

A. RICHTER.  
AUTOMATIC MUSICAL INSTRUMENT.

No. 560,283.

Patented May 19, 1896.

Fig.1

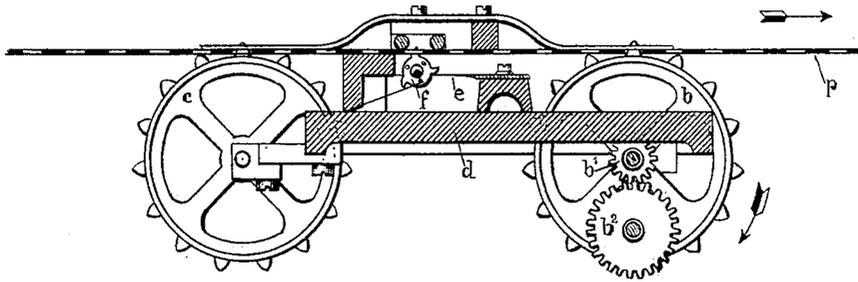


Fig. 2

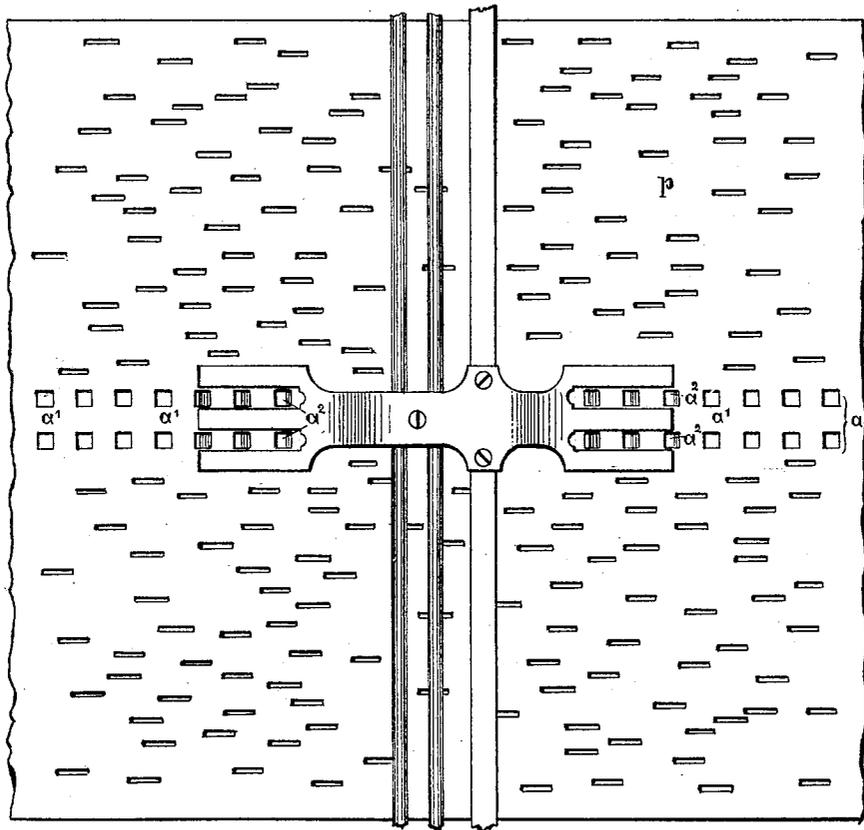


Fig. 3.



