M. J. MATTHEWS.

Mechanical Musical Instrument.

No. 216,622. Patented June 17, 1879.

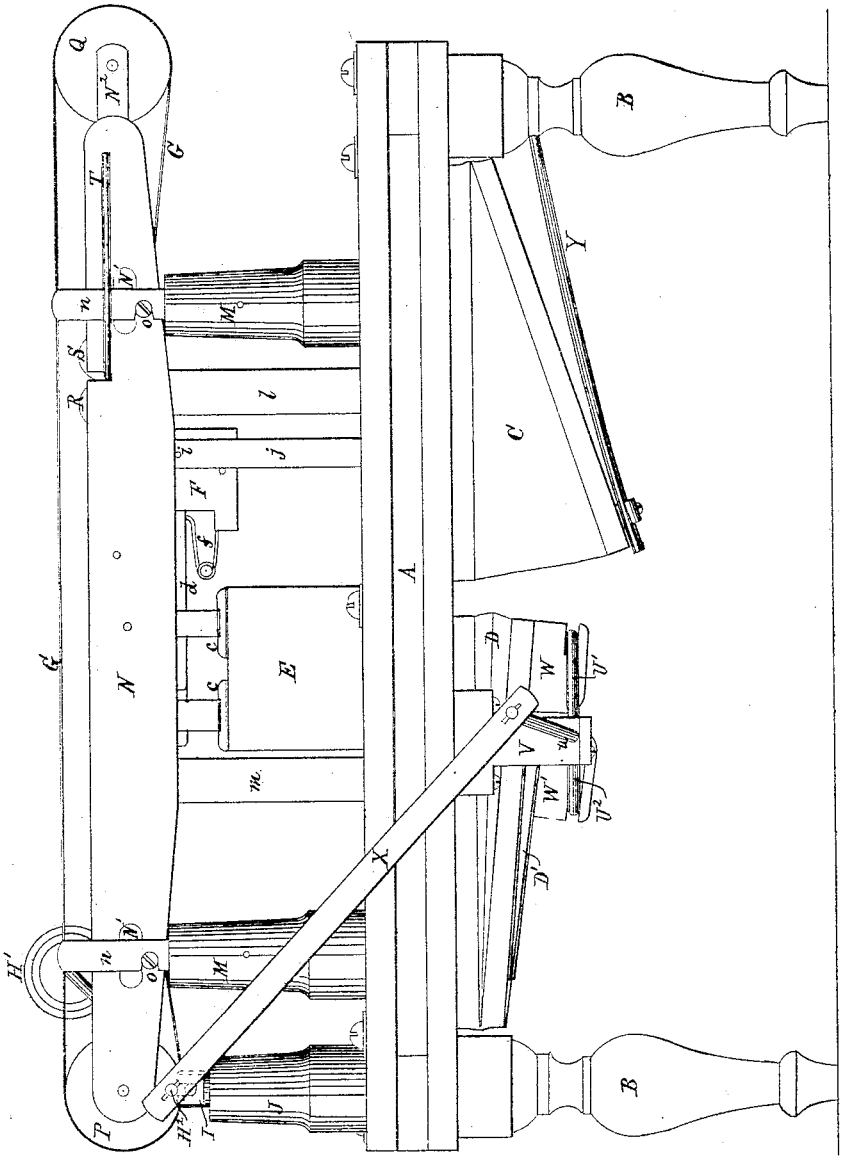

Fig. 1.

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W. C. Loubard

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3 Sheets—Sheet 2.

