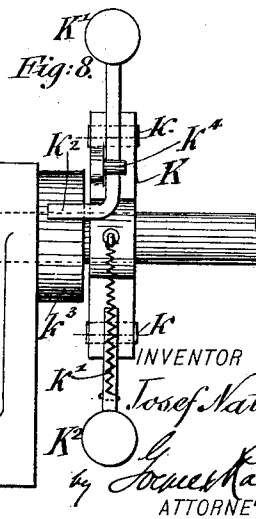
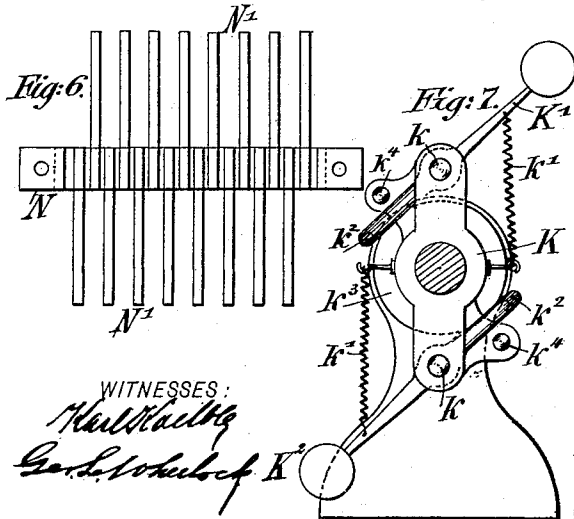
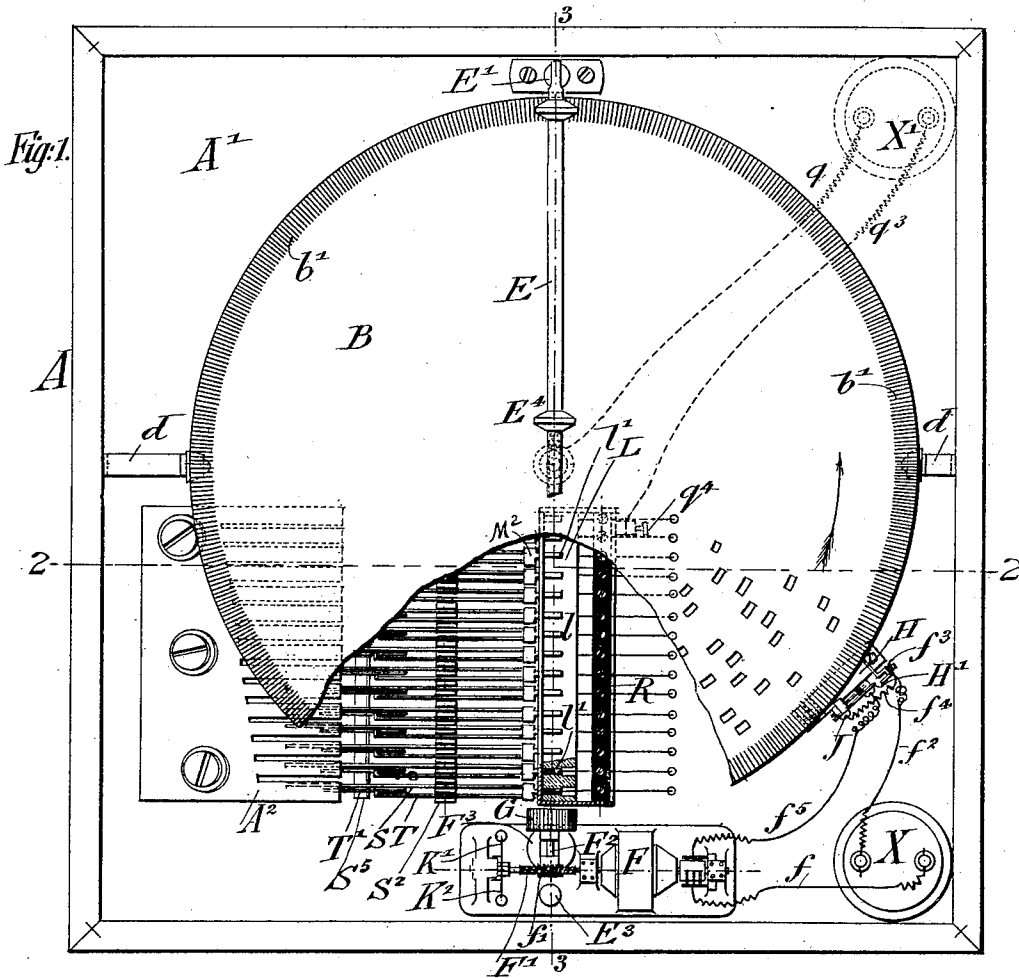


J. NATTERER.
ELECTRICAL MUSIC BOX.
(Application filed July 29, 1899.)

(No Model.)

