

No. 848,278.

PATENTED MAR. 26, 1907.

A. WILHELMJ.
PIANO PLAYING ATTACHMENT.

APPLICATION FILED AUG. 4, 1903.

2 SHEETS—SHEET 1.

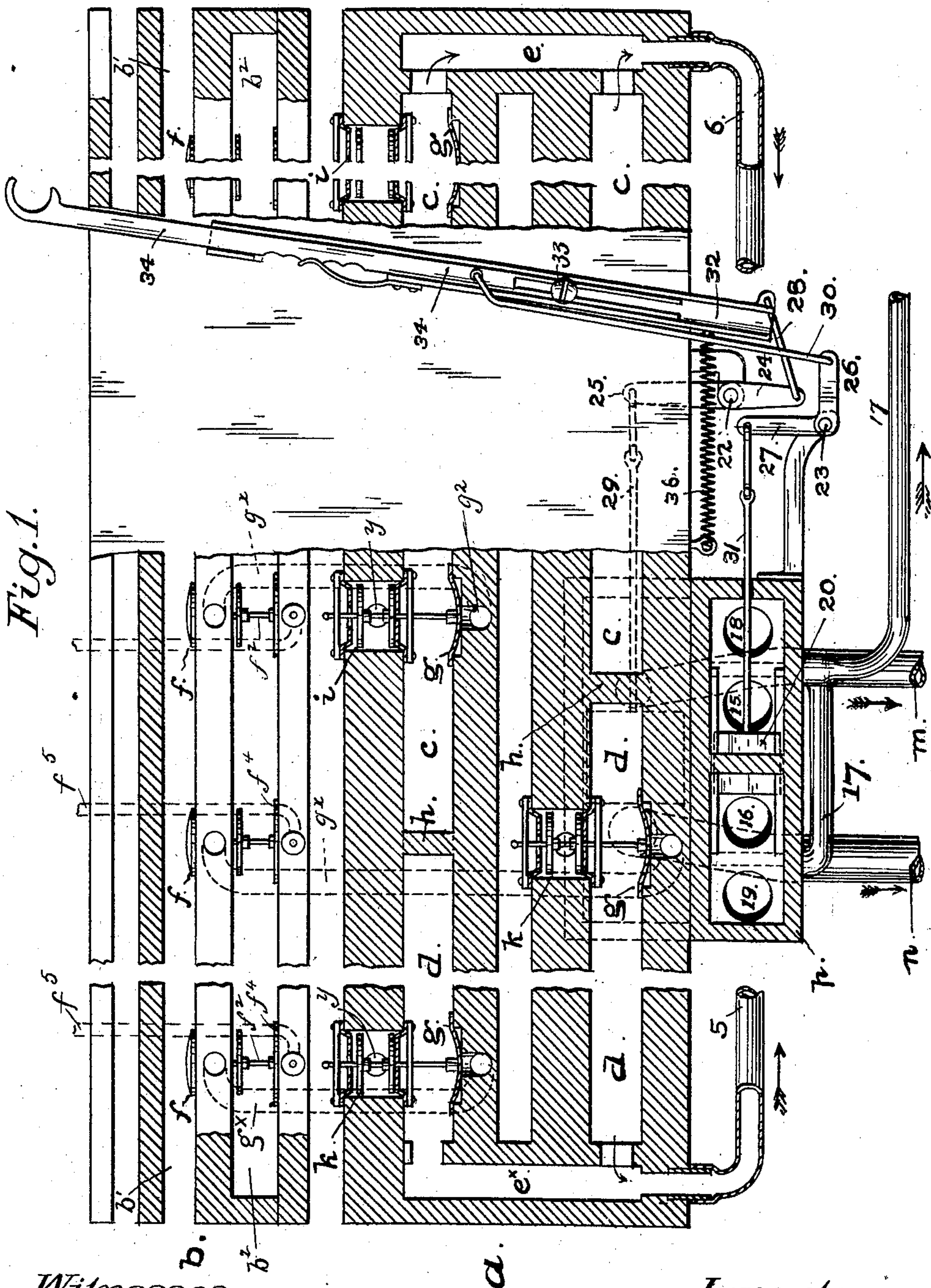


Fig. 1.