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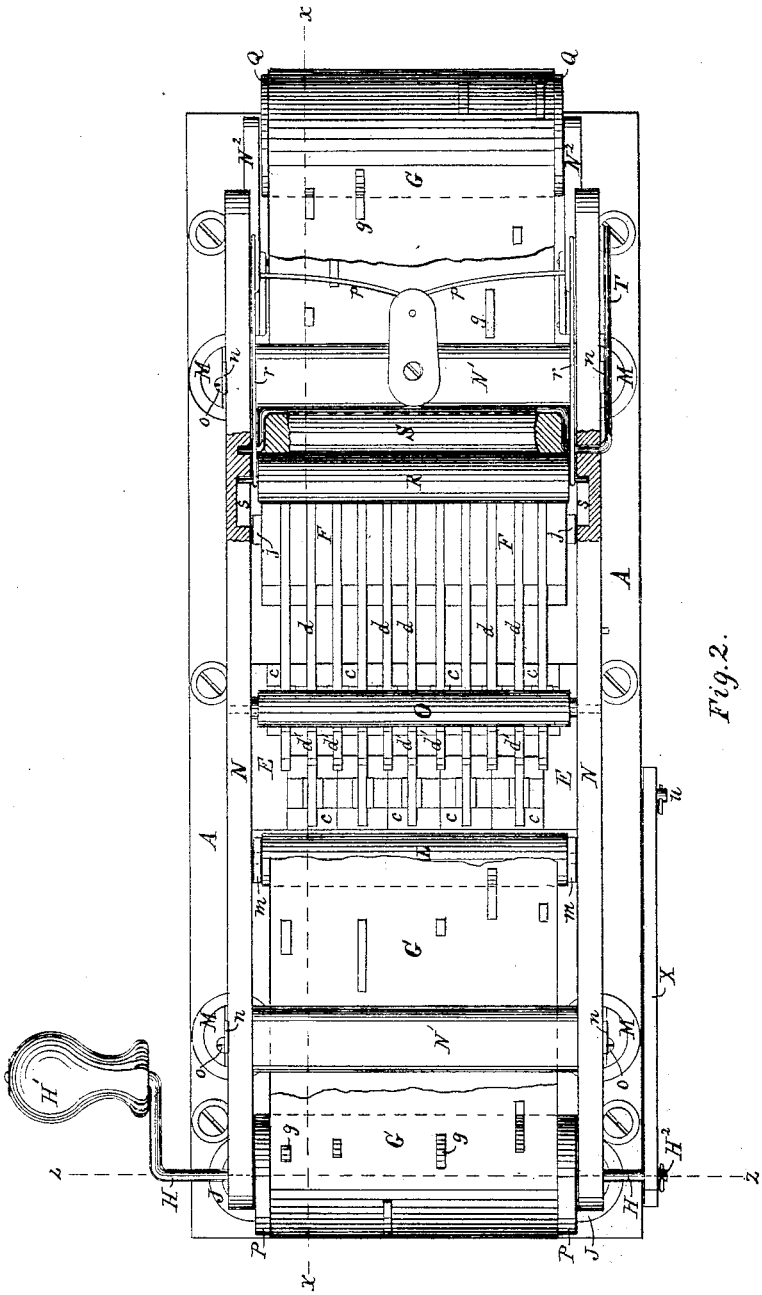

Fig. 2.

