

(No Model.)

2 Sheets—Sheet 1.

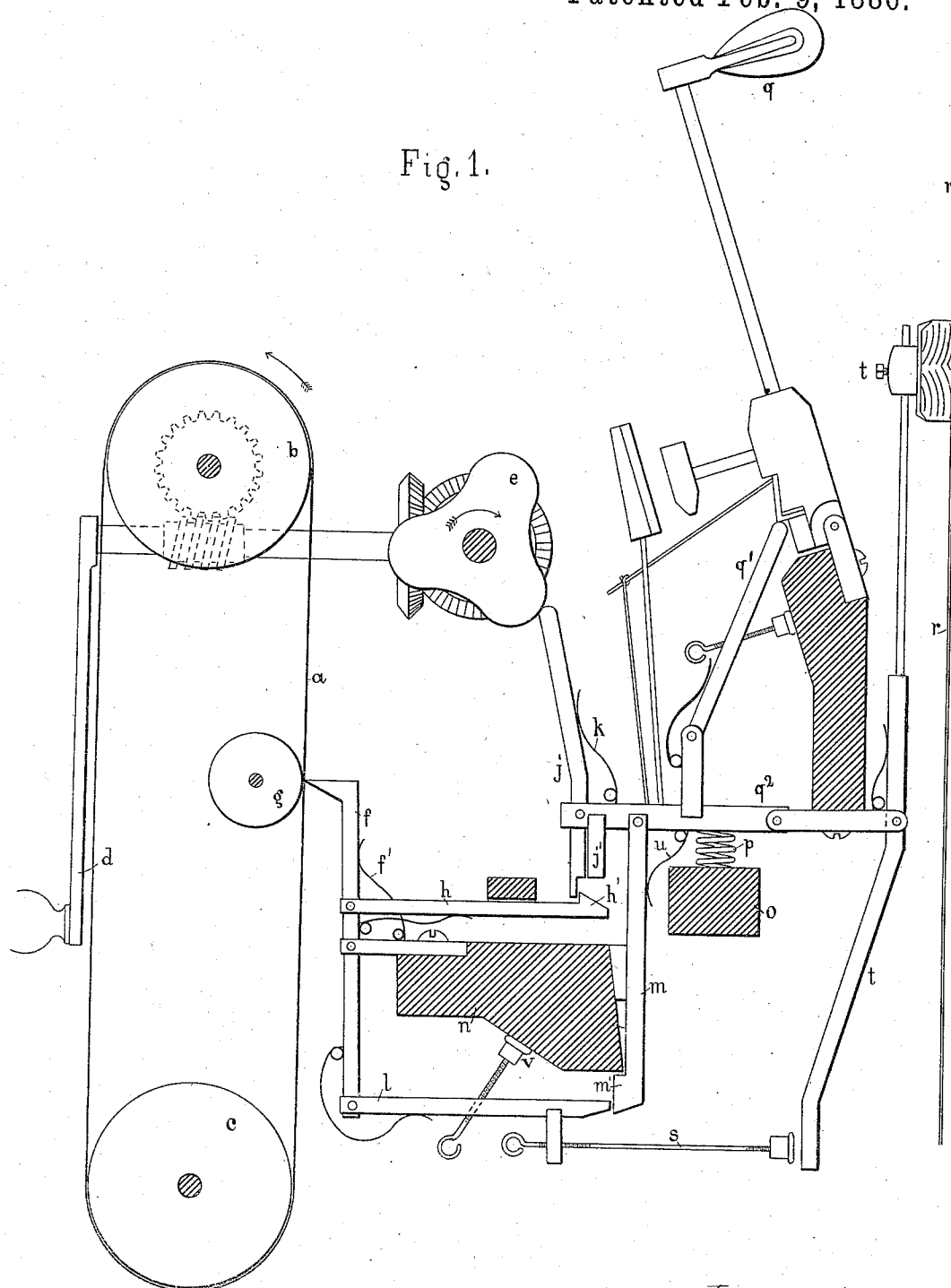
F. E. P. EHRLICH.

MECHANICAL MUSICAL INSTRUMENT.

No. 335,903.

Patented Feb. 9, 1886.

Fig. 1.



Witnesses:
E. H. Wick
H. Blandford

Inventor:
F. E. Paul Ehrlich
by Marshall Bailey
his attorney

(No Model.)