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Fig. 4

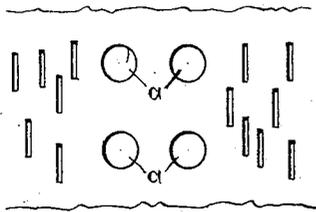


Fig. 5

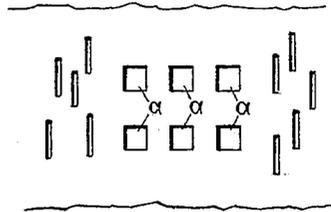


Fig. 6

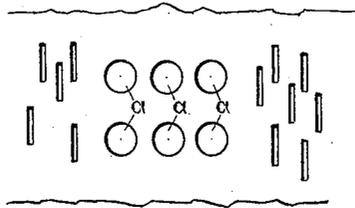


Fig. 7

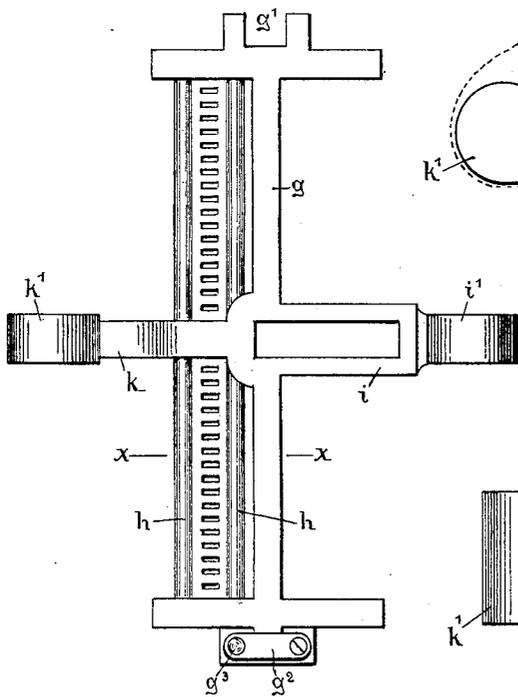


Fig. 8

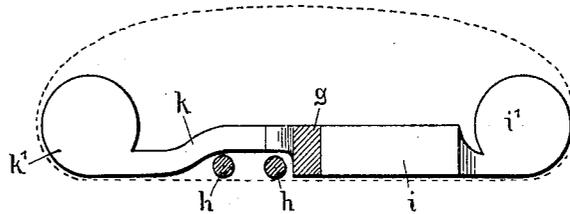
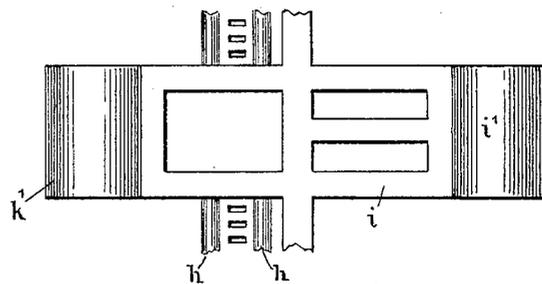


Fig. 9



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# UNITED STATES PATENT OFFICE.

ADOLF RICHTER, OF RUDOLSTADT, GERMANY.

## AUTOMATIC MUSICAL INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 560,283, dated May 19, 1896.

Application filed July 8, 1895. Serial No. 555,338. (No model.)

*To all whom it may concern:*

Be it known that I, ADOLF RICHTER, a subject of the King of Bavaria, residing at Rudolstadt, in the Principality of Schwarzburg-Rudolstadt, Germany, have invented certain new and useful Improvements in Automatic or Mechanically-Played Instruments, of which the following is a specification.

My invention relates to improvements in so-called "automatic" or "mechanically-played" instruments.

My invention consists, first, in the arrangement of two toothed music-sheet-controlling wheels, one behind the other, in the same line, for the purpose of insuring a proper rectilinear motion of long and endless music-sheets, the latter being driven by the said wheels from the center of the line of notes.

My invention consists, secondly, of a bar pressing the music-sheet against the push-point levers or tripping apparatus, the said bar having two parallel rods loosely revolving in their bearings, one of the rods before and the other behind the push-points of the push-point levers, and an arm provided with one or more slots for the engagement of the music-sheet-controlling wheel, for the purpose of giving the music-sheet a smooth and sure guidance.

My invention consists, thirdly, in the construction of a fly-wheel for the driving mechanism of the music-sheet, the said fly-wheel having its two overlapping wings pivoted parallel to the driving-shaft and connected one with the other by a piece, so that the two wings are forced to unfold and to put together simultaneously, whereby a quiet motion and a quick regulation is insured.

My invention consists, fourthly, in an arrangement, hereinafter described and claimed, for quietly winding up the barrel of the driving mechanism, by which arrangement the pawl is held out of gear with the ratchet-wheel during the winding up.

In the accompanying drawings, Figure 1 is a side elevation, partly in section, of my improved device for moving and guiding the music-sheet in a rectilinear manner. Fig. 2 is a plan view of the same. Fig. 3 is a detail plan view of a driving-wheel having two rings of teeth. Figs. 4, 5, and 6 are plan views of music-sheets with several rows of driving-

holes. Fig. 7 is a plan view of the music-sheet presser-bar. Fig. 8 is a section of the same on the line *xx* of Fig. 7. Fig. 9 shows the middle part of the presser-bar arranged for driving-wheels with two rings of teeth. Fig. 10 is a side elevation of the fly-wheel, and Figs. 11 and 12 are a plan view and a front elevation of the same. Figs. 13 and 14 are a side elevation and a plan view of a modified construction of the fly-wheel. Fig. 15 shows a side elevation of the winding-up mechanism, the pawl being out of gear with the ratchet-wheel, and Fig. 16 is a like elevation of the same, showing the pawl catching in the ratchet-wheel. Fig. 17 is a front elevation of a chest containing the mechanical musical instrument on consoles. Fig. 18 is a perspective view of the instrument on consoles. Figs. 19 and 20 are front and side elevations of an oval casing inclosing the mechanical musical instrument.