Witnesses.

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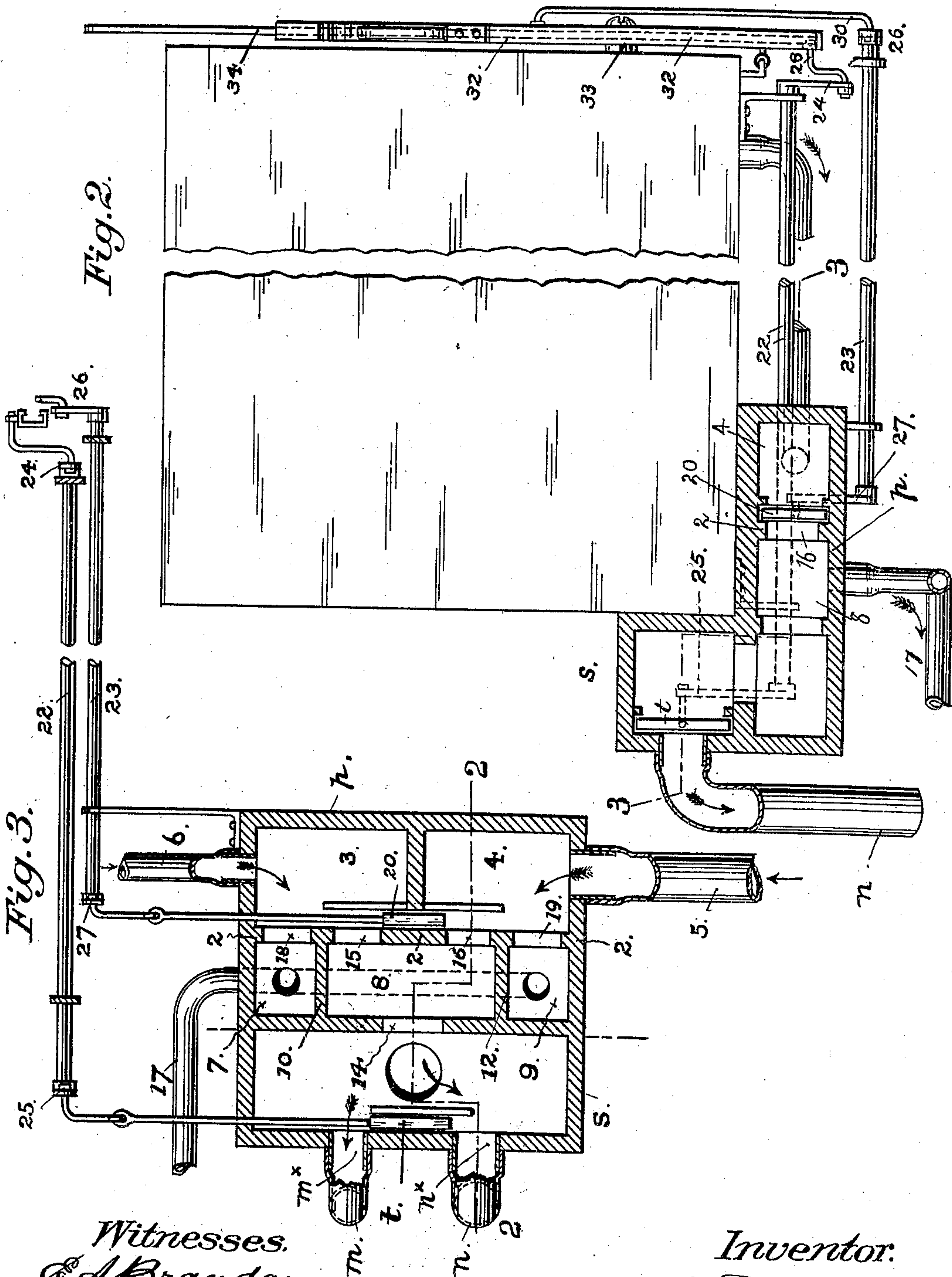
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UNITED STATES PATENT OFFICE.