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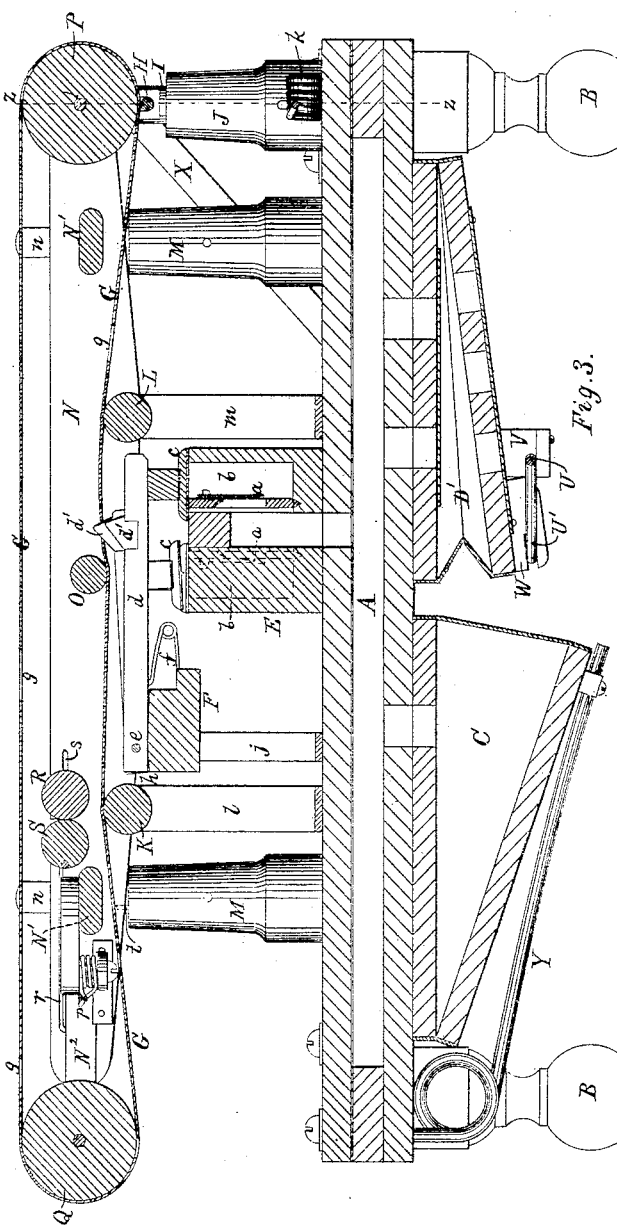

Fig. 3.

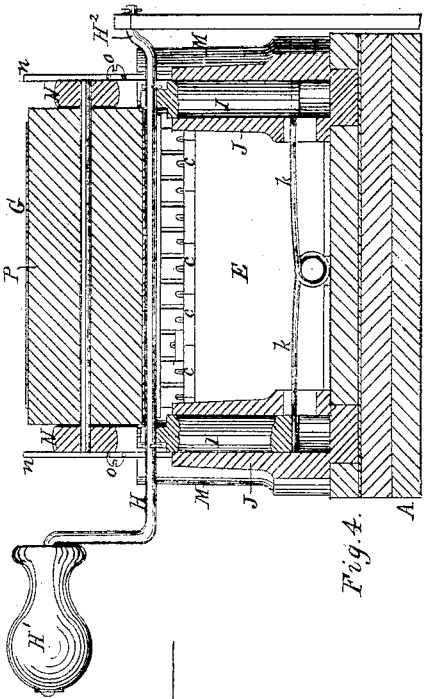

Fig. 4.

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UNITED STATES PATENT OFFICE.

MASON J. MATTHEWS, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN MECHANICAL MUSICAL INSTRUMENTS.

Specification forming part of Letters Patent No. **216,622**, dated June 17, 1879; application filed August 19, 1878.

To all whom it may concern:

Be it known that I, MASON J. MATTHEWS, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Mechanical Musical Instruments, of which the following, taken in connection with the accompanying drawings, is a specification.

My invention relates to that class of mechanical musical instruments in which a series of valves are controlled by a perforated sheet of paper or other suitable flexible material, and is an improvement upon the invention described in Letters Patent No. 204,352, granted to me May 28, 1878; and it consists, first, in so pivoting the valve-levers in a pivoted fulcrum-bar that, while said bar shall serve as a stop to limit the upward movement of the valves during the operation of the instrument, said fulcrum-bar may be rotated around its axis to raise all of the valves simultaneously, and remove them from above the reed-chamber, so as to render the reeds accessible for repairs when the paper band is removed.

It further consists in the combination, with valves adapted to control the passage of wind through the reeds of a musical instrument and a sheet or band of perforated paper for operating said valves, of a series of guide-rolls so arranged relatively to the angular push-points of the valve-levers and to each other as to bend the paper from a straight line and strain it taut as it passes over said push-points.

