

H. B. HORTON.  
Mechanical Musical Instrument.

No. 210,424.

Patented Dec. 3, 1878.

Fig. 8.

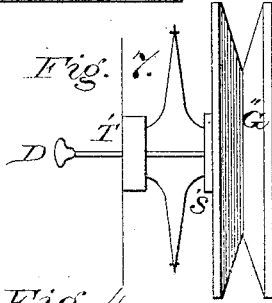
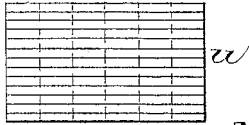


Fig. 4.

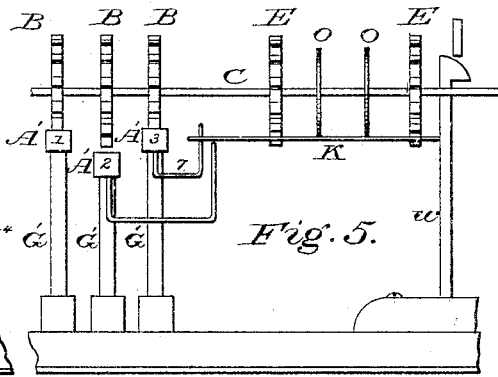
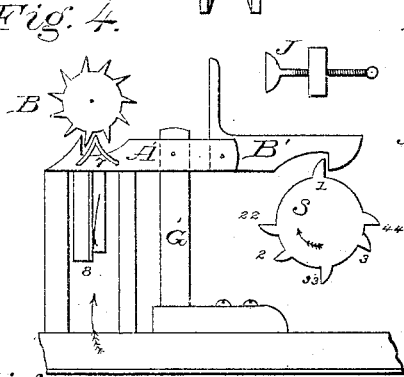


Fig. 2.

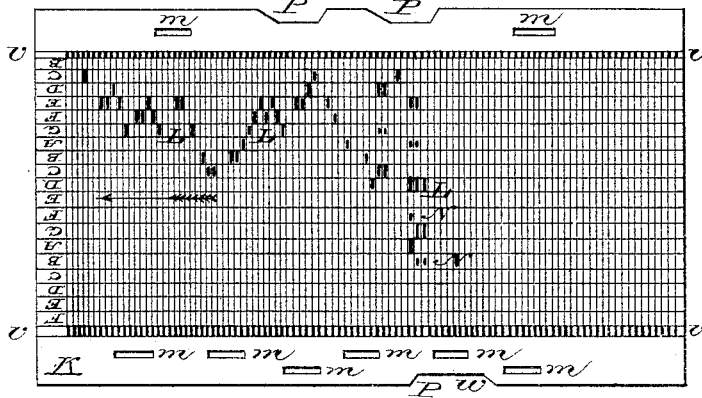


Fig. 3.

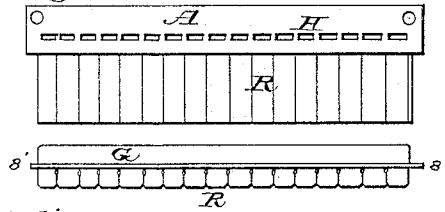


Fig. 6.

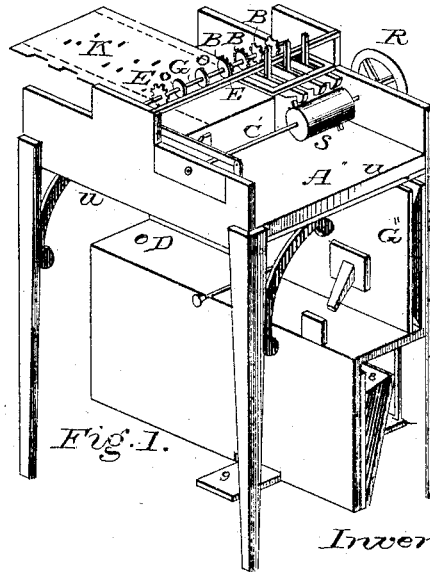
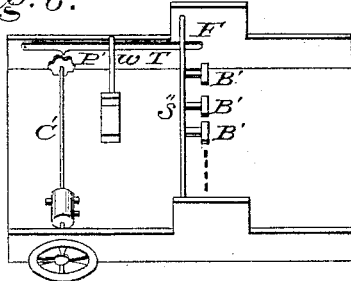


Fig. 1.

Witnesses:

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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN MECHANICAL MUSICAL INSTRUMENTS.

Specification forming part of Letters Patent No. **210,424**, dated December 3, 1878; application filed March 15, 1878.

