(No Model.) 2 Sheets—Sheet 1.

J. McTAMMANY, Jr.

AUTOMATIC MUSICAL INSTRUMENT.

No. 260,109. Patented June 27, 1882.

Fig. 1.

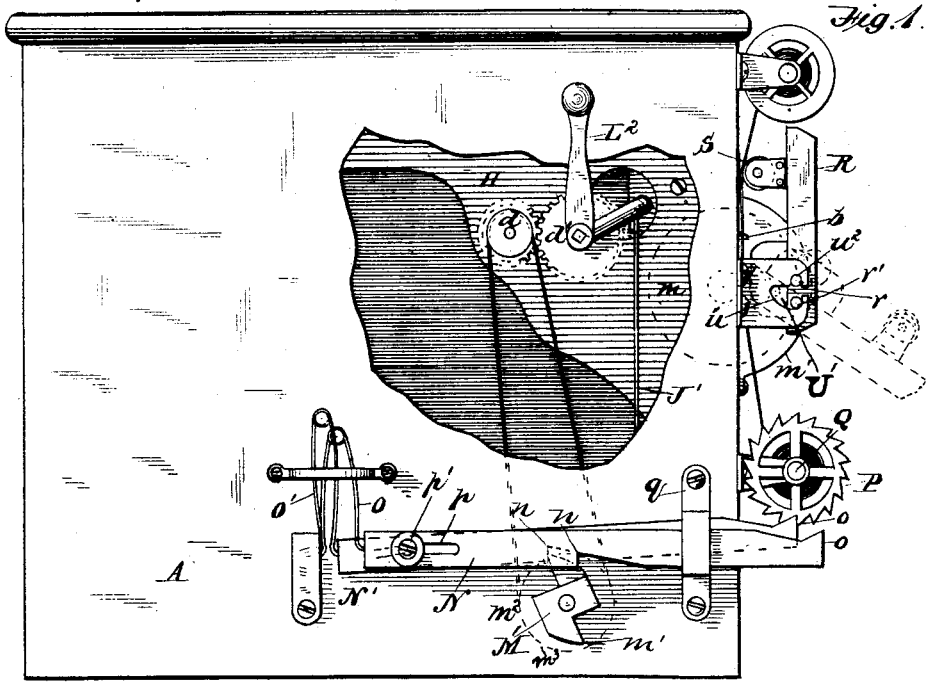
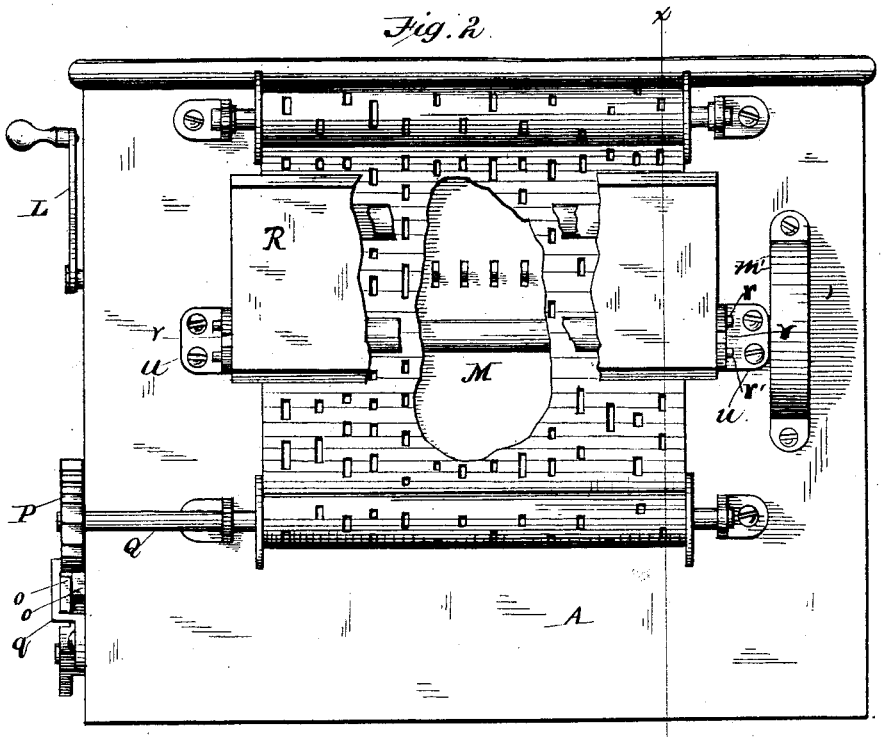


Fig. 2.



WITNESSES

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(No Model.) 2 Sheets—Sheet 2.