3 Sheets—Sheet 1.



WITNESSES:
H. H. H. H.
G. L. L. L.

INVENTOR
Josef Natterer
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No. 645,405.

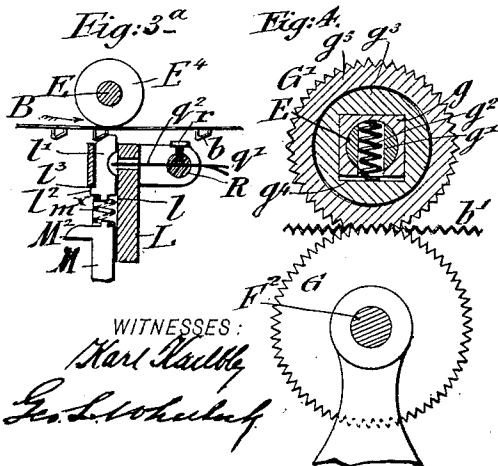
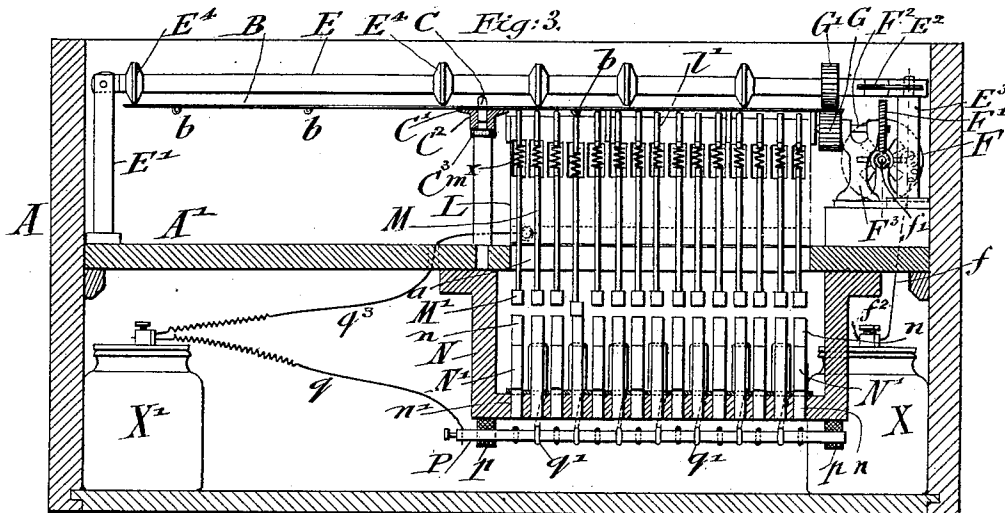
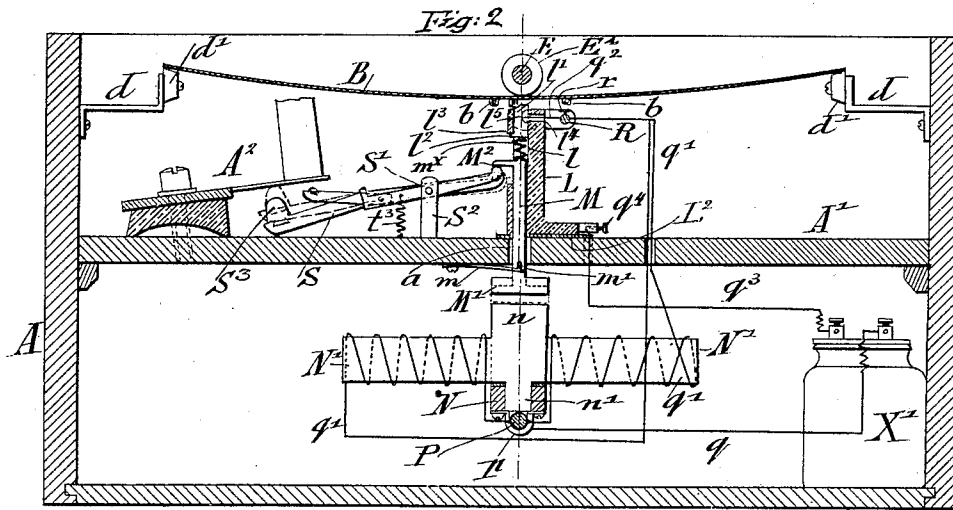
Patented Mar. 13, 1900.

J. NATTERER.
ELECTRICAL MUSIC BOX.

(Application filed July 29, 1899.)

(No Model.)

3 Sheets—Sheet 2.



No. 645,405.

Patented Mar. 13, 1900.

J. NATTERER.
ELECTRICAL MUSIC BOX.

(Application filed July 29, 1899.)

(No Model.)

3 Sheets—Sheet 3

Fig. 10.