ARTHUR WILHELMJ, OF SAN FRANCISCO, CALIFORNIA.

PIANO-PLAYING ATTACHMENT.

No. 848,278.

Specification of Letters Patent.

Patented March 26, 1907.

Application filed August 4, 1903. Serial No. 168,140.

To all whom it may concern:

Be it known that I, ARTHUR WILHELMJ, a subject of the Emperor of Germany, residing in the city and county of San Francisco and State of California, have invented new and useful Improvements in Piano-Playing Attachments, of which the following is a specification.

This invention relates to a means or device of novel construction applicable to mechanical piano-players of most of the different makes now in use as an attachment for varying and modifying at the pleasure of the performer the loudness and softness of the bass or accompaniment and the treble or melody parts of the composition being played.

The invention is designed to constitute an addition to the accentuating-box usually provided in these piano-playing instruments for producing staccato effects or giving greater sharpness or expression to certain notes, although it is not dependent on that part of the mechanism for its effective operation, and it may be separated from the accentuating-box and controlled by a different lever instead of being joined to that part.

Briefly stated, the invention has for its object the production of an attachment for varying the area of the connecting-passages or conductors between the suction-chamber or exhaust and the actuating pneumatics of the bass side of the valve-chest separately and independently of the similar passages or conductors between the pneumatics in the treble side of the valve-chest and the suction-chamber, whereby the performer is enabled to control the degree of loudness or softness of the notes on one side over the other and to modify the same at pleasure during the playing.

To such end and object the invention consists in certain novel means for varying the tension or condition of the exhaust acting on the key-striking devices that play the bass side of the keyboard separately of the tension which actuates the strikers of the keys in the treble side and in the combination therewith of controlling-valves and valve-actuating devices controlled by the performer, as hereinafter fully described, and pointed out in the claims at the end of this specification, in which reference is had to the accompanying drawings, forming part thereof.

Figure 1 of the drawings is a front elevation of the valve-chests containing the primary and secondary pneumatics of a me-

chanical piano-player of the well-known pianola type having my invention applied to it, the front wall of the chest being broken away in part to uncover the conducting-passages. Some of the pneumatics and their motors are omitted from the figure. The casing of the modifying device is shown in section, and the accentuating-box with which it is connected in the present construction is indicated by the dotted lines behind the chest containing the secondary pneumatics. Fig. 2 is a side elevation taken from the left side of Fig. 1, with the modifying means and the accentuating-box in section on the line 2 2, Fig. 3. Fig. 3 is a horizontal sectional view through the line 3 3, Fig. 2.

The drawings represent the invention applied to the secondary chest *a* of an instrument of the well-known pianola type containing the channels and conducting-passages *c d e* connecting the pneumatics of the key-actuating devices with the exhaust-compartments of the bellows-action. These last-mentioned parts of the playing mechanism are not shown in the drawings.

Like the valve-chests in other instruments of the kind, the primary chest *b*, Fig. 1, is of well-known construction, with a primary valve *f* for each note in the scale, having two disks fixed on a common stem *f*² and the pocket behind the "puff" or diaphragm-pneumatic *f*⁴ connected in the usual way by a tubular conductor *f*⁵ with a duct in the tracker-board of the instrument. From the space or chamber between the upper and lower disks of the valve *f* a tubular conductor *g*^x (indicated by dotted lines in Fig. 1) connects the space controlled by the valve directly with the pocket *g*² under the diaphragm-pneumatic *g*, that actuates the similar controlling-valve in the secondary chest *a*. Like the corresponding chest in other instruments or playing attachments, this chest *a* is provided with compartments open to the atmosphere and separate compartments communicating with the exhaust or tension bellows of the instrument; but instead of having an exhaust-compartment common to the controlling-valves of the whole set of pneumatics that operate the treble and the bass notes the valve-chest *a* has an exhaust-compartment divided by a transverse partition *h* into a treble side *c* and a bass *d* in such manner that the valves *i*, which control the pneumatics of the strikers for the notes in the treble or melody side, are situated on the

right of the partition, while the corresponding valves *k*, controlling the strikers for the notes on the bass or accompaniment side, are in communication with the exhaust through the compartment *d* on the right of the partition.