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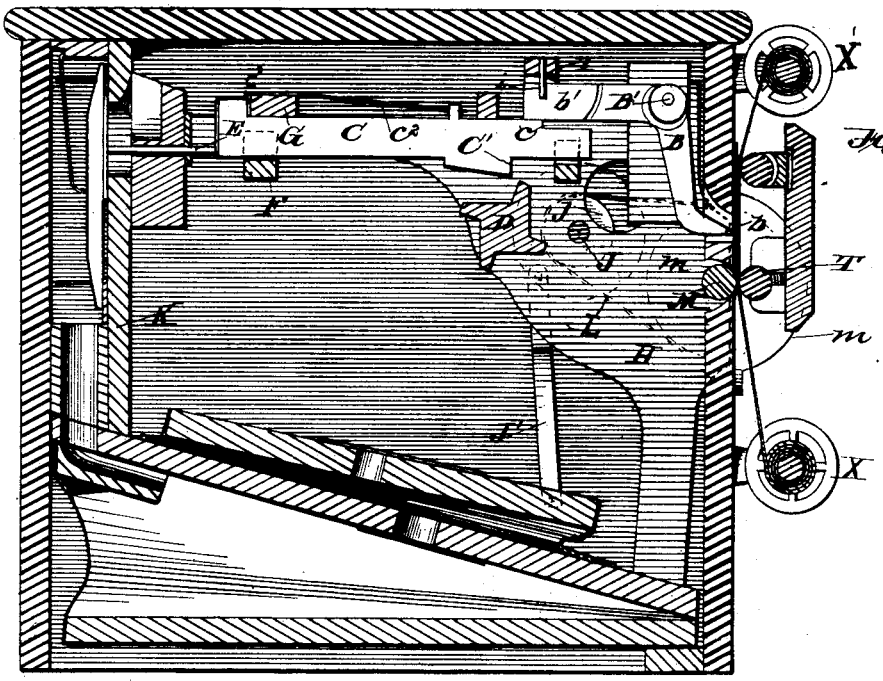


Fig. 3.

Fig. 4

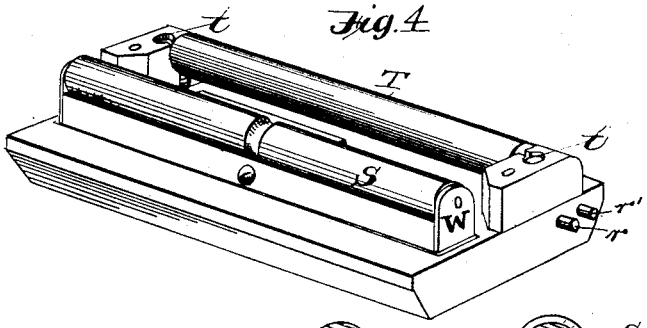
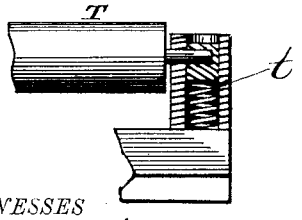


Fig. 6.



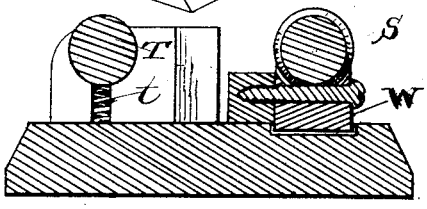


Fig. 5.

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UNITED STATES PATENT OFFICE.

JOHN McTAMMANY, JR., OF WORCESTER, MASSACHUSETTS.

AUTOMATIC MUSICAL INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 260,109, dated June 27, 1882.

Application filed April 1, 1882. (No model.)

To all whom it may concern:

Be it known that I, JOHN McTAMMANY, Jr., 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; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as 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 letters or figures of reference marked thereon, which form a part of this specification.

This invention relates to that class of automatic musical instruments in which the music-sheet acts on a set of fingers which are forced in by the solid part of the sheet, but allowed to protrude through the openings therein. Some of the improvements hereinafter described are, however, applicable to any kind of automatic musical instruments.

The said invention consists partly in certain improvements in mechanism for controlling the action of the reed-valves, partly in certain improvements in the winding mechanism for the music-sheet, and partly in certain improvements in devices for holding the music-sheet against the body of the instrument in proximity to the fingers, all as hereinafter set forth and claimed.

In the accompanying drawings, Figure 1 represents a side elevation of an automatic musical instrument embodying my present improvements, partly broken away. Fig. 2 represents a front elevation of the same, the rack, music-sheet, and rollers being shown partly broken away. Fig. 3 represents a vertical section from front to back on line *x x*, Fig. 2. Fig. 4 represents a detail view of the rack. Figs. 5 and 6 are cross-sections showing the arrangement of the rollers and the manner of securing them in the rack.

