

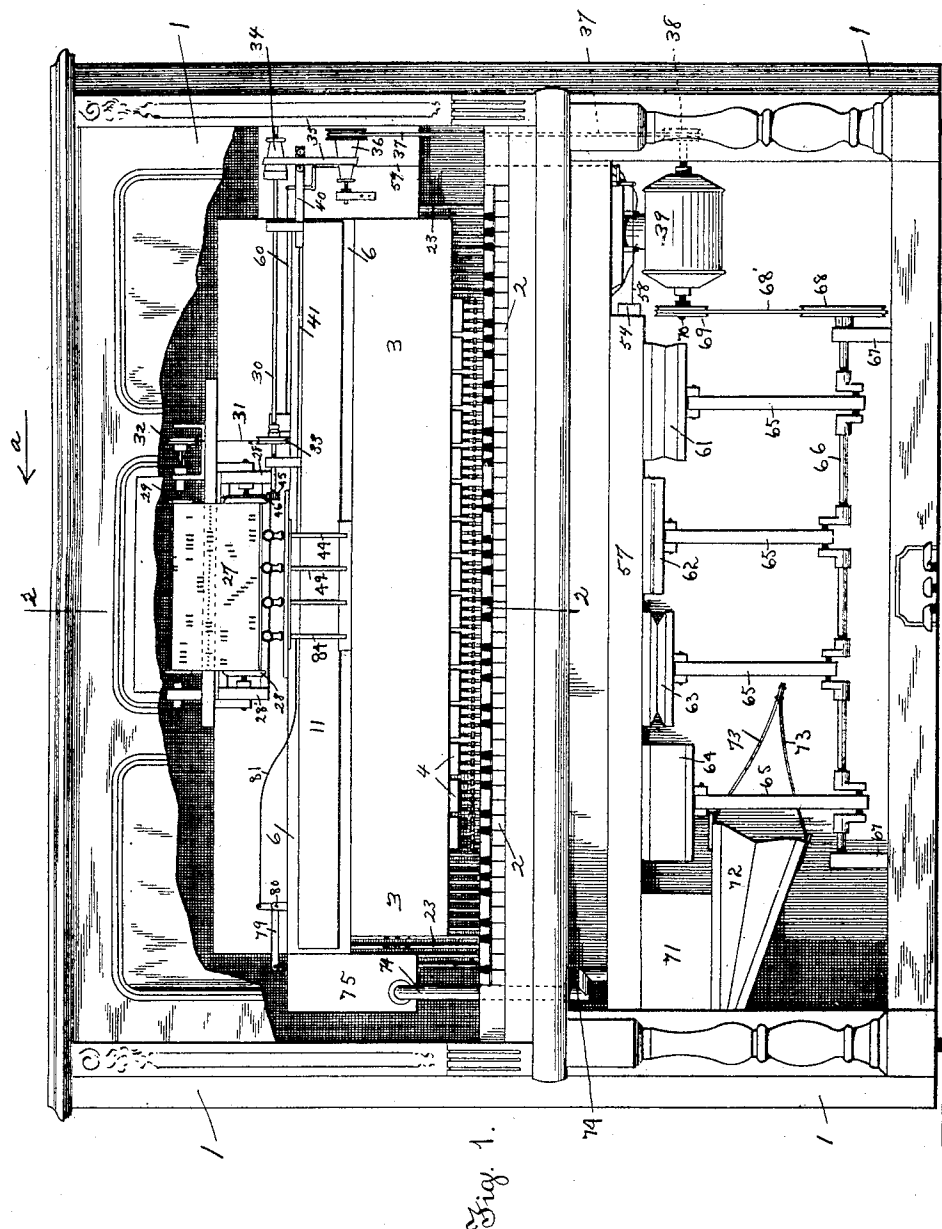
(No Model.)

3 Sheets—Sheet 1.

T. P. BROWN.
AUTOMATIC MUSICAL INSTRUMENT.

No. 581,390.

Patented Apr. 27, 1897.



Witnesses
adwhiting
M. J. Galvin

By his Attorney

L. C. Dewey

Inventor
T. P. Brown.