It further consists in mounting the endless band of perforated paper upon two carrying-rolls having bearings in the ends of a detachable skeleton-frame, with their peripheries extending beyond the edges and extreme ends of said frame, so that the band of paper may be slipped off from the ends of said rolls or drums for the purpose of changing the tune when said frame is detached from the instrument, as will be described.

It further consists in a detachable skeleton frame placed above the reed-chamber, having mounted in bearings formed in one end thereof a paper-carrying roll of a diameter greater than the width of the side bars of said frame, and provided at the opposite end thereof with movable extensions of said side bars, having mounted in bearings formed in the outer ends thereof a second paper-carrying roll, in combination with a spring or springs connected with said movable extension side bars, and adapted to move them and the roll carried thereby outward for the purpose of straining the endless band of paper taut, and to permit said extensions and roll to be moved inward to loosen said band of paper and facilitate its removal.

It further consists in the combination, with a detachable skeleton frame having mounted therein a pair of rolls or drums and an endless band of perforated paper or other flexible material stretched taut upon said rolls, of an operating or driving shaft mounted in yielding bearings directly beneath one of said rolls, and adapted to gripe the paper band between it and said roll, and by its rotation in contact therewith cause said band to be moved over the valve-levers, holding the valves to their seats by pressing upon the angular push-points, except when an opening in the paper passes over a push-point, when, being relieved from the pressure of the paper, the valve is raised by the action of its spring, as described in my former patent before cited.

Figure 1 of the drawings is an elevation of the rear side of an instrument embodying my improvements without the inclosing casing. Fig. 2 is a plan with portions of the perforated paper band broken away. Fig. 3 is a vertical longitudinal section on line *x x*, Fig. 2; and Fig. 4 is a vertical transverse section on line *z z* on Fig. 3.

A is the wind-chest, supported upon the legs B B, and having secured to its under side the reservoir C and two wind-moving bellows, D and D′, and upon its upper side the reed-chamber E, having set therein, in a vertical position, two rows or series of reeds, *a a*, and provided with suitable wind-passages *b* leading therefrom, all constructed in a well-known manner.

The wind-passages *b* are closed by valves *c*, depending from levers *d*, pivoted at *e* to the bar F, and provided upon their upper sides with angular projections *d′*, upon which the endless band of paper G presses to hold said valves down upon their seats, a spring, *f*, serving to raise each of said valves when one of

the openings *g* cut in the paper band G passes over its angular projection or push-point *d'*, the rear end of the lever *d* striking against the bar F to limit its upward movement, as shown at *h* in Fig. 3.

To facilitate the insertion and removal of the reeds, the bar F is provided with journals *i*, one at each end, and mounted in bearings in the standards *j j* in such a manner that it may be rotated partially around its axis, carrying with it all of the valves *c* and their levers *d*, removing them from above the reed-chamber to one side thereof, in an obvious manner.

H is the driving-shaft, provided at one end with the operating-crank H^1 and at the opposite end with the crank H^2, and mounted in bearings in the upper ends of the pistons I I, fitted to move up and down in the hollow posts J, projecting upward from the upper side of the wind-chest A, said pistons resting at their lower ends upon the springs *k k*, which tend to force said pistons and the shaft H upward.

K and L are two guide-rolls, mounted in bearings in the standards *l l* and *m m*, respectively, and over which the lower portion of the endless band of perforated paper G passes, said rolls serving to aid in keeping said paper taut at the point where it acts upon the angular push-points *d'*.

M M are four posts projecting upward from the wind-chest A, upon which rests a skeleton frame composed of the two side rails, N N, and cross-ties N^1 N^1, the said frame being firmly secured thereon by the latches *n n*, pivoted to the posts M and engaging with the headed pins or screws *o o*, as shown.

O is a guide-roll, having its bearings in the side rails, N N, and adapted to press upon the paper band just as it approaches the angular push-points and aid in keeping the paper taut at the point of action.

