



# UNITED STATES PATENT OFFICE.

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## MUSICAL BOX.

SPECIFICATION forming part of Letters Patent No. 266,826, dated October 31, 1882.

Application filed May 6, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, ALBERT JEANRENAUD, of St. Croix, Canton de Vaud, Switzerland, have invented certain new and useful Improvements in Musical Boxes, of which the following is a specification.

In ordinary musical boxes in which a pin-studded cylinder is caused to slowly rotate in front of a comb of keys there is an intermission in the music at every complete revolution of the cylinder, on account of the longitudinal blank space on the cylinder, necessary to permit it, without injury to the pins or keys, to be moved by the tune-changer to bring another set of pins into action opposite the points of the keys. It necessarily follows from this that each tune or air must be rendered complete by one revolution of the cylinder, and that such instruments are adapted to play only comparatively short selections. It has been attempted to remedy this defect in musical boxes by arranging the pins on the cylinder spirally, and imparting to the same a gradual longitudinal movement corresponding to the spiral arrangement of the pins as it is rotated in front of the keys. This was found to be impracticable, for the reason that it was necessary when it was desired to start the instrument after all the pins had passed over the ends of the keys to move the cylinder away from the keys before it could be brought back to the starting position. Such movement to be automatic would require considerable mechanism. Besides, the cylinder-bearings being movable they would very soon get out of order, and it is absolutely essential to the proper working of musical boxes that the cylinder-bearings be very firm and rigid.

Now, my improvements in musical boxes are such that pieces of music which require two or more revolutions of the pin-studded cylinder may be rendered with perfect continuity in a practical manner; and they consists—

First, in arranging two similar pin-studded cylinders of the ordinary construction end to end on the one driving-shaft, opposite to combs of keys, each cylinder being provided with an independent tune-changing device, and the blank longitudinal spaces on them arranged in different planes, so that when the blank

space of one cylinder is opposite its comb of keys and its tune-changer is actuating it the pins of the other cylinder are moving over the other comb of keys. Thus the music is without intermission when the two cylinders are alternately moving longitudinally to bring a new section of pins in front of their respective keys. The two combs of keys are duplicates when the pins are arranged alike on the two cylinders; but, if desired, the pins and combs of keys of each cylinder may be arranged to render different parts of any piece of music. All of the pins on the cylinder may be arranged to play one piece of music, requiring therefor all the different longitudinal positions of the cylinder, thus enabling complete operas, &c., to be rendered without any intermission in the music.

Secondly, a stop device, whereby the cylinders are stopped rotating only when all the pins have passed over the keys, and the cylinders moved back to their starting positions.

Thirdly, of a simple arrangement of levers by which the two dogs which actuate the tune-changers are thrown simultaneously out of gear when it is desired to change the pin-studded cylinders.

The invention also embraces certain improvements in the construction and arrangement of the various parts, as will be fully understood by reference had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a plan view of my improvements in musical boxes. Fig. 2 is a longitudinal sectional view of the pin-cylinders. Figs. 3, 4, 5, and 6 are transverse sections respectively cut through the lines *w w*, *x x*, *y y*, and *z z*.

The driving and regulating mechanism is substantially of the ordinary construction, consisting of the spring-drum *a*, gear *a'*, meshing into the pinion *b* on the short shaft *b'*, and into the pinion *c* of the train of gears *c'* *c''* *c'''*, of which the fly *c''''* is the terminal. The shafts of the spring-drum and gears and pinions rotate in bearings secured to the bed-plate *d*.

The cylinder-shaft *e* is fitted in the open bearings *e'* *e''*, which are provided with hinged caps, in a similar manner to the method described in the United States Letters Patent to A. Paillard, No. 212,103, dated February 11,

1879, and for the purpose of allowing the cylinders to be readily removed or to be replaced by others adapted to play different tunes.

At the end of the shaft *e*, just inside of the bearings *e'* and *e''*, are secured the flanges *f* and *g*, provided respectively with the driving-pins *f'* and *g'* and the tune-changers *f''* and *g''*. The two pin-cylinders *h* and *i* are fitted so as to slide freely on the shaft *e*, but are caused to rotate therewith by the driving-pins *f'* and *g'*, and between their inner ends is located the spring *h'*, which presses their outer ends against their respective tune-changers *f''* and *g''*. The sleeve *i'* on the cylinder *i* slides freely over the inner end of the cylinder *h*, and has for its object to cover the opening between the cylinders.

It will be observed that the longitudinal blank spaces *h''* of the cylinders *h* and *i* are in different planes, so that when the blank space *h''* is opposite the comb of keys *h'''* the pins of the cylinder *i* are actuating the comb of keys *i'''*, and vice versa. To enable the two cylinders to be properly set so that their pins shall actuate their respective keys in unison, the driving-pin *g'* of the cylinder *i* enters a hole in its end in the ordinary manner; but the driving-pin *f'* enters a slotted box, *j*, on the end of the cylinder *h*, provided with two set-screws, *j'* *j''*, which may be adjusted, as desired, so that the pin *f'* is just free to slide between their ends, by which means the pins of the cylinder *h* are adjusted in relation to those of the cylinder *i*, so that the pins of each cylinder actuate their respective keys in harmony.