Similar letters of reference indicate corresponding parts.

Heretofore wide long music-sheets could only be moved over the tripping apparatus with any amount of certainty by arranging the two rows of driving-holes for the two toothed wheels mounted on one shaft either at the outermost edges of the music-sheet outside of the line of notes or to a certain extent within the line of notes; but with this arrangement the driving-holes had to be made of rather great width in order to insure a certain engagement of the teeth of the two wheels therein in case of alteration of the paper or cardboard music-sheets, such as shrinking and expanding resulting from the weather. The greater the width of a music-sheet of this kind the greater must be the space or play in the driving-holes. With an arrangement of this kind there is no guarantee for proper rectilinear movement. On the contrary, the sheet in its forward movement will be shifted to and fro by the entrance of the tripping points or pins in the notes or music-holes, the amount of such shifting being proportionate to the amount of play in the driving-holes. It has been attempted to obviate this drawback by providing special side guiding devices; but in this case also the contraction or shrinking and expansion of the music-sheets have been found inconvenient. In the case of side guiding devices

the maximum width of the music-sheet resulting from the action of the weather must be taken into consideration, because if this is not done side friction is produced, which will interfere with the proper forward movement. Now the present invention completely obviates all these drawbacks. The alterations—such as the shrinking and expansion of the music-sheets resulting from the weather—can no longer injuriously affect the rectilinear motion of the music-sheet. According to this invention the driving-holes *a*, Fig. 2, are arranged in the middle of the music-sheet *p*, and two sheet-controlling toothed wheels *b* and *c*, Fig. 1, are provided at a suitable distance apart, one behind the other, of which the front wheel—that is to say, the wheel *b* which is driven by means of the toothed wheels *b'* and *b''* from the motive mechanism—serves to effect the forward motion of the music-sheet, while the rear wheel—that is to say, the wheel *c*—is actuated by the music-sheet and serves exclusively for guiding the music-sheet in a straight line. With this arrangement the driving-holes of the music-sheet need not be wider than is necessary for the proper engagement of the teeth of the two wheels, and since both wheels serve for guiding the music-sheet positively in a straight line it cannot be shifted laterally. Furthermore, this apparatus has also the advantage that it requires considerably less power for operation, because all friction and irregularity of motion resulting from the expansion of the music-sheet is excluded. The two wheels *b* and *c* rest in bearings on the bed-plate *d*, the latter supporting the steel tongues *e* and the tripping or striking wheels *f*.

In order to enable the hereinbefore-described apparatus to be used with very wide music-sheets, the two toothed wheels must be each provided with two or more separated rings of teeth *a''*, Fig. 3. This is necessary in order to make the connecting portion between the driving-holes of the music-sheet of sufficient strength by leaving also a longitudinal connecting-piece *a'*, Fig. 2, between the said holes.

The driving-holes *a* in the music-sheet may also be of circular form, as in Fig. 4, and instead of two rows of driving-holes there may be three or more rows, as represented in Figs. 5 and 6. In all these cases the driving-holes are in the middle of the line of notes.

Figs. 7 to 9 show the presser-bar for pressing the music-sheet toward the push-point levers or striking-wheels. The presser-bar *g* is at *g'* hinged to the casing of the instrument and held down on the other end by a flat bolt *g''* turning at *g'''*. This bar *g* is provided with two loosely-revolving and parallel rods *h*, which press on the music-sheet before and behind the push-point levers engaging the music-sheet. The revolving rods *h* allow the music-sheet to travel smoothly and with less friction over the push-point levers. The bar *g* is further provided with a slotted arm *i*, in

the slot of which engage the teeth of the driving-wheel, while the arm *i* presses down the music-sheet so that the teeth of the driving-wheel engage in a sure and uniform manner into the driving-holes of the music-sheet. The free end *i'* of the arm *i* is rounded, and also the end *k'* of the arm *k*, the latter being opposite to the arm *i*. The rounded ends *i'* and *k'* facilitate the travel of endless music-sheets, so far as the latter move around the arms *i* and *k*, as indicated in dotted line in Fig. 8. If the music-sheet is very wide, the arm *i* of the presser-bar *g* is made with two or more slots, as shown in Fig. 9, for the engagement of the teeth of a wheel with two or more rings of teeth. (Represented in Fig. 3.) The rods *h* are in this case divided into two parts, the one ends of these parts having their bearings in the sides of the arm *k* and the other ends in the ends of the bar *g*.