*To all whom it may concern:*

Be it known that I, HENRY B. HORTON, of Ithaca, in the county of Tompkins and State of New York, have invented certain new and useful Improvements in Wind Musical Instruments; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to wind musical instruments; and consists in a number of new improvements for automatic musical instruments, as set forth in the following specification and accompanying drawings, in which—

Figure 1 is a perspective view of the interior or working parts of an instrument which I denominate the "autophone." Fig. 2 is a plan view of a perforated strip of card-board, which I term the "valve" or "valve-sheet." Fig. 3 represents plan and end views of the exterior of the reed-plate incased in metallic tubes or pipes. Fig. 4 is a side view, and Fig. 5 is a front view, of the rotating and oscillating parts and their connections. Fig. 6 is a view representing the tremolo and its operation. Fig. 7 is a side view of the pressure or equalizing bellows, representing the springs in connection with it. Fig. 8 is a plan view of an elastic sounding-board used in the instrument.

To enable others skilled in the art to construct my instrument, I will proceed to describe the various parts, reference being made to the annexed drawings, letters, and figures.

Fig. 1 represents the valve-sheet K in the act of passing through the instrument, which can be accomplished by any unskilled person in music, and which enables him to acquire a knowledge of musical sounds. It also represents my mode of arranging the bellows 8 and receiver G"; also the position of the balance-wheel, as connected with the bellows 8 and pedal 9.

Figs. 1 and 5 represent the shaft C, on which are two spur-wheels, E E, which engage the valve-sheet K and move it forward. I have also used two clicks or hooks in place of the

spur-wheels E E, to forward the valve-sheet K, but do not consider them as good as the wheels, and three ratchet-wheels, B B B, which cause the shaft to rotate; also the plain disks O O, which press the valve-sheet K down, and hold it in close contact with the top of the reed-plate A, Fig. 3.

The valve-sheet K, Fig. 2, is made of card-board or other suitable thin material, and has on each side a row of equidistant perforations, V, to receive the teeth of the wheels E E when it is applied to the instrument, the two working after the manner of a rack and pinion.

The perforations L L L, of equal width with the mouths H of the pipes, are made at suitable intervals and in proper places longitudinally of the valve-sheet and in line with the pipes, for the purpose of allowing the air expelled by the bellows to issue from each at the proper time and cause it to produce its appropriate note. These openings may be made of various lengths to govern the duration of the note, making a semibreve, crotchet, quaver, &c., as may be required.

On one edge of the valve-sheet K are lateral indentations P P, for the purpose of admitting the tremolo to act or vibrate when desired. On the other edge of the valve-sheet is another lateral indentation, P W, for the purpose of allowing the swell, which may be made in any known form, to close when desired.

I construct the sound-apertures of different sizes for the following reasons: All key-board instruments or those having the chromatic scale, as the piano or organ, cannot be tuned with perfect harmony in all keys, the present system being to tune in equal temperament producing a sharp major third in every key. I therefore, to remedy this defect, make the aperture N N smaller to depress the tone, making the major third perfect with the first or key note.

I construct my reeds on a continuous plate, S' S', Fig. 3, similar to harmonicas or mouth-organs; but the receiving ducts or pipes which convey the air to and from the reeds are what I consider new. The manner of forming the pipe-box is as follows: Sheets of thin metal, such as tin or some similar metal or material, of proper width, are folded or bent as shown

at R, Fig. 3, to form the partitions between the reeds, as each fold or doubling of the metal is made to form the pipes side by side the length of the reed-plate 8'. The edge is soldered to the reed-plate 8' between the reeds on the back or outlet escape side. The reed-front or inlet side has a similar pipe-box, R, but is not rigidly fastened, in order to allow for tuning the reeds. After the escape-pipes are secured to the reed-plate 8' the top and bottom plates, A and G, are secured in place by soldering to the reed-plate. The music-box is then ready to be hung or suspended for use by the top plate, A, leaving the reeds free to sound, as seen in end view, Fig. 4.

The advantage of constructing the pipes of metal or hard rubber instead of wood, as is usual, is, first, that a large number of reeds can be more compact and close together; second, that there is no change by moisture, expansion, or contraction, and by these improvements the valve-sheet will adhere to the apertures H, as desired.

Figs. 4 and 5 represent the rotating and oscillating parts of my instrument. Figs. 1 and 4 represent a cylinder or roller having six pins or projections, which operate the valve-sheet K. This cylinder has a shaft, C', on which is a balance-wheel, connected by a pitman to the foot-pedal 9, Fig. 1.

One of the six pins (marked 1) must be ready for action at the top when the pedal is going down, or down-beat in music.

Pins 1, 2, and 3 are for triple time, as  $\frac{3}{4}$ ,  $\frac{3}{8}$ ,  $\frac{6}{8}$  time. Pins 1, 22, 2, 33, 3, 44 are for even time, as  $\frac{2}{4}$ ,  $\frac{2}{4}$ ,  $\frac{4}{4}$  time.