The shafts *e* and *b'* are in line with one another, and on their adjacent ends are secured the disks *e''* and *b''*, respectively. The disk *e''* is provided with a pin, *e'''*, which fits into a slot cut in the edge of the disk *b''*, so that the shaft *e* is caused to rotate with the shaft *b'*. This open connection of the shaft *e* with the shaft *b'* permits of the ready removal of the shaft *e* with the cylinders *h* and *i*, after the hinge-caps of the bearings *e'* and *e''* have been thrown back; but before the shaft *e* can be removed it is necessary that the stationary dogs *f'''* and *g'''*, which respectively operate the tune-changers *f''* and *g''*, should be moved away from the tune-changers. To enable this to be done without extra trouble, these dogs are secured to or form part of the levers *f''* and *g''*, pivoted at *f''''* and *g''''* to the bed-plate *d*, and connected at their inner ends by the sliding joint *k*. The outer end of the lever *g''* is connected to the hinged cap *h''* of the bearing *e''* by means of the link *h'''*, as shown at Fig. 6, by which the dogs *f'''* *g'''* are moved away from the tune-changers *f''* *g''* when the cap *h''* is opened and moved back again into their operative positions when the said cap is closed down on the shaft *e*.

The starting and stopping device consists of the three-arm lever *l*, pivoted to the bearing-frame of the spring-drum *a*. One arm, *l'*, extends downward through an opening in the bed-plate *d*, and is moved toward the left (see Fig. 5) by the end of the starting-bar *m*, which is lo-

ated under the bed-plate *d* and pivoted thereto at its center *m'*, the handle *m''* of the same projecting through the other end of the bed-plate. This starting-lever is shown by dotted lines in Fig. 1. Another arm, *l''*, of the lever *l* is adapted to stop the fly *c'* of the train of gears when the lever is in a certain position, and the third arm, *l'''*, is bent at its end to rest on the notched hub of the ratchet-wheel *n*, which rotates on a stud projecting from the frame-bearing of the drum *a*, and held by the retaining spring-pawl *n'*. This ratchet is moved one tooth for every revolution of the cylinders *h* and *i* by means of the pin *o*, secured to the disk *b''*, and it has as many teeth as there are changes to the tune-changers *f''* and *g''*, which number of course corresponds to the number of rows of pins on the cylinders arranged to actuate each individual key of the combs *h'''* *i'''*. The arm *l'''* is held against the notched hub of the ratchet-wheel *n* by means of the spring *l''''*, and the notch in the hub is so located that the end of the arm *l'''* is forced therein and the arm *l'''* brought in contact with the fly *c'* to stop the instrument just when the commencing ends of the first row of pins on the cylinder *h* are about to actuate the keys *h'''* and when the finishing ends of the pins on the cylinder *i* have just left the ends of the keys *i'''*, and at this time the pin *o* is directly opposite the ratchet-wheel *n*, and has only partly turned the tooth in which it is engaged when the instrument is stopped. Upon moving the starting-lever *m* the arm *l'''* is moved away from the hub of the ratchet-wheel *n*, thereby allowing the cylinders to revolve, the pin *o* immediately turning the ratchet-wheel *n* so that the end of the arm *l'''* of the lever *l* may rest on the cylindrical part of its hub, thereby holding the arm *l'''* away from the fly *c'*. The starting-lever may now be moved back, if desired, so that the instrument will stop after all the pins on the cylinder have passed over the keys; or the starting-bar may be left in the position in which it was first placed to hold the arm *l'''* away from the fly *c'*. Then the instrument will play continuously until the spring in drum *a* has run down, and at any time while the instrument is playing the starting-lever *m* may be moved away from the arm *l'''*; but it will be observed that the instrument will only stop when all the pins of the two cylinders have passed over the keys.

It is obvious that this stopping and starting arrangement may be applied to musical boxes in which the train of gears is differently arranged to that shown, so I do not claim anything relating to the construction or arrangement of said train. It is also obvious that any of the several devices herein shown and described are adapted to be used without the others, so I do not wish to confine myself to the particular construction and arrangement of the various devices herein shown; but

What I claim as new, and desire to secure by Letters Patent, is—

1. In a musical box, in combination, two pin-

cylinders on the one shaft, each provided with a tune-changer and two independent sets of keys, said cylinders being arranged, substantially as described, so that their blank spaces pass in front of their respective sets of keys alternately.

2. In combination, the shaft *e*, cylinders *h* and *i*, tune-changers *f*<sup>2</sup> and *g*<sup>2</sup>, and spring *h*<sup>1</sup>, substantially as described.

10 3. In combination, the shaft *e*, disks *f* and *g*, driving-pin *g*<sup>1</sup>, pin-cylinder *i*, tune-changer *g*<sup>2</sup>, keys *i*<sup>3</sup>, driving-pin *f*<sup>1</sup>, adjusting-box *j*, cylinder *h*, tune-changer *f*<sup>2</sup>, and keys *h*<sup>3</sup>, substantially as described.

15 4. In combination, the hinged cap *k*<sup>1</sup>, link *k*<sup>2</sup>,

lever *g*<sup>4</sup>, with dog *g*<sup>3</sup>, and lever *f*<sup>4</sup>, with dog *f*<sup>3</sup>, and tune-changers *f*<sup>2</sup> and *g*<sup>2</sup>, carried by the cylinder-shaft.

5. In combination, the three-arm lever *l*, fly *c*<sup>4</sup>, starting-lever *m*, ratchet-wheel *n*, having a 20 notched hub, and pin *o*, carried by a disk which actuates the cylinder-shaft, substantially as described.

In witness whereof I have hereunto set my hand, at St. Croix, Canton de Vaud, Switzerland, this 25th day of January, A. D. 1882. 25

ALBERT JEANRENAUD.

Witnesses:

HERMANN THORENS,

EUGÈNE THORENS.