 43 is connected to the moving member of the bellows 41 and a fixed part of the apparatus and so adjusted that

the bellows 41 will be collapsed to open the valve 10 only when the tension of the air suction in the apparatus is at the maximum degree it is desired that it be limited to, the said bellows 41 preferably having little or no action on valve 10 at any lower degree of air tension.

When both chambers 13 and 16 are disconnected from the air suction, and chambers 14 and 15 are also inactive, the air tension will rise until the degree is reached when the bellows 41 will sufficiently overcome its spring 43 to open the valve 10 and thereby limit the air tension to whatever degree the spring 43 has been set for, and this maximum tension degree will be controlled no matter whether one or a number of notes are struck at once by the pneumatic music playing action. Thus is secured an additional exact degree of air tension and the musical degree of FFFF or such as may be desired without an additional aperture in the tracker bar 35 or additional button and valve.

The degrees found easily and safely procurable by these means, and of great convenience and utility in musical effects, are as follows, although many other combinations and proportions of chambers may be employed and be subject to the claims hereof. The following table states the chambers in action and the resultant air tensions used by this applicant in actual general use with the player pianos of his design and patents, and will be found useful in determining desirable proportions and degrees for use of the present invention with any pneumatic musical action with which it might be employed:

Chambers.	*Musical degrees.*	*Air tensions.*
13 14 15 16	PPP	3 in. w. g.
13 14 — 16	PP	3½ in. w. g.
13 — 15 16	P	4½ in. w. g.
13 — — 16	MF	6 in. w. g.
— — — 13	F	10½ in. w. g.
16 — — —	FF	12½ in. w. g.
15	FFF	18 in. w. g.
— — — —	FFFF	22 in. w. g.

This last degree is preferably controlled by the maximum bellows above described.

As the music sheet with expression perforations adapted to the peculiar combination system of the expression control structure hereof, and the special valuable feature of a normal medium degree from the unperforated parts of such a music sheet, are not claimable in this patent, but belong in the sub-class 162, note sheets, such claims will be included in a separate application #192,501, filed Sept. 20″ 1917.

The normal medium air tension feature of the present invention may be applied to any other suitable system of control of air tension or quantity; the combination system of chambers herein set forth can be employed either with a normal medium air tension control, or the tension at either extreme, or any other desired degree, although the normal medium is especially desirable for the reasons above set forth; the combination system of chambers either with or without the maximum tension device can be employed with an air tension device of a "choker" type cutting off the current of air between the pumper unit and the player action, or with any other suitable means of air tension or quantity control; and the maximum tension device can be employed with any suitable governing means; and it is well known that the substitution of pressure for suction, or of electric or mechanical tracker bar control for the pneumatic type herein shown, may be made if desired, and yet in any of these conditions, the said features will be subject to.—

What I claim as my invention, which is:—

1. A pneumatic music playing apparatus; an air tension inducing means connected thereto; a relief port from the outer air directly to the said air tension inducing means, and a relief valve to the said port; a plurality of collapsible chambers each having a controlling air port from its interior directly to the said air tension inducing means and receiving no outer air from the said relief port; a moving wall to each said chamber, and mechanical connecting means from all the said moving walls to the said relief valve; and a valve means to each said air port to cut any one or several of the said chambers in or out of air connection with the said air tension inducing means; the said moving walls always moving with the movements of the said relief valve.

2. A pneumatic music playing apparatus; an air tension inducing means connected thereto; a relief port from the outer air directly to the said air tension inducing means, and a relief valve to the said port; a plurality of collapsible chambers each having a controlling air port from its interior directly to the said air tension inducing means; a moving wall to each said chamber, and mechanical connecting means from all the said moving walls to the said relief valve; and a valve means to each said air port to cut any one or several of the said chambers in or out of air connection with the said air tension inducing means; the said moving walls moving with the movements of the said relief valve.

3. A pneumatic music playing apparatus; an air tension inducing means connected thereto; a relief port from the outer air directly to the said air tension inducing means, and a relief valve to the said port, and the said relief port serving outer air to the said air tension inducing means only; a plurality of collapsible chambers each having a controlling air port from its interior to the said air tension inducing means, and receiving no outer air from the said relief

port; a moving wall to each said chamber, and mechanical connecting means from all the said moving walls to the said relief valve; and a valve means to each said air port to cut any one or several of the said chambers in or out of air connection with the said air tension inducing means, the said moving walls always moving with the movements of the said relief valve.

4. A pneumatic music playing apparatus; an air tension inducing means connected thereto; a relief port from the outer air directly to the said air tension inducing means, and a relief valve to the said port, and the said relief port serving outer air to the said air tension inducing means only; a plurality of collapsible chambers each having a controlling air port from its interior to the said air tension inducing means; a moving wall to each said chamber, and mechanical connecting means from all the said moving walls to the said relief valve; and a valve means to each said air port to cut any or several of the said chambers in or out of air connection with the said air tension inducing means; the said moving walls moving with the movements of the said relief valve.