Figs. 10, 11, and 12 represent the fly-wheel. On the vertical axle *m* of the same, the under end of which is threaded as usual, is fixed a horizontal cross-piece *n*, supporting two vertical bolts *n'*, serving as axles for the wings *o*. These latter are connected by the piece *q*, the ends of which are loosely mounted on short pins on the upper edge of the wings *o*. Above the cross-piece *n* is arranged on the axle *m* a coiled spring *m'*, the lower end of which is connected with the cross-piece *n*, the upper end being pivoted to the connecting-piece *q*. By this arrangement the coiled spring acts on the piece *q*, so that the wings *o* are put together in a uniform manner. When the fly-wheel is rotating and one of the wings *o* begins to unfold, the connecting-piece *q* forces simultaneously the other wing also to unfold.

In Figs. 13 and 14, instead of one coiled spring, as in Fig. 12, two coiled springs *m''* *m'''* are arranged, each of which is connected on its one end with the cross-piece *n*, and on its other end with one of the wings *o*, as shown in Fig. 14.

Figs. 15 and 16 show the mechanism for quietly winding up the barrel. The catching of the pawl into the ratchet-wheel causes, as is known, a disagreeably rattling noise when the barrel is wound up. In order to prevent this, an arm *r'* is pivoted on the arbor *r* of the barrel, which is connected with the mainspring, said arm being under tension of a strut-spring *w*, and having at its free end a notch *r''*, which, during the winding up of the arbor, engages the pin *s'* of the pawl *s*, which is lifted by the arm and thus holds the pawl out of engagement with the ratchet-wheel *t*. When the arbor of the barrel starts to turn in the opposite direction by impulse of the mainspring, the pin *s'* of the pawl is released from the socket *r''* of the finger *r'* and the pawl is again forced into engagement with the ratchet-wheel by a spring *u*.

Fig. 17 shows the musical instrument arranged on consoles *v* within a chest or the like, whereby is attained that endless music-sheets

may be put very easily on the instrument and then hang freely down over the whole instrument, as shown in Fig. 18. The consoles *v* may be preferably fixed on the back side of the chest. In placing the instrument on consoles the same can ever remain on its place without being removed when a new music-sheet shall be put on the instrument.

If the mechanical musical instrument shall be arranged within a larger chest or the like, the instrument is inclosed in a drum of wood or sheet metal and of round or oval form, as shown in Figs. 19 and 20. The drum is supported by a console and fixed to the back side of the chest.

I am aware that heretofore governors have been devised wherein overlapping wings, movable independent of each other and pivoted parallel to the shaft which carries them, were provided, and such I do not broadly claim. I am not aware that a governor has ever before been devised wherein overlapping wings, pivoted parallel to the shaft which carries them, were provided with connecting means for maintaining a parallelism between the wings whether in the expanded or contracted position.

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

1. In a mechanical musical instrument, the combination of two toothed music-sheet-controlling wheels arranged one behind the other in the same line, a music-sheet having regularly-spaced engaging apertures in the middle of the line of notes adapted to be engaged by the controlling-wheels, substantially as described and for the purposes specified.

2. In a mechanical musical instrument a music-sheet presser-bar having two parallel and loosely-revolving rods and in the middle

an arm provided with one or more slots for the engagement of the teeth of the music-sheet-controlling wheel, substantially as described.

3. In a fly-wheel for mechanical musical instruments, the combination of two overlapping wings pivoted parallel to the driving-shaft and which overlap to their greatest extent when the fly is in position of rest, a connecting-piece pivoted to each of said wings and carried thereby, whereby a movement of one wing will cause a corresponding movement of the other wing, and a parallelism will always be maintained between the fans substantially as described.

4. In a mechanical musical instrument, the combination of a winding-arbor, a main-spring connected therewith, a spring-pressed arm pivoted on said arbor and tending to turn therewith, the free end of said arm having a notch therein, a spring-pressed pawl having a pin thereon adapted to be engaged by said arm and be received within the notch therein, and a ratchet-wheel adapted to be engaged by said pawl, whereby, when the arm starts to move in one direction, the pin upon the pawl is engaged by the arm and forced into the socket thereof to hold the pawl out of engagement with the ratchet and when said arm starts to turn in an opposite direction, the pawl will be released from engagement with said arm and be forced, by means of the spring thereof, into engagement with the ratchet, substantially as described.

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

ADOLF RICHTER.

Witnesses:

WM. HAUPT,  
CHAS. H. DAY.