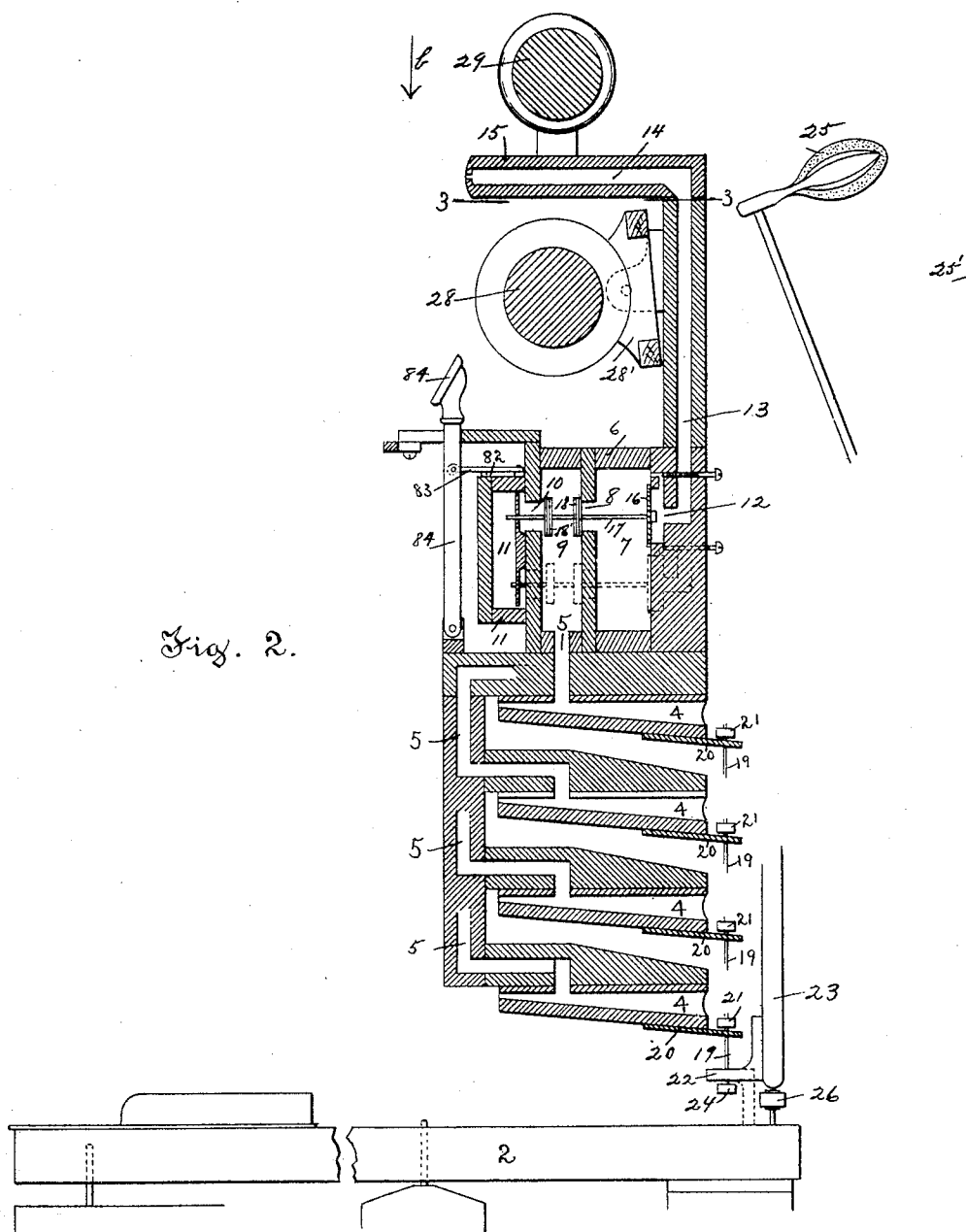
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3 Sheets—Sheet 2.