In said drawings, A designates the case of the instrument, through the front of which the fingers *b* play in and out, suitable slots or openings being provided to allow of such motion. These fingers are formed on or attached to the inclined lower forward ends of a series of angle-bars or bell-crank levers, B, which are pivoted at their angles or corners on a rod, B′, that passes through the whole series. These levers are preferably castings, and their rear ends are weighted or made heavy, as shown at *b′*, so as to hold down the forward ends of longitudinally-movable bars C. Each of these bars C is constructed with a shoulder, *c*, on its top, against which the end of its lever abuts, and a shoulder, C′, on its under side, adapted to receive the impact of the flutes or ribs on a fluted roll, D, arranged transversely below them. Each bar C is also held upward by a spring, c^2, which is attached preferably to a lug on its upper side and at the other end to a fixed transverse bar, G, forming a part of the supporting frame-work. This fixed bar or bridge G acts also as a stop to prevent said bars C from moving forward too far, shoulders c^3 being formed upon them on top at their rearward ends. These rearward ends are in immediate contact with the valve-rods E, which operate the reed-valves so as to open them and allow the emission of sound through them when the bars C are pressed against the valve-rods E, so as to force the latter in.

Of course the reed-valves are provided with the usual valve-springs, whereby the valve rods and bars are forced back when the pressure of the fluted roll ceases.

The bars C are supported and guided by a bar, F, which is recessed on top to form guide-ways for them. They are also guided and prevented from rising too far by the cross-bar G, which extends across them. This cross-bar G is attached to or forms part of the fixed interior frame, whereby the foregoing levers or castings, bars, and fluted roll are supported. This frame is marked H.

The castings or levers B are guided and separated by studs *i*, which extend downward at intervals from a raised bridge, I, supported on frame H. As there are a lever, B, and a sliding bar, C, for each valve-rod, it is obvious that any valve may be automatically operated by a music-sheet without affecting the others.

While the solid part of the music-sheet is passing over any point or finger *b* it forces that point in through the slotted front of the casing, so as to lift the rear end of the lever B, which is provided with said point, and to allow the forward end of its sliding bar C to be raised by its spring c^2, as stated. The said

bar is thus held up out of engagement with the fluted roll D; but as soon as an opening in the music-sheet comes opposite said point or finger the latter is free to protrude, and the weight of the rear end of the bell-crank lever forces down the forward end of the said sliding bar C, so as to engage its shoulder C′ with the rotating fluted roller, which thereupon forces said sliding bar C backward, so as to open the appropriate valve. When the end of the opening in the music-sheet is reached said sheet presses against the inclined face of the point or finger, and thus forces it into the box, thereby raising the rear end of the lever, as before. The spring c^2 then raises the bar C out of engagement with the fluted roll, and the valve-spring closes the valve and presses out the valve-rod, forcing the bar C forward. The said fluted roll is operated by means of cog-wheels d d', arranged respectively on the shaft or gudgeon of said fluted roll and on the driving-shaft J, which is journaled in frame H. Said driving-shaft has a crank at one end and an eccentric and wrist-pin at the other, and by means of these it causes pitmen J′ J′ to alternately operate the feeder-bellows arranged in the bottom or lower part of the instrument. Below these feeder-bellows is the reservoir-bellows, which communicates with the reed-board K at the back of the instrument. Said driving-shaft also carries a drum or pulley, j, whereby it is enabled, through a belt, L, to operate the inner feed-roll or feed-roll proper for the music-sheet. This feed-roll (marked M) turns in a recess in the front of the case of the instrument and protrudes slightly through an opening in said front, so as to get hold of the music-sheet. Its shaft carries at one end a wheel or pulley, m, which turns within a hollow offset, m', of the casing, or it may turn within the casing itself. The belt L passes around drum j on the driving-shaft and pulley m on the feed-roll, and motion is communicated thereby directly from said shaft to said feed-roll in the usual manner. This arrangement allows the said shaft and feed-roll to be set at some little distance from one another, which is important in operating the fluted roll and bellows.

One end of the driving-shaft extends through the side of the instrument, and is provided with an operating crank-handle, L^2, for operating the instrument. This driving-shaft d' is connected by cog-gearing to the shaft of a pulley, d, which is belted to a lower pulley, m^3. The latter carries a wheel or rotary block, M′, having two teeth, m' m^2, one of which is arranged a little farther from the body of the instrument than the other. These teeth operate alternately on corresponding shoulders, n n, of two parallel horizontal bars, N N′, so as to force said bars backward against the resistance of springs O O′, which springs bear respectively on said bars N N′.