2 Sheets—Sheet 2.

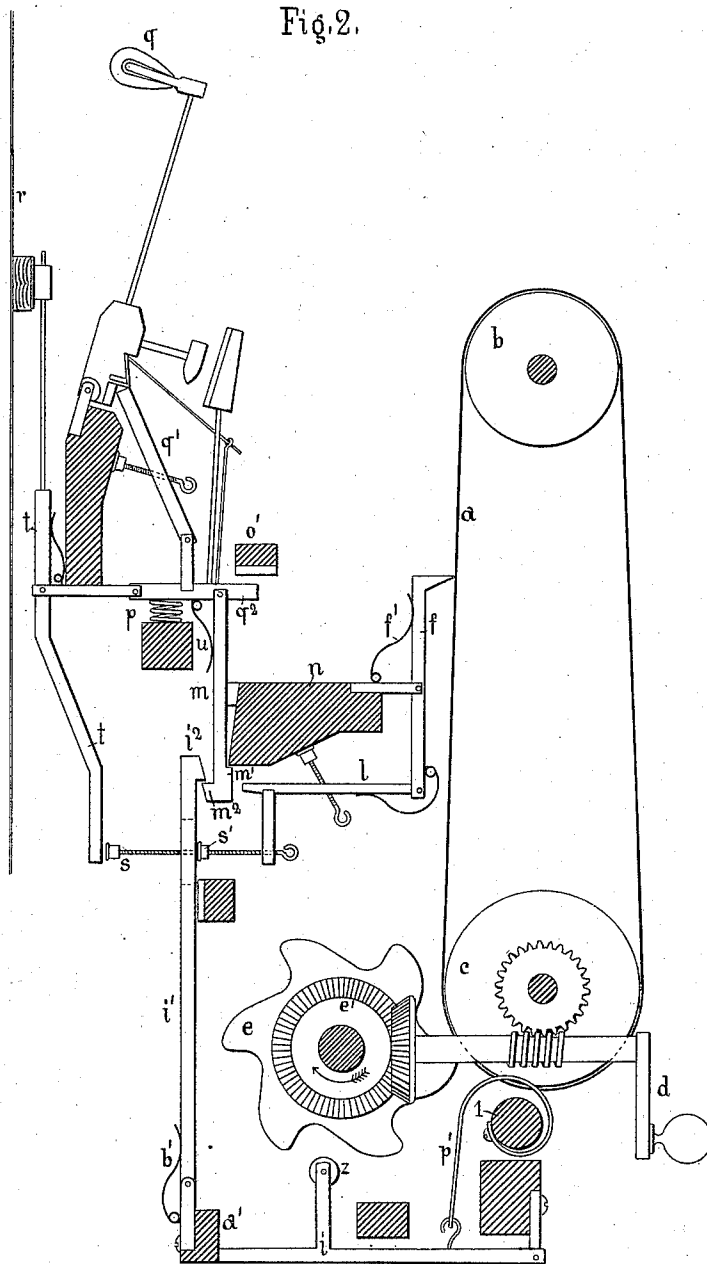
F. E. P. EHRLICH.

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No. 335,903.

Patented Feb. 9, 1886.

Fig. 2.



Witnesses:
E. A. Bick
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Inventor:
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UNITED STATES PATENT OFFICE.

FRIEDRICH ERNST PAUL EHRLICH, OF GOHLIS, NEAR LEIPSIC, SAXONY,
GERMANY.

MECHANICAL MUSICAL INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 335,903, dated February 9, 1886.

Application filed July 11, 1885. Serial No. 171,283. (No model.) Patented in France December 11, 1884, No. 165,879.

To all whom it may concern:

Be it known that I, FRIEDRICH ERNST PAUL EHRLICH, a subject of the King of Saxony, and residing at Gohlis, near Leipsic, Kingdom of Saxony, have invented new and useful Improvements in Mechanically-Actuated Pianos, (for which I have obtained Letters Patent in France December 11, 1884, No. 165,879), of which the following is a specification.

My invention relates to musical instruments in which the notes are produced by the percussion of hammers of piano-actions against strings or other sounding bodies; and it consists in the mechanism employed for actuating such hammers according to the indications of music sheets or cylinders provided with perforations or projections corresponding to the notes of a melody.

On the annexed two sheets of drawings are shown two different arrangements for carrying out my invention.

In the arrangement Figure 1 the piano action or mechanism comprises as main parts the hammer *g*, the jack or hopper *q'*, and a lever, *q''*, to an arm of which the latter is pivoted. The means for causing the said parts and the mechanism to be described to act in accordance with the notes of a melody consist in the perforated endless music-sheet *a*, running over two rollers, *b* and *c*, and the lever *f*, which is pressed by the spring *f'* with its beak against the music-sheet, the said beak dropping into the perforations registering therewith as they pass along under the beak. The roller *b* is put in motion by the crank *d* and worm-wheel gearing.

g is a roller for supporting the sheet *a* opposite to the beaks of the row of levers *f*.