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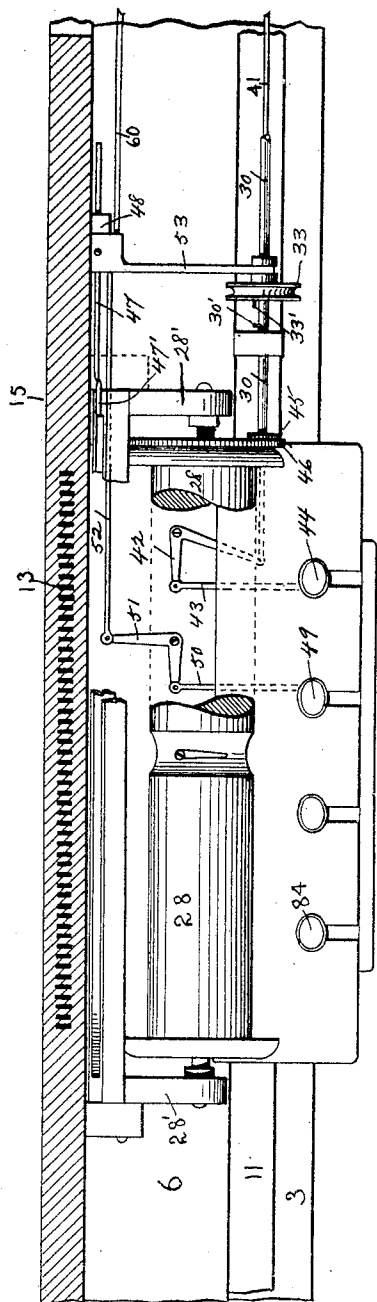


Fig. 3.

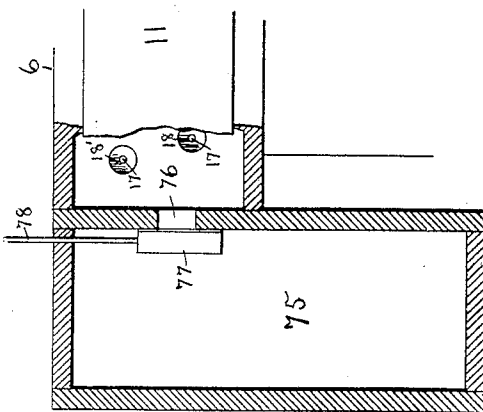


Fig. 4.

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UNITED STATES PATENT OFFICE.

THEODORE P. BROWN, OF WORCESTER, MASSACHUSETTS.

AUTOMATIC MUSICAL INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 581,390, dated April 27, 1897.

Application filed April 25, 1896. Serial No. 588,996. (No model.)

To all whom it may concern:

Be it known that I, THEODORE P. BROWN, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Automatic Musical Instruments, of which the following is a specification.

My invention relates to that class of musical instruments which are adapted to be played manually by a keyboard or mechanically and automatically by a perforated music-sheet attachment.

The object of my invention is to improve upon the construction of the class of musical instruments above referred to and to provide mechanism of simple construction and operation adapted to be combined with a musical instrument of ordinary construction played manually by a keyboard mechanism for playing said instrument mechanically and automatically; and my invention consists in certain novel features of construction and combination of parts of my mechanism for playing the instrument mechanically and automatically, combined with the ordinary mechanism of the instrument, as will be hereinafter fully described.

Referring to the drawings, Figure 1 is a front view of a musical instrument, in this instance a piano, embodying my improvements. The lower front part of the case and a portion of the upper part of the case is removed to expose the parts which would be concealed thereby. Fig. 2 is a section through the upper part of the musical instrument shown in Fig. 1, taken at a point indicated by line 2 2, Fig. 1, looking in the direction of arrow *a*, same figure. Fig. 3 is a horizontal section taken at a point indicated by line 3 3, Fig. 1, looking in the direction of arrow *b*, same figure; and Fig. 4 is a sectional detail through the air-box at the left in Fig. 1. Figs. 2 to 4, inclusive, are shown on an enlarged scale.

In the accompanying drawings, 1 is the case of the instrument, in this instance a piano, and 2 the keyboard, the keys of which are connected with the sound-producing devices, and may be operated manually in the ordinary way.

Combined with the keyboard, to play the

keys mechanically and automatically, is a perforated music-sheet attachment, which is located within the case above the keyboard. The system of bellows for exhausting the air from the pneumatics of the perforated music-sheet attachment is located in the lower part of the case below the keyboard, as shown in Fig. 1.

In the perforated music-sheet attachment a box or chamber 3, of suitable size and construction, is arranged in the case above the keyboard and contains a series of pneumatics, in this instance arranged in four rows, one over the other, as shown in Fig. 2.

