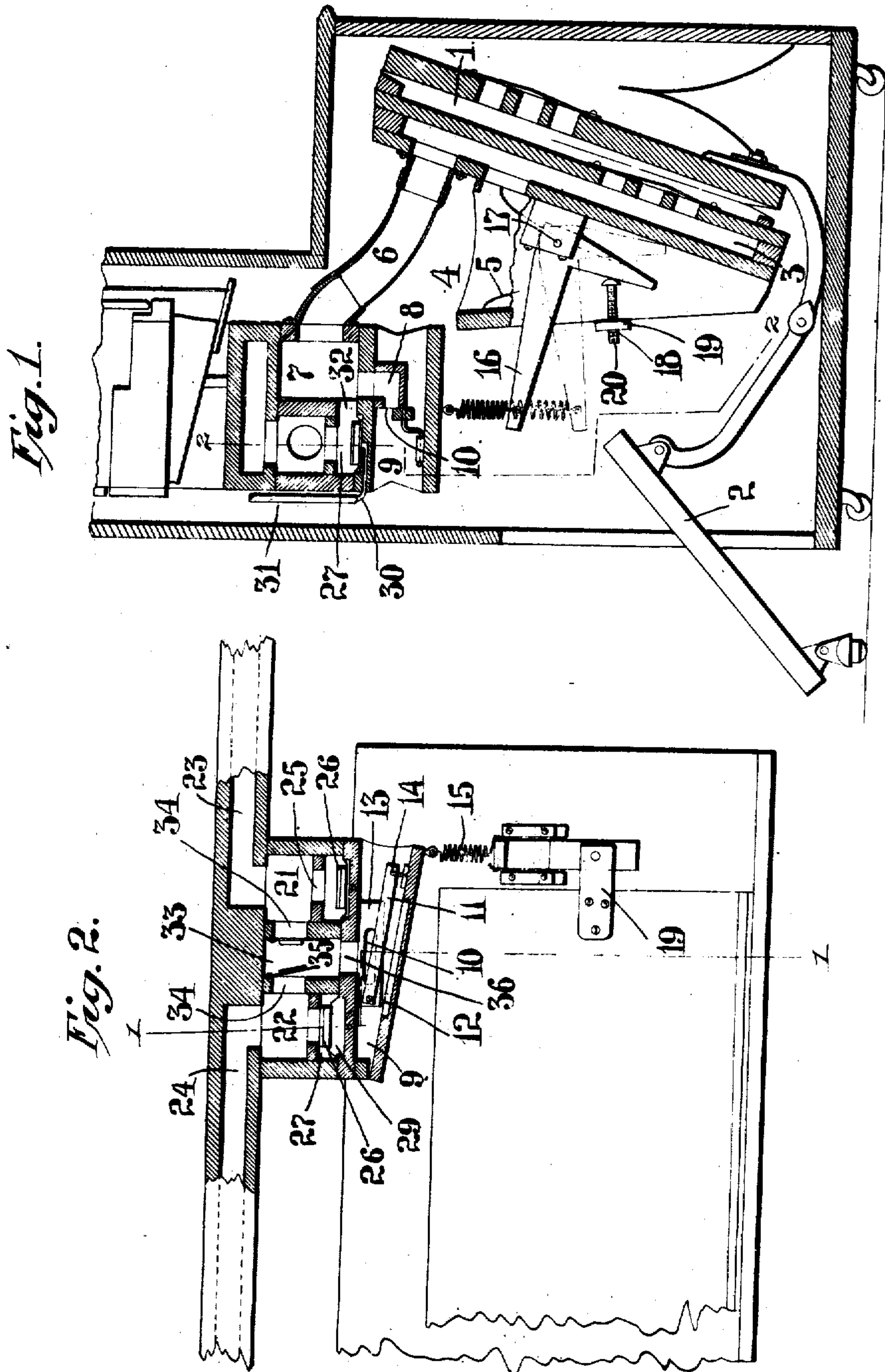


J. H. DICKINSON.
 EXPRESSION DEVICE FOR PNEUMATIC PLAYING ATTACHMENTS FOR MUSICAL INSTRUMENTS.
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916,279.

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WITNESSES:
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EXPRESSION DEVICE FOR PNEUMATIC PLAYING ATTACHMENTS FOR MUSICAL INSTRUMENTS.

No. 916,279.

Specification of Letters Patent.

Patented March 23, 1909.

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To all whom it may concern:

Be it known that I, JOSEPH HUNTER DICKINSON, a citizen of the United States, and a resident of Cranford, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Expression Devices for Pneumatic Playing Attachments for Musical Instruments, of which the following is a specification.