5. A pneumatic music playing apparatus; an air tension inducing means connected thereto; a relief port from the outer air directly to the said air tension inducing means, and a relief valve to the said port; a plurality of collapsible chambers each having a controlling air port from its interior to the said air tension inducing means and receiving no outer air from the said relief port; a moving wall to each said chamber, and mechanical connecting means from all the said moving walls to the said relief valve; and a valve means to each said air port to cut any one or several of the said chambers in or out of air connection with the said air tension inducing means; the said moving walls always moving with the movements of the said relief valve.

6. A pneumatic music playing apparatus; an air tension inducing means connected thereto; a relief port from the outer air directly to the said air tension inducing means, and a relief valve to the said port; a plurality of collapsible chambers each having a controlling air port from its interior to the said air tension inducing means and receiving no outer air from the said relief port; a moving wall to each said chamber, and unyielding mechanical connecting means from all the said moving walls to the said relief valve; and a valve means to each said air port to cut any one or several of the said chambers in or out of air connection with the said air tension inducing means; each said moving wall moving with the movements of the said relief valve.

7. A pneumatic music playing apparatus; an air tension inducing means connected thereto; a relief port from the outer air directly to the said air tension inducing means, and a relief valve to the said port; a plurality of collapsible chambers each having a controlling air port from its interior to the said air tension inducing means and receiving no outer air from the said relief port; a moving wall to each said chamber, and unyielding mechanical connecting means from all the said moving walls to the said relief valve; and a valve means to each said air port to cut any one or several of the said chambers in or out of air connection with the said air tension inducing means; each said moving wall moving with the movements of the said relief valve at all times and whenever the chamber of which that wall is a part is in air connection with the said air tension inducing means; the said air tension service acting on the chamber of any such moving wall in direction opposed to the closing of the said relief valve.

8. A pneumatic music playing apparatus; an air tension inducing means connected thereto; a relief port from the outer air directly to the said air tension inducing means, and a relief valve to the said port; a plurality of collapsible chambers each having a controlling air port from its interior to the said air tension inducing means and receiving no outer air from the said relief port; a moving wall to each said chamber, and unyielding mechanical connecting means from all the said moving walls to the said relief valve; and a valve means to each said air port to cut any one or several of the said chambers in or out of air connection with the said air tension inducing means; the said moving walls always moving with the movements of the said relief valve.

9. A pneumatic music playing apparatus; an air tension inducing means connected thereto; a relief port from the outer air directly to the said air tension inducing means, and a relief valve to the said port; a plurality of collapsible chambers each having a controlling air port from its interior to the said air tension inducing means and receiving no outer air from the said relief port; a moving wall to each said chamber, and mechanical connecting means from all the said moving walls to the said relief valve; and a valve means to each said air port to cut any one or several of the said chambers in or out of air connection with the said air tension inducing means; each said moving wall always moving with the movements of the said relief valve, and whenever the chamber of which that wall is a part is in air connection with the said air tension inducing means the said air tension service then acting on the chamber of any such moving wall in direction opposed to the closing of the said relief valve.

10. In a pneumatic music player: an air

service inducing means; an air service regulating valve means; a plurality of pneumatic control chambers connected to said regulating means; valve means to each of said chambers; ports from each said valve to its chamber and the air service; and pneumatic actuating means to each said valve adapted to throw its one of said valves open or closed from said air service to its certain chamber; certain of said valves being closed to the said air service when its actuating pneumatic is inactive, and certain other of said valves being open to the said air service when said actuating pneumatics are inactive.

11. In a pneumatic music player: an air service inducing means; an air service regulating valve means; a plurality of pneumatic control chambers connected to said regulating means; valve means to each of said chambers; ports from each said valve to its chamber and the air service; and pneumatic actuating means to each said valve adapted to throw its one of said valves open or closed from said air service to its certain chamber; certain of said valves being closed to the said air service when its actuating pneumatic is inactive, and certain other of said valves being open to the said air service when said actuating pneumatics are inactive, the action of any one of said actuating pneumatics reversing the open or closed position of its valve and the connection or closing of the air service to said chamber by said valve.

12. In a pneumatic music player: an air service inducing means; an air service regulating valve means; a plurality of pneumatic control chambers connected to said regulating means; valve means to each of said chambers; ports from each said valve to its chamber and the air service; and pneumatic actuating means to each said valve adapted to throw its one of said valves open or closed from said air service to its certain chamber; certain of said chambers being normally closed to said air service by the corresponding valves, and certain of said chambers being normally open to said air service by their corresponding valves; and an actuating pneumatic to each of all said valves, each said pneumatic adapted to open or close its corresponding valve from the air service to the respective chamber to which said valve is related when said pneumatic is actuated.