The operative end of each bar is provided with a tooth, o, which is adapted to engage the broad ratchet-teeth of ratchet-wheel P on the shaft of winding-roll Q. These bars are guided by a bracket, q, attached to the side of the instrument-case, and their rear ends are slotted at p to allow them to move over a stud, p', which serves as support pivot and guide. When each bar is released from the tooth m^2 or m' which acts upon it its spring O or O′ forces it forward with an obliquely-downward pressure on the rear end of said bar; but the leverage of this pressure lessens as the bar slides forward, and consequently the forward end of the bar, after rising and engaging the ratchet-wheel aforesaid and turning it a little, is gradually and gently separated therefrom, and the next takes hold in its turn, while the former is withdrawn. The amount of winding accomplished at each forward motion of a bar necessarily depends on the amout of resistance encountered—that is, as the size and weight of the roll increase by the accumulation of paper the spring will not be able to turn said roll so far as before; but the amount of rotary movement will steadily decrease, so as to compensate for the strain on the music-sheet or the undue acceleration of motion which would be caused by the increase in the size of the winding roll of paper, if said roll were driven by ordinary belting or any means which does not provide for compensation. This method of compensation is more reliable than any form of slipping gear, as it consists of a direct equable yielding pressure, and is not at all likely to fail through clogging. It adjusts itself exactly to the requirements of the case.

R designates a rack or frame which carries the presser bar or roll S and the outer feed-roll, T. The latter is provided with the usual springs, t t, for holding it against the paper; but the presser bar or roll has no springs attached or applied to it. The said rack or frame is provided with two parallel studs, r r', at each end near its rear corners. The stud r' on each side is behind the point at which the feed-roll is journaled, but the stud r on each side is in front of said point. These studs serve in turn as the journals or trunnions of said frame or rack. They set into a bearing-bracket, U, attached to and projecting from the front of the case, and having a neck, u, which leads to an internal recess, U′. The rear part of this recess has a curved wall or edge, u', inclining obliquely upward and rearward. The front part has an offset, u^2, at or near its upward end. When the rack is turned back the rear studs, r', ride as trunnions on the curved oblique bearing-edges u' of recess U′ of the two brackets U. When the rack is turned down the forward studs, r, enter the offsets u^2 and become in their turn the trunnions or pivots of the rack, the other studs, r', riding up on the said bearing-edges u' and serving to guide the frame. When the rack or frame R has been turned down toward the instrument so far that the journal-points of the feed-roll carried thereby are in a plane behind that of the studs r r, the springs which bear against the bearings of said feed-roll will exert an out-

ward pressure against the rack or frame, and this pressure will cause the presser-bar above described, and which is on the other side of the pivot-points of the rack, to press tightly against the music-sheet and the body of the machine. The feed-roll in said rack (it is really an idle-roll) is at this time held against the lower feed-roll or feed-roll proper. As the force of the feed-roll springs *t t* can find no further outlet in that direction, it is mainly exerted outwardly and against the rear end of frame or rack R. This frame or rack then acts on the principle of the lever, having its fulcrum between its power and the operative end, the springs *t t* supplying the power, and the presser bar or roll being forced downward or inward by the operative end, so as to hold the music-sheet to its work.

The presser-roll S which I employ is journaled in the ends of a trough-shaped bar, W, which is pivoted at its middle to a block on the rack R. This construction and arrangement allows the ends of the presser-roll to move up and down, one going up as the other goes down, so that it easily accommodates itself to any inequality in the music-sheet, while allowing the roll to turn freely, substantially as set forth.

The rewinding-roll is marked X′, and is connected to the winding-roll by the music-sheet only.

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

1. In combination with a winding-roll and toothed wheel carried thereby, a reciprocating bar or bars arranged to operate said wheel, and forced against the same by spring-pressure, and means for returning the said bar after its forward movement, substantially as and for the purpose set forth.

2. In combination with the winding and rewinding rolls of a music-sheet and a ratchet-wheel carried by the shaft or gudgeon of the former, a pair of reciprocating bars acting alternately on said ratchet, a pair of springs acting to force said bars against said ratchet, and a rotating block or wheel carrying teeth which alternately force said bars back against the resistance of their springs.

3. A pair of slotted toothed bars acting on the ratchet-wheel of the winding-roll, as stated, in combination with a fixed stud which enters the longitudinal slots of said bars, a pair of springs which force said bars forward, and a rotating block or toothed wheel which forces back said bars against the resistance of said springs, substantially as and for the purpose set forth.

4. The combination of a set of point-carrying levers or castings weighted at their rear ends, with sliding vertically-movable valve-operating bars on which said weighted ends rest, springs for raising the forward ends of said bars, and a fluted roll adapted to operate said bars when lowered by the weighted ends of said levers, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN McTAMMANY, JR.

Witnesses:
WM. H. BABCOCK,
J. C. LATHROP.