The pneumatics 4 in the different rows are arranged alternately or staggering, and each pneumatic is of bellows construction in the usual way, and consists of a stationary piece and a movable piece and a flexible connection between them. An opening, as 5, leads out from each pneumatic 4 to a puppet-valve mechanism of ordinary construction and operation and located in a box or chamber 6 above the chamber 3, containing the pneumatics. There is a puppet-valve for each pneumatic.

In the box 6 a primary box 7 extends the full length of said box. From the primary box 7 an opening 8 leads into the puppet box or chamber 9. From said chamber 9 an opening 10 leads into the chamber 11, which is open at its ends to the outer air. The chamber in the primary box 7 is under constant suction or exhaust from the suction-bellows located under the keyboard and to be hereinafter described.

Leading out from the chamber in the primary box 7 is an opening 12, leading into an opening or channel 13, which at its upper end leads into a channel 14 in the tracker-board 15. (See Fig. 2.)

Extending over the opening 12, leading out of the primary box 7, is a flexible diaphragm 16, to which is attached one end of the puppet-valve stem 17. Two disks 18 and 18' are secured on the stem 17 and are adapted to close alternately the opening 8 or the opening 10 in the usual way.

The movement of the diaphragm 16, acting as a non-perforated or a perforated portion of the music-sheet comes opposite the opening 14 in the tracker-board 15, acts to close

the opening 8 or the opening 10. In case of the closing of the opening 10 and the raising of the disk 16 from the opening 8 the pneumatic will collapse, and the upward movement of the movable piece of the pneumatics will, through a pin 19, extending loosely at its upper end through an arm 20 on said flexible piece and provided with a button 21 and extending at its lower end loosely through an angle-lever 22, fast on a vertical-moving abstract 23 and provided with a button 24 at its lower end, raise said abstract 23 and allow the weighted key 2 to drop down at its front end. The raising of the rod 23 will operate the hammer 25 to strike the wire 25' and produce the desired note.

In case the keyboard is played manually the depression of the keys 2 at their front ends will, through the buttons 26 on their rear ends, raise the abstract 23 to operate the hammer 25, and the angle-lever 22 will slide loosely on the pin 19 without moving the same.

The perforated music-sheet 27 extends in front of the tracker-board 15 and is adapted to be wound from one roll, as 28, onto another roll, as 29. Said rolls are journaled in bearings, and the upper roll is belted to a shaft 30 by an endless belt 31, passing around grooved pulleys 32 and 33. The shaft 30 is provided with a cone-pulley 34 at one end, which is belted by a belt 35 to a cone-pulley 36. Said cone-pulley 36 is belted by a belt 37 to a pulley 38 on the shaft of a motor 39, in this instance an electric motor, which may be of any ordinary construction and located under the keyboard in the lower part of the case.

By means of the reverse-cones 34 and 36 and the shifting of the belt 35 by a slide 40 and rod 41, angle-lever 42, and link 43 (see Fig. 3) to the stop 44, pivoted at its lower end and adapted to move out or in at its upper end, the speed of the shaft 30, and consequently of the roll 29, may be varied according as it is desired to have the perforated music-sheet 27 move fast or slow in front of the tracker-board.

On the opposite end of the shaft 30 from the cone 34 is a pinion 45, which is adapted to mesh into a gear 46 on the end of the lower roll 28. Said roll 28 is mounted in a frame 28', which is pivotally supported, as shown in Fig. 2, and adapted to be thrown out at its lower part to disengage the gear 46 from the pinion 45 by the bevel end 47' of a rod 47, secured in a block 48. The end 47' of said rod 47 engages the frame 28' below its pivotal support in the ordinary way.

A stop 49, through link 50, angle-lever 51, and rod 52, operates the rod 47 to move the gear 46 out of engagement with the pinion 45, and at the same time moves the loose pulley 33 on the shaft 30 through the arm 53 to the left in Fig. 3 and causes the pin 30' on said shaft to engage a pin 33' on the pulley 33 and cause the pulley to revolve with the

shaft to operate, through the belt 31, the pulley 32 and the roll 29 to rewind the music-sheet 27 thereon in the usual way. At the same time that the pulley 33 is moved on the shaft 30, as above described, a valve 54 on the end of the air-box 57 is opened to release the air, through connections 58, 59, and 60, to the arm 53. (See Figs. 1 and 3.)