13. In a pneumatic music player: an air service inducing means; an air service regulating valve means; a plurality of pneumatic control chambers connected to said regulating means; valve means to each of said chambers; ports from each said valve to its chamber and the air service; and pneumatic actuating means to each said valve adapted to throw its one of said valves open or closed from said air service to its certain chamber; certain of said chambers being normally closed to said air service by the corresponding valves, and certain of said chambers being normally open to said air service by their corresponding valves; and an actuating pneumatic to each of all said valves, each said pneumatic adapted to open or close its corresponding valve from the air service to the respective chamber to which valve is related when said pneumatic is actuated; a tracker bar having apertures therein; and a duct from each said actuating pneumatic to a corresponding one of said apertures.

14. In a pneumatic music player: an air service inducing means; an air service regulating valve means; a plurality of pneumatic control chambers connected to said regulating means; valve means to each of said chambers; ports from each of said valve means to its chamber and the air service; and pneumatic actuating means to each said valve adapted to throw its one of said valves open or closed from said air service to its certain chamber; certain of said chambers being normally closed to said air service by the corresponding valves, and certain of said chambers being normally open to said air service by their corresponding valves; and an actuating pneumatic to each of all said valves, each said pneumatic adapted to open or close its corresponding valve from the air service to the respective chamber to which said valve is related when said pneumatic is actuated; a tracker bar having apertures therein; a duct from each said actuating pneumatic to a corresponding one of said apertures; and a music sheet having successive blank and perforated parts in direction of its length, said perforations adapted to coincide with said apertures at their certain times of travel of said sheet.

15. A pneumatic music playing apparatus; an air service inducing means; an air service regulating valve means; a plurality of pneumatic control chambers connected to said regulating means; an expression actuating air box including two valve boards and having an air suction chamber in said box; valve ports to said valve boards, and leaders from said ports to their respective control chambers; two valves to each of said ports; certain pairs of said valves positioned with one of said valves of a said pair adjacent to a face of one of the said valve boards opposite to the face of that board to which the other valve of that pair is adjacent; and certain other pairs of said valves positioned with the two valves of a said pair intermediate the faces of the two said valve boards; and means to actuate said valves to and from the said faces of the said boards.

16. A pneumatic music playing apparatus; an air service inducing means; an air service regulating valve means; a plurality

of pneumatic control chambers connected to said regulating means; an expression actuating air box comprising two valve boards and having an air suction chamber in said box; valve ports to said valve board, and leaders from said ports to their respective control chambers; two valves to each of said ports; certain pairs of said valves positioned with one of said valves of a said pair adjacent to a face of one of the said valve boards opposite to the face of that board to which the other valve of that pair is adjacent; and certain other pairs of said valves positioned with the two valves of a said pair intermediate the faces of the two said valve boards; the leader from a pair of said oppositely positioned valves connected to the ports of those two valves intermediate the two said faces of said valve board; and the leader from a pair of the intermediately positioned valves connected to the ports of those valves intermediate the two said valve boards; and means to actuate said valves to and from the said faces of the said boards.

17. A pneumatic music playing apparatus; an air service means thereto; governing and controlling means adapted to control said service to several degrees of greater or less service, and an additional and intermittent air service control device adapted to operate only when the first named controlling means is thrown entirely out of operation.

18. A pneumatic music playing apparatus; an air service means thereto; governing and controlling means adapted to control said service to several degrees of greater or less service, and an additional and intermittent air service control device adapted to operate only when the first named controlling means is thrown entirely out of operation for effecting the highest degree of service.

19. A pneumatic music playing apparatus; an air service means thereto; governing and controlling means controlling said service to several degrees of greater or less service, and an additional intermittent air service control device adapted to operate only when the first named controlling means is thrown entirely out of operation, the said additional controlling means being actuatively connected to said same governing means as is controlled by said first stated controlling means.

20. A pneumatic music playing apparatus; an air service means thereto; governing and controlling means controlling said service to several degrees of greater or less service, and an additional intermittent air service control device adapted to operate only when the first named controlling means is thrown entirely out of operation for effecting the highest degree of service, the said additional controlling means being actuatively connected to said same governing means as is controlled by said first stated controlling means.

21. A pneumatic music playing apparatus including an air suction inducing means and an air suction limiting means in a lower part of the said apparatus, and a note playing pneumatic action and a control means adapted to control said air suction limiting means, said note playing action and control means in an upper part of said apparatus at a distance from said air suction inducing and limiting means; air connections from said air suction inducing means to said note playing action and said control means, and a mechanical connection from said control means to said air suction limiting means.

22. A pneumatic music playing apparatus including an air suction inducing means and an air suction limiting means in a lower part of the said apparatus, and a note playing pneumatic action and a control means adapted to control said air suction limiting means, said note playing action and control means in an upper part of said apparatus at a distance from said air suction inducing and limiting means; air connection from said air suction inducing means to said note playing action and said control means, and a mechanical connection from said control means to said air suction limiting means; a tracker bar having apertures therein and positioned in the same said upper part of the apparatus as the control means, and actuating connections from said tracker apertures to said controlling means.

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