P is roll or drum mounted in bearings in the ends of the side rails, N N, directly over the driving-shaft H, which is pressed against its periphery with considerable force by the springs *k k*, thereby griping the paper band G, which passes around the roll P and between it and the shaft H in such a manner that a rotation of the shaft H will cause the paper band to travel around the roll P.

To the opposite end of each of the side rails, N N, is fitted, so as to move endwise in suitable slides or bearings thereon, an extension, N^2, having formed in its outer end a bearing to receive one of the journals of the roll Q, around which the paper band G passes, as shown in Fig. 3.

The extension-bars N^2 and roll Q are forced outward by the springs *p p* to strain the paper taut, and may be moved inward, at pleasure, when it is desired to change the tune, by removing the paper band and substituting another therefor.

The extension-bars N^2 are each connected, by a wire, *r*, to the journal of the roll R, which has its bearings in slots *s s*, formed in the inner faces of the side rails, N N, and along which it may be moved by partially rotating the eccentric roll S by means of the lever T.

The rolls P and Q are made of a diameter greater than the width of the side rails, N N; and when it is desired to change the tune the frame N N^1 is removed from the instrument. The roll Q is moved inward to slacken the paper band, when it can easily be slipped off from the rolls and another put in its place, when the roll Q is again moved outward into the bight of the paper band to strain it taut. The frame with the paper band is then placed in position on the posts M M, with the pins *t t* entering holes in the under sides of the rails N N, as shown in dotted lines in Fig. 3, and the latches *n n* are brought into engagement with the pins *o o* to lock the frame in position, when the instrument is ready for operation.

U is a rocker-shaft, mounted in bearings in the hangers V, and having formed therein between said bearings the two cranks U^1 and U^2, projecting in opposite directions and engaging with slots formed in blocks W and W', respectively, said blocks being secured to the lever-boards, respectively, of the bellows D and D'.

The shaft U is also provided at one end with the crank *u*, to which a vibratory motion is imparted by the crank H^2 on the driving-shaft through the medium of the connecting-rod X.

Y is a spring applied to the reservoir C to keep it expanded in a well-known manner.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The combination of the reed-chamber E, provided with a series of reeds and wind-passages, the pivoted bar F, a series of levers, *d*, provided with angular or other suitably-shaped push-points *d'*, and valves *c*, pivoted to the bar F, and a sheet or band of perforated paper or other flexible material, all arranged and adapted to operate substantially as and for the purposes described.

2. In combination with a series of valves, *c*, push-points *d'*, and a sheet or band of perforated paper, G, the rolls K L, adapted to support the paper upon either side of the push-points *d'*, and the roll O, mounted upon and removable with the frame N N^1, and adapted to bend the paper out of a straight line and strain it taut over the push-points, substantially as described.

3. In combination with an endless band of perforated paper or other suitable flexible material for controlling the passage of wind through the reeds of a musical instrument, a detachable skeleton frame having mounted in each end thereof a paper-carrying roll, the peripheries of which extend beyond the top, bottom, and ends of said frame, substantially as and for the purposes described.

4. The detachable skeleton frame N N^1, provided with the extension-bars N^2, in combination with the rolls P and Q and springs *p p*,

all arranged and adapted to operate substantially as and for the purposes described.

5. The combination, in a musical instrument, of a detachable skeleton frame, a pair of rolls or drums mounted in said frame, one at each end thereof, an endless band of perforated paper stretched taut around said rolls, and a driving-shaft mounted in yielding bearings directly beneath one of said rolls, and adapted to gripe said paper between it and said roll, substantially as and for the purposes described.

6. In a mechanical musical instrument, a bar carrying spring-fingers, when arranged to be partially rotated about an axis to lift said spring-fingers upward, substantially as described, for the purposes specified.

Executed at Boston, Massachusetts, this 15th day of August, A. D. 1878.

MASON J. MATTHEWS.

Witnesses:
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E. A. HEMMENWAY.