The primary valves *f* are represented in Fig. 1 in their normal position, with their lower disks away from their seats and the ports open to the exhaust-compartment *b*² in the primary valve-chest, with the effect to deflate the diaphragm-pneumatics *g* of the corresponding valves in the secondary valve-chest. This is the normal position of the primary valve when its controlling-duct in the tracker-board being covered by the music-sheet is deflated and the upper disk of the primary valve is on its seat, closing communication with the passage *b'*, which is open to the atmosphere, as shown in Fig. 1.

The secondary valves (those in the right exhaust-compartment *c* being indicated by the letter *i* and those in the left compartment *d* by the letter *k*) are of similar construction to the primary valves in having two disks on a common valve-stem arranged to control two ports, one communicating with the atmosphere and the other with the exhaust.

The tubular conductors that connect the pockets behind the diaphragm-pneumatics with the primary valves and also those connecting the motors of the action or key-actuating devices with the secondary valves, are situated on the front of the valve-chests in the usual way, where they extend upward from the secondary to the primary chest and from the secondary valves to the power pneumatics or motors of the action. They would therefore not be seen in the sectional portion of Fig. 1, which is taken in a plane behind and parallel with the front of the chest. However, the positions of these tubular conductors are indicated in dotted lines in this view, those that connect the primary and secondary valves being designated *g*^x and those that connect the secondary valves with the power-pneumatics being designated *y*. The exhaust-spaces in the chest divided in this manner into the compartments for the bass and the compartments for the treble are connected with exhausting apparatus of different degrees of tension or exhaust, such as these piano-playing instruments are now provided with and which generally comprise what may be termed the "high-tension" or "forte" bellows and the "low-tension" or "piano" bellows.

At the present time it is the practice to lead separate conductors *m* *n* from the two bellows directly into a closed box *s*, to which the exhaust-spaces in the secondary chest are connected by conducting-channels opening into the box, and, by means of a single slide-valve *t*, arranged to control the two openings in the box, the tension or degree

of exhaust is varied by covering the high-tension opening or reducing the area of the opening. This part of the apparatus is generally known as the "accentuating-box," and its valve is controlled by the performer through the medium of a rocking lever situated in front of the chest in position near the tempo-regulating means, and where it is readily operated with the right hand. Interposed between this accentuating-box and the channels in the chest *a* are the means herein described for separately controlling and varying the tension or degree of exhaust in the two compartments *c* *d* before mentioned, and as the best mode of carrying out the invention I prefer to connect to the front of the accentuating-box *s* and form directly as a part of it a box *p*, containing two sets of compartments separated by a partition 2, extending longitudinally of the box and comprising two compartments 3 4 in front of the partition 2, from which tubular conductors 5 6 lead, respectively, to the bass side and the treble side of the chest *a*. Behind the partition 2 the space is divided by two cross-partitions 10 12 into three compartments 7 8 9, the middle one communicating with the accentuating-box through an opening 14 and also with the two compartments 3 4 on the opposite side of the partition 2 through separate valve-controlled ports or openings 15 16, while the outer compartments 7 9 are connected by a tubular conductor 17 with the smaller or low-tension bellows of the instrument. The last-mentioned compartments 7 9 communicate separately with the two compartments 3 4 through opening 18 19 in the divided wall 2.

It will be understood that the pipe *n* connects with the low-tension bellows, and the pipe *m* with the high-tension bellows. By virtue of this arrangement the channel *d* in the bass side of the chest communicates with the accentuating-box through the passage *e*^x, the conductor 5, and the compartments 4 and 8, while the channel *c*, through which the pneumatics in the treble side are actuated, is connected separately with the accentuating-box through the passage *e*, the conductor 6, and the compartments 3 and 8. In addition to such connection with the high-tension and low-tension bellows through the accentuating-box *s* the compartments 3 4 are directly connected with the low-tension exhaust alone through the outer compartments 7 9 and the conductor 17, which leads to the low-tension bellows, as before described.