I will now describe the arrangement of the bellows for exhausting the air and producing the suction to operate the pneumatics.

Arranged under the keyboard-frame is the inclosed chamber 57. On the bottom thereof is secured the stationary leaf of each one of the four bellows 61, 62, 63, and 64, and an opening leads into each of said bellows from said chamber.

The movable leaf of each of the bellows is provided with a valve (not shown) and is connected by a link 65 with a crank-shaft 66, mounted in bearings 67 in the lower part of the case. The crank-shaft 66 has a grooved pulley 68 on one end thereof which is belted to a grooved pulley 69 on the shaft 70 of the motor 39 by a belt 68'. (See Fig. 1.) The crank-shaft 66 is therefore driven by the motor 39 and operates the bellows.

At one end of the case 57 is a box 71, on the lower surface of which is secured a stationary leaf of an equalizing-bellows 72. A spring 73, attached at one end to the stationary leaf and at its other end to a movable leaf of the bellows 72, tends to expand said bellows against the action of the bellows 61, 62, 63, and 64.

Leading out from the end of the chamber 57 is a pipe 74, which opens into the lower end of the wind chest or box 75, which is connected with the primary box 7 of the puppet-valve mechanism by an opening 76. (See Fig. 4.) The size of the opening 76 is governed by a valve 77 on the end of a rod 78, attached at its upper end to the angle-lever 79, pivoted at 80 and connected by a rod 81 with an angle-lever 82, which is connected by a link 83 with the stop 84. By means of the stop 84, through the intermediate mechanism, the exhaust of air from the primary box of the puppet-valve mechanism is controlled so that the notes may be played soft or loud, as desired.

The advantages of my improvements will be readily appreciated by those skilled in the art.

My attachment may be combined with any ordinary piano or other musical instrument without interfering with the ordinary manual operation of the keys.

The pneumatic action is located entirely over the keyboard, so that all the channels and passages leading to the perforated music-sheet are above the keyboard, and there is no necessity of employing rubber tubes extending below the keyboard, as the pneumatics act on the keys from above instead of below, as is customary.

It will be understood that the details of con-

struction of my improvements may be varied, if desired. For example, the angle-lever 22 may be attached to the keys 2, as shown by dotted lines in Fig. 4, instead of the abstract

5 23. Any kind of a motor, as an electric motor, a water-motor, or a gas-motor, may be used for operating the mechanical mechanism.

I have herein shown and described certain mechanism for operating the note-sheet rollers, but I do not claim the same here, since such mechanism forms the subject-matter of a separate application filed by me.

15 Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a mechanical musical instrument, the combination with the manual-keyboard, of the wind-chamber 57, located below the key-
20 board, a series of bellows connected to said wind-chamber, a wind-box 71, arranged alongside the bellows and communicating with the said chamber, an equalizing-bellows 72, having its stationary leaf secured to the under
25 side of the wind-box, a wind-chest 75, located above and to one side of the keyboard and communicating with the wind-chest by a pipe 74, a box or chamber located over the rear ends of the manual-keys and containing puppet-valve mechanism, a series of pneumatics
30 arranged below the box or chamber and communicating therewith by suitable air-passages, each pneumatic having a connection with the sound-actuating devices, a vertically-arranged music-sheet, a motor, and in-

dependent connections between the motor and series of bellows, and music-sheet-operating mechanism for imparting motion thereto, substantially as described.

2. In a mechanical musical instrument, the combination with the manual-keyboard, of the vertically-disposed pneumatic action located above the rear ends of the manual-keys and provided with a plurality of pneumatics, a rearwardly-extending perforated arm 20, 45 secured to the movable member of each pneumatic, a rod 19 passing loosely through each perforated arm and provided with a button on each end, a series of vertically-movable abstracts 23, arranged above the rear ends 50 of the manual-keys, a perforated bracket 22, secured to each abstract and through which the said rods loosely pass, a vertical air-channel board leading upward from the pneumatic action and terminating in a forwardly-projecting horizontal tracker-board, a vertically-
55 arranged music-sheet moving over the face of the tracker-board, means for operating the music-sheet, a series of bellows located below the keyboard and supplying air under pressure to the pneumatics, and a motor having
60 an independent connection with the bellows and music-sheet-operating means whereby both are operated simultaneously, substantially as described.

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