This invention relates to a new and improved expression device for pneumatic playing attachments for musical instruments and more particularly to that class of pneumatic attachments in which the playing mechanism is divided into two sections, one for the bass and one for the treble.

The object of my invention is to provide a new and improved expression device by means of which the player can, at will, by operating the pedals more or less forcibly produce greater air tension in one part of the playing attachment than in the other, so that one part of the composition, either in the treble or the bass, can be played with greater force or power, than some or all of the notes of the other part, which attachment is simple in construction, can easily be applied, is adjustable and is not expensive.

In the accompanying drawings: Figure 1 is a vertical transverse sectional view through a pneumatic playing attachment for musical instruments, provided with one embodiment of my new and improved expression device, the section being on the line 1—1 of Fig. 2. Fig. 2 is a vertical longitudinal sectional view through parts, others being shown in elevation the section being on the line 2—2 of Fig. 1.

The pumping bellows 1 of conventional construction are operated by suitable pedals 2 and connections therefor and these pumping bellows are connected in the conventional manner with a wind chamber 3 with which an expansible chamber 4 provided with an expansion spring 5 is connected, all of conventional construction. The wind chamber 3 is connected by a duct or tube 6 with a suction chamber 7 from which a duct 8 leads to bellows 9, said duct terminating in a slot 10 within the bellows, which slot can be closed more or less by a knife valve 11, pivoted at 12, to the block 13, in which said slot is formed, the free end of said knife valve 11 being pivotally connected at 14 with the

movable board of the bellows 9 so that as the bellows collapses more or less the knife valve 11 closes the slot 10 correspondingly and vice versa as the bellows 9 expands the slot is opened. A spring 15 attached to the movable board of the bellows 9 tends at all times to expand the bellows and this spring is shown as attached to one end of an angle lever 16 pivoted at 17 to a fixed part of the instrument in this case the fixed wall of the wind chamber 3.

An adjustable screw 18 is held in a bracket 19 attached to the front movable board of the expansible chamber 4, the inner end of said screw resting against the inner arm of the angle lever 16. That end of the screw facing the front of the instrument, is provided with a slot 20 for applying a screw driver or other suitable implement, for the purpose of adjusting the screw.

Two compartments 21 and 22 are connected respectively with the wind chest 23 and 24 for the treble and the bass of the instrument, it being understood that the mechanism is divided into a treble section and a bass section. Each compartment 21 and 22 is provided with a port 25 which can be closed by an upwardly seating valve 26 located in a compartment 27 beneath each compartment 21 and 22 respectively. In the construction shown, the valves 26 are operated pneumatically by the bellows 29, the interior of which is connected by a duct 30 with a tube 31 through which in any well known manner air can be admitted to the bellows 29 for the purpose of expanding the bellows and causing the valve operated by the bellows to close the corresponding port 25. The compartments 21 and 22 are not connected directly with the suction chamber 7 but the compartments 27 are each connected by a duct 32 with the chamber 7. Between the two compartments 21 and 22, a space 33 is formed, which communicates by the lateral ports 34 with the compartments 21 and 22, said ports being closed by flap valves 35 opening into the space 33 as shown in Fig. 2. A port 36, as shown in Fig. 2, connects the space 33 directly with the bellows 9.

I have shown pneumatic means in the present construction for operating the valves 26 but do not wish to confine myself to pneumatic means, as any well known means can be used for operating said valves without in

any way affecting the spirit of my present invention, which does not relate to the construction or operation *per se* of these valves and which can be controlled by the operator 5 manually, one independently of the other, or in some construction of playing attachments, operated automatically by means of side perforations in the music sheet, as practiced in existing instruments. Each valve 26 is thus 10 an air controlling valve independent of the regulating valve 11.