The two conductors 6 17 are always in direct communication with the low-tension side of the exhausting apparatus through the compartments 7 and 9, whereas the connection with the high-tension side of the bellows-action is through the two valve-controlled ports 15 16. By the valve 20 the degree or condition of the tension in the con-

ductors 5 6 is varied separately of each other by shifting the valve 20 to one side or the other, so as to uncover one port and cover or reduce the area of the other.

5 The full force or highest degree of tension of which the exhaust apparatus of the instrument is capable will be obtained when the valve *t* stands on the center and both ports $m^{\times} n^{\times}$ in the accentuating-box are uncovered, for at such time both compartments 3 4
10 will be in direct communication with the middle space 8 and with the common exhaust-space in the accentuating-box *s*, thus giving the same conditions in the two channels on
15 opposite sides of the partition 2; but if the port 16 be closed or reduced in area by moving the valve 20 to the left the compartment 4 will be cut off from the compartment 8, connecting with the high tension, or will be
20 reduced to a greater or less degree, according to the position of the valve 20, and the port 15 being full-open will give the compartment 3 and the conductor 6 leading from it the full force or effect of the tension existing in the
25 accentuating-box.

Closing communication between either one compartment 3 or the other 4 and the high-tension space 8 has the effect to produce or set up in the compartment the low condition
30 of tension necessary for playing piano passages and by shifting the valve 20 this effect on the loudness or intensity of the sound produced by the striking mechanism is controlled and varied in degree in one side over the other
35 side of the keyboard delicately and promptly through the movements of a single lever.

For conveniently moving the accenuating-valve *t* and the valve 20, as well as to avoid multiplying the regulating levers and stops
40 of the instrument, I connect the two valves through the medium of separate rock-shafts 23 23 and the arms or links with a rocking lever of novel character, the construction and operation of which will be readily understood
45 by referring to Figs. 1 and 2. This lever consists of a grooved bar 32, set on a pivot 33, on which point as a center it is movable in a vertical arc on both sides of a vertical center line passing through the pivot. In this bar
50 a second bar 34 is fitted to slide freely, while being confined in the groove on the front face of the first-mentioned bar, so as to be movable up and down, and also having the same angular movement with the pivoted member.

55 The slide-bar 34 is connected with the valve 20 by the rock-shaft 23, carrying the arms 26 27, fixed on it at right angles to each other, one connected with the slide-bar by a rod 30 and the other with the valve 20 by a
60 rod 31 and a link. The rocking bar 32 is similarly connected with the accentuating-valve by the rock-shaft 22 and the arms 24 25, which are set in line with each other on opposite sides of the shaft, instead of at
65 right angles, in order to produce sliding

movement of the valve from the rocking movement of the lever, one arm being connected to the lever 32 by the link 28 and the remaining arm of the shaft to the valve by the rod 29. These parts are so arranged that
70 the accentuating-valve *t* stands on the center between the high-tension port and the low-tension port when the lever is moved over to the right, and the slide-bar 34 will be about
75 midway between its extreme highest and lowest positions on the rocking member 32 when the valve 20 is midway between the two ports 15 16.

A coiled spring 36, attached to the lower end of the rocking member 32 and to a fixed
80 point on the case, acts in the contrary direction to the pressure of the performer's finger, whereby he moves the lever over toward the left and brings it toward the right again or
85 back to the starting-point as often as the lever is released or the pressure of the finger against it is lessened.

What I claim as my invention is—

1. In a pneumatic music-playing instrument, the combination with a series of power-
90 pneumatics and key-operating devices individual to the notes of the instrument; of two sources of pneumatics tension of different degrees of exhausting power, and means for shifting and varying the communication be-
95 tween the said sources of exhausting power, and the power-pneumatics, comprising a box having a principal exhausting-chamber common to both sources of pneumatic tension, a compartment with which the power-pneu-
100 matics of the treble-notes communicate through a common conductor, a second compartment with which the power-pneumatics of the bass-notes similarly communicate, a valve adjusted to control at will the com-
105 munication of the principal exhausting-chamber with either source of pneumatic tension, a valve controlling communication between the principal exhausting-chamber and the said exhausting-compartments, means con-
110 necting both exhausting-compartments directly with the source of low-tension exhausting power around the valves, and means for separately operating said valves.