The oscillating click-bar A' has a projection or hook downward, which connects with the roller-pin, 1 when desired. The other end has a hook or click projecting upward, connecting with the ratchet-wheels B B B, for moving the valve-sheet at intervals.

The click-bar A' is in two parts. The part having the click downward and connecting with the rollers S is constructed in a right angle, B', the click part forming a part of the bar, which is hinged to vibrate separately from the bar proper.

The arm of the angle B' extends upward, and is controlled by a stop, J, which lets the click loose when desired.

The click-bar A', in two parts, forming a whole, is held in place by an upright post, G', pivoted at the top and bottom to allow the bar to vibrate upward when the angle-click B' strikes the stop J. Click-bar A' has offsets 7 7, Fig. 5, projecting toward and underneath the valve-sheet K, in such position as to enter apertures M M M, Fig. 2, for the purpose of allowing the clicks to fall into the notches of the ratchet-wheel B, Fig. 5, and by their action to forward the valve-sheet K at quickened intervals to produce short notes. The click-bar A', No. 1, Fig. 5, has no offset or wire projection, as in all the others; but it is intended to assist in operating the valve-sheet

at every downstroke of the pedal 9, or at each revolution of the cylinder S.

I will now proceed to describe my tremolo. In Fig. 6 the balance-wheel shaft C' has attached at one end a corrugated disk, P'. A light bar, S'', running the width of the instrument, has attached to it a series of pads, B', which come in contact with the valve-sheet apertures. This light bar S'' is pivoted at one end, leaving it free to vibrate, the other end resting on another light bar, T, at right angles with it, which is also pivoted at one end. The ends of the bars where they come in contact at F are loose, and the bar T rests upon the corrugated disk P' on the balance-wheel shaft C'. The bar T comes in contact with an upright stud, W, Fig. 6, that rests against the valve-sheet K; and when the sheet is laterally cut away, as at P P, the stud W, falling into the said cuts, allows the right-angle bar T to come in contact with the corrugated disk P', which causes the pads over the apertures of the valve-sheet to vibrate rapidly.

Fig. 7 represents my manner of softening the power or sound of the instrument. The receiver or equalizing-bellows G'' has a block, S', resting in its center, with a rod screwed into it, said rod extending through another thick block, T', to support it, and through the front of the case, with a knob, D, attached to it. Between the two blocks S' and T' are two springs, fastened, for giving force and power to the music. By drawing the knob D out, the connection of the block S' is severed from the equalizing-bellows G'', taking the springs with it.

At the bottom or under side of the bed-plate A'', Fig. 1, which supports the reeds, being the whole size of the instrument, is an elastic sounding-board, U, Fig. 8. The reeds in this instrument being placed in a rigid air-tight chamber, they must have some flexible means to allow them to vibrate freely. To accomplish this, I provide an elastic sounding-board, Fig. 8, on the under side, or near the reeds, for the purpose above described. Said sounding-board U, Fig. 8, being thin, is ribbed each way on one side, to strengthen and improve the tone.

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

1. The balance-wheel R, when arranged to act conjointly with foot-pedal 9, bellows 8, and pitman, in the manner and for the purpose specified.

2. The series of pins 1 2 3 in roller S, arranged to operate their corresponding clicks, as shown.

3. The apertures M M M in the valve-sheet K, when arranged to operate in combination with offsets 7 and ratchet-wheels B, in the manner shown.

4. The lateral indentations p p in valve-sheet K, when arranged to act conjointly with corrugated disk P', bars S'' and T, stud W, and

pads B', substantially in the manner and for the purpose set forth.

5. The reed-plate S', metal pipe-box R, and the top plate, A, having apertures H, when combined, constructed, and arranged to operate for the purpose specified.

6. The corrugated disk, P', in combination with bars S'' and T, stud W, and pads B', when arranged to operate as shown.

7. The valve-sheet provided with the apertures L and N, when said apertures are constructed and arranged to operate as described and shown.

8. Clicks A' A', with offsets 7, when arranged to operate in combination with valve-

sheet K, cylinder S, with pins 1 2 3, and ratchet-wheel B, as shown and described.

9. The click-bar A', when made in two parts, substantially as and for the purpose specified.

10. The equalizing-bellows G'', blocks S' and T', with their springs and knob D, when combined and arranged to operate substantially as and for the purpose set forth.

In testimony that I claim the foregoing as my own I hereby affix my signature in presence of two witnesses.

HENRY B. HORTON.

Witnesses:

WM. J. TOTTEN,

CHS. G. DAY.