The operation is as follows: When the pedals are operated and the pumping bellows exhaust air from the chambers 3 and 7 and 15 the ports 25 of the compartments 21 and 22 are both opened, the air is drawn directly from the treble and bass wind chests 23 and 24 through the compartments 21 and 22, and ports 25 and 32 into the chamber 7 and from 20 the latter through the tube 6 and chamber 3 into the pumping bellows. If the port 25 of either chamber 21 or 22 is closed by means of the valve 26, the air from such chamber can no longer pass directly from such chamber 21 25 or 22 through the port 25 into the chamber 7 but must pass through the corresponding port 34 and port 36 into the regulating bellows 9 from which it can only be exhausted through the slot 10 and as there is now suction in the 30 regulating bellows, this bellows is collapsed by this suction more or less, against the tension of the spring 15 and the valve 11 reduces the effective area of the slot 10 and the player pneumatics in the corresponding wind chest 35 23 or 24 will be operated with less power. Of course, it is well understood that such reduced power may exist for a greater length of time according to the will of the operator, or the arrangement of the controlling apertures 40 in the music sheet. As soon as the port 25 that has been closed is opened again, the communication from the corresponding chest 23 or 24 to the exhausting mechanism is direct and the regulator bellows 9 has not any 45 effect on the player mechanism of the corresponding chest 23 or 24 for the time being. Although this operation as far as I have described it is old and well known, I have deemed it necessary to describe it here for the 50 perfect understanding of my invention. It will also be understood that the suction of that wind chest 23 or 24 directly connected with the pumping bellows is greater than that suction in the wind chest connected 55 with the suction bellows through the regulating bellows 9 and hence will keep the corresponding flap valve 35 closed.

If the spring 15 is not made adjustable and the air exhausted is compelled to pass 60 through the slot 10, it follows that the regulating bellows 9 will be collapsed in accordance with the suction, that is to say, that if the pumping bellows are worked more forcibly the tension is increased, the regulating 65 bellows collapsed to a greater degree and as

the pumping bellows are worked less forcibly and the tension decreased the bellows 9 will be expanded by the spring 15 and the effective area of the slot 10 is increased, but there is no possibility of producing an intermediate 70 tension. When the tension is increased by operating the pumping bellows with greater force the expansible chamber 4 is collapsed to a greater extent and as this expansible chamber is collapsed the screw 18 acting on 75 the angle lever 16 increases the tension of the spring 15 thus preventing the suction in the regulating bellows 9 from closing the slot 10 by means of the valve 11 to as great an extent as the same suction would close it if the 80 tension of the spring had not been increased. The player is thus enabled, at any time, to play softer than normal loud, by causing the air to travel through the regulating bellows 9, but he can also vary this degree of softness 85 by operating his pedals with more or less force and is thus enabled to make most minute gradations in the playing and to produce effects which more closely simulate manual playing than has been possible heretofore. He can, for example, keep the valve 26 for the bass notes playing the accompaniment, permanently closed and either manually or automatically can keep the valve 26, 90 for the treble, playing the melody, closed, only opening the same so as to play the theme notes with full pumping bellows power by permitting the air to pass for such notes directly to the suction bellows without compelling them to pass through the regulating 100 bellows 9. At the same time he is enabled to play the accompaniment produced by the playing mechanisms in the other section, louder or with varying loudness, while still playing it piano, and is enabled to play it 105 louder than it could be played with the corresponding valve 26 closed and the tension of the spring not varied.

Having described my invention what I claim as new and desire to secure by Letters 110 Patent is:

1. In a pneumatic playing attachment for musical instruments, the combination with a wind chest, a pumping device and an expansible chamber in communication therewith, of a regulating pneumatic under spring 115 tension regulating valve controlled thereby, an independent air controlling valve and means for varying the effective power of the regulating pneumatic automatically from 120 said expansible chamber, substantially as set forth.

2. In a pneumatic playing attachment for musical instruments, the combination with a wind chest, a pumping device and 125 an expansible chamber in communication therewith, of a regulating pneumatic under spring tension, an air regulating valve controlled thereby, an independent air controlling valve and means for varying the power 130

of the spring of the regulating pneumatic automatically from said expansible chamber, substantially as set forth.

3. In a pneumatic playing attachment
5 for musical instruments, the combination with a wind chest, a pumping device and an expansible chamber in communication therewith, of a pneumatic, a spring acting on the said pneumatic, an air regulating
10 valve controlled by said pneumatic, an independent air controlling valve, and means for varying the power of said spring and devices for actuating said means from the expansible chamber, substantially as
15 set forth.

4. In a pneumatic playing attachment for musical instruments, the combination with a wind chest, a pumping device and
20 an expansible chamber in communication therewith, of a pneumatic, a spring acting on said pneumatic, an air regulating valve

controlled by said pneumatic, an independent air controlling valve, a lever connected with said spring and means for moving said lever from the expansible
25 chamber, substantially as set forth.

5. In a pneumatic playing attachment for musical instruments, the combination with a wind chest, a pumping device and an expansible chamber in communication
30 therewith, of a pneumatic, a spring acting on said pneumatic, an air regulating valve controlled by said pneumatic, an independent air controlling valve, a lever connected with said spring and an adjustable
35 device on the expansible chamber for moving said lever, substantially as set forth.

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Witnesses:

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