2. In a pneumatic music-playing instru-
115 ment the combination of key-operating devices individual to the notes of the instrument, and power-pneumatics adapted to actuate the same; of a source of high-tension exhausting power, a source of low-tension
120 exhausting power, and means for shifting and controlling the communication of the power-pneumatics that actuate the bass-notes in the scale of the instrument with either the high-tension or the low-tension
125 source of power separately of the power-pneumatics actuating the treble-notes, comprising a principal exhausting-chamber common to both sources of exhausting power, an exhausting-compartment common to all the
130

power-pneumatics of the bass-notes in the scale, a second exhausting-compartment common to all the treble-notes in the scale, a valve for closing communication of the principal chamber with one source of pneumatic tension and opening the chamber to the other source of tension, a valve controlling communication between said principal chamber and either of said exhausting-compartments, a conductor connecting said compartments directly with one source of pneumatic tension around the said controlling means, a handle-
 lever, and means connecting said lever with both valves for operating the same simultaneously.

3. In a pneumatic music-playing instrument, the combination with pneumatically-actuated key-operating devices individual to all the notes within the scale of the instrument, of a source of high-tension exhausting power, a source of low-tension exhausting power, an accentuating-box having a principal chamber, conductors connecting both sources of power with said chamber, and a valve operating to control the communication thereof with said sources of power, and means for simultaneously increasing the action of the exhausting power upon one set of the key-operating devices and reducing the action of said exhaust power upon another set of said key-operating devices, comprising a box having an exhausting-compartment common to the key-operating devices contained in one set a second and similar compartment common to the key-operating devices contained in the other set, an intermediate compartment connecting said exhausting-compartments with the accentuating-box having a valve adapted to control communication between both compartments and said box, and a conductor connecting both of the exhausting-compartments directly with one source of exhausting power around the valves, and means for operating said valves at will.

4. In a pneumatic music-playing instrument the combination with a series of key-operating devices individual to the notes in the scale of the instrument, of a source of high-tension and a separate source of low-tension exhausting power, a principal exhausting-chamber common to both sources of power, a valve adapted to open communication of the chamber with one source of power and close communication thereof with the other source, and comprising a box having a separate exhausting-compartment for the key-operating devices of each of the sets into which the whole number is divided, a conductor connecting each set of key-operating devices with its separate compartment,

a valve-controlled passage connecting each compartment with the exhausting-chamber, and a conductor connecting both compartments directly with the low-tension exhausting power around the said chamber.

5. In a pneumatic music-playing instrument the combination with a valve-chest containing key-operating pneumatics individual to the notes in the scale of the instrument, of a high-tension exhausting-bellows, a low-tension exhausting-bellows, an accentuating-box having valve-controlled apertures, conductors separately connecting the high-tension bellows and the low-tension bellows to said apertures, and a box interposed between the accentuation-box and the valve-chest comprising two exhausting-compartments to which the pneumatics actuating the bass-notes and the pneumatics actuating the treble-notes of the instrument are separately connected, a chamber having direct communication with the accentuating-box, a chamber having direct communication with the low-tension bellows only, and valve-controlled means for connecting either of said exhausting-compartments at will with the accentuating-box and shutting off the other exhausting-compartment.

6. The combination with two sources of exhaust tension of different powers, of the accentuation-box having a principal chamber with which both sources of power are connected, and a valve adapted to open communication with one and close communication with the other source of power, and a box *p* having two separate exhausting-compartments, valve-controlled passages through which either of said compartments is thrown at will into communication with the chamber of the accentuation-box, a conductor connecting the compartments of the box *p* directly with the source of low tension, an operating-lever and means operatively connecting said lever with the valves of both boxes.

7. The combination with an accentuation-box having a controlling-valve, and a box having a controlling-valve, of an operating-lever comprising a rocking member, a slidable member movable with the rocking member and also slidable thereon, means operatively connecting the rocking member with one valve, and means similarly connecting the slidable member with the other valve.

In testimony whereof I have hereunto set my name to this specification in the presence of two subscribing witnesses.

ARTHUR WILHELMJ.

Witnesses:

EDWARD E. OSBORN,
 M. REGNER.