For operating the hammer a spring, *p*, is placed under the lever *q''*. The said spring is kept in a state of compression and the lever *q''* in the position of rest by means of a bar, *m*, or locking-bar pivoted to *q''*, and provided with a spring, *u*, and which catches with a projecting part or heel, *m'*, under an edge of the frame part or beam *n*. Opposite to the heel *m'*, being in normal position, there is a bar, *l*, pivoted to the lower end of the lever *f*, so that when the beak of *f* drops into a perforation of the sheet *a* the bar *l* pushes the heel *m'* out of

engagement with the beam *n*. The lever *q''* and the spring *p* are thereby released, in consequence whereof the latter will act, through *q'* and the jack *q'*, on the hammer, and impel the same against the string *r*. After each stroke of the hammer the said parts are returned to their position of rest, and the spring *p* is re-compressed by a cam-disk, *e*, rotated by means of the crank *d* and bevel-wheel gearing, the said cam-disk operating against a bar, *j*, jointed to the lever *q''*, and maintained in normal position by a spring, *k*, and a stop, *j'*, on the lever. With the lower end of the bar *j* is in engagement the heel *h'* of the bar *h* pivoted to the lever *f*. When under these conditions the lever *f*, being opposite to a hole in the sheet *a*, is oscillated by its spring *f'*, the bar *j* is first moved out of reach of the cam-disk by the bar *h* in order that there may be no impediment to the upward motion of the lever *q''*, with its attachments; but while this motion takes place the bar *j* disengages from the heel *h'*, and is then pressed by its spring *k* against the cam-disk *e*, so that one of the cams may, in acting against the end of *j*, return the lever *q''* and parts attached thereto to their position of rest, as already stated. This position is then secured until renewed action of the lever *f*, by the bar *m* again catching with its heel *m'* under the edge of the beam *n*. In order that it may do so even while the bar *l* is not yet drawn back, this bar is fitted with a knob, *v*, sliding on an inclined surface of the beam *n*, so that when *l* is pushed forward to release the bar *m* it will at the same time be shifted far enough down to be out of the way of the heel *m'* returning to its locking position. When, finally, at the end of a note, the lever *f* resumes its normal position, the heel *h'* of the bar *h*, beveled on its upper surface, slides along under the end of the bar *j* and re-engages therewith. All parts are then ready for renewed action.

s is a wire carried by the bar *l*, and having at its end a knob for actuating the damper-lever *t*.

Although for every note a complete mechanism, such as described, is required, the cam-disks *e* need not be separate from each other, and may form together a cam-cylinder.

Instead of the perforated endless music-sheet shown in the drawings, a music-sheet of any

other character, or a cylinder having studs for operating the lever *f*, may be employed, this part of the mechanism not being comprised in my invention.

- 5 The piano-action represented by Fig. 2 is alike to the one described, and it is disengaged in similar manner by the lever *f* pressing, through the medium of the bar *l*, against the locking-bar *m*. The mechanism for returning
10 the parts to their position of rest and recompressing the spring *p* is, however, somewhat different. The same consists in a vertically-reciprocating bar, *i'*, having at its upper end a shoulder or projection, *i''*, by means of which
15 it engages with the heel *m''* of the locking-bar *m*. All the bars *i'* of the instrument are pivotally attached to a frame formed by the bar *a'* and levers *i*, the said frame being drawn upward by a spring or springs, *p'*, and alternately de-
20 pressed and allowed to rise by rotating cam-disks *e*, acting against rollers *z*, carried by arms on the levers *i*. Each bar *i'* is pressed by a spring, *b'*, toward the locking-bar *m*, and its projecting part *i''*, as well as the heel *m''* of bar
25 *m*, are beveled, so that in rising *i''* may slide away over *m''*. On the damper-actuating wire *s*, which passes through a slit in the bar *i'*, a collar, *s'*, is screwed, adapted to act against the said bar.
30 When the lever *f* is oscillated by its beak dropping into a perforation of the sheet *a*, the collar *s'* first pushes the bar *i'* out of engagement with the heel *m''* of bar *m*, and thereupon bar *l*, in acting against *m'*, releases the hammer
35 mechanism. On returning to its normal posi-

tion the lever *f* draws *l*, *s*, and *s'* back, so that the bar *i'*, having arrived at its upper end of its stroke, will engage by its projection *i''* with the heel *m''* of bar *m*. The bar *i'* being then
40 drawn down by the operation of the cam-disks *e* on the frame *a' i*, draws with it the bar *m*, which is finally brought in re-engagement with the beam *n* by the spring *u*.

I claim as my invention—

1. The combination, with a piano-action, of 45 a spring, *p*, a locking-bar, *m*, with heel *m'*, a lever, *f*, operated by a music-sheet or its described equivalent, intermediate devices whereby said lever by its oscillation in one di- 50 rection disengages the locking-bar, and a ro- tative cam-disk, *e*, and mechanism operated thereby to return the piano-action to its position of rest, substantially as and for the purpose described.

2. The combination, with a piano-action 55 actuated by a spring, *p*, of a locking-bar, *m*, having the heels *m'* and *m''*, a lever, *f*, operated by a music-sheet or its described equivalent, and carrying the disengaging-bar *l* and collar *s'*, and a bar, *i'*, with projection *i''*, pivoted to 60 an oscillating frame, *a' i*, operated by a cam or cams, *e*, and a spring or springs, *p'*, substantially as hereinbefore set forth.

In testimony whereof I have signed my name to this specification in the presence of two sub- 65 scribing witnesses.

FRIEDRICH ERNST PAUL EHRLICH.

Witnesses:

ERNST SCHMUNTZSCH,
OSMUND RIOTTOR.