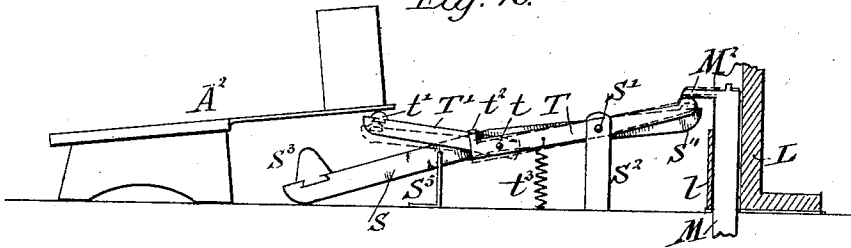


Fig. 11.

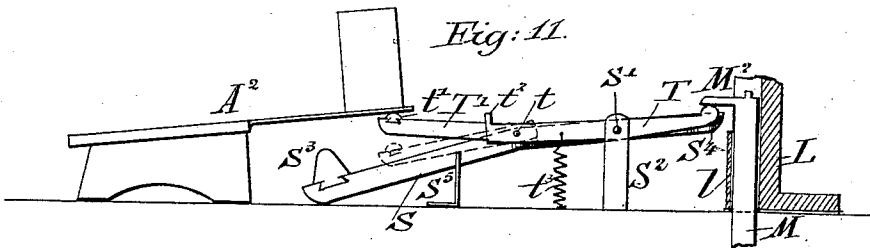


Fig. 12.

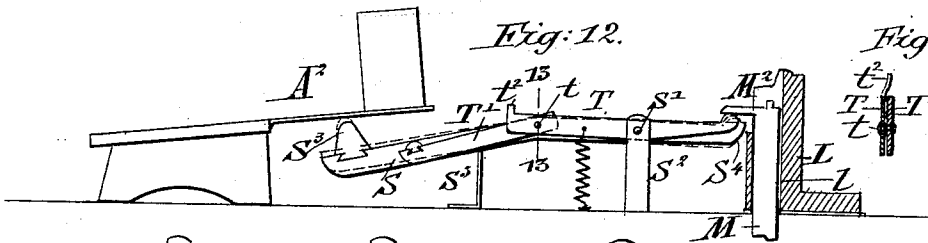


Fig. 13.

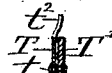


Fig. 14.

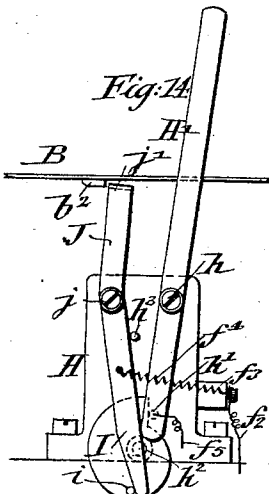


Fig. 15.

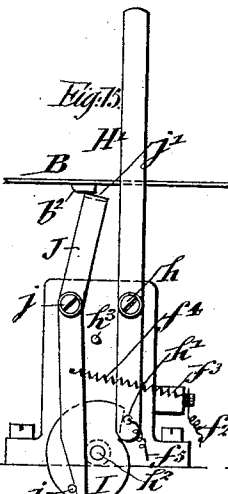


Fig. 16.

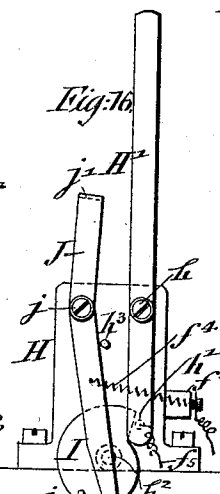
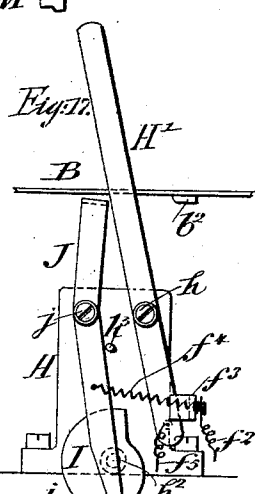


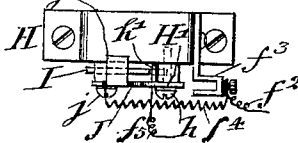
Fig. 17.



WITNESSES:

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Fig. 18.



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UNITED STATES PATENT OFFICE.

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ELECTRICAL MUSIC-BOX.

SPECIFICATION forming part of Letters Patent No. 645,405, dated March 13, 1900.

Application filed July 29, 1899. Serial No. 725,474. (No model.)

To all whom it may concern:

Be it known that I, JOSEF NATTERER, a citizen of the United States, residing at Jersey City, county of Hudson, and State of New Jersey, have invented certain new and useful Improvements in Electrical Music-Boxes, of which the following is a specification.

This invention relates to music-boxes, and more especially to music-boxes which are operated electrically, one object of the invention being to provide means controlled by the tune-sheet for instantly and automatically actuating the impact means for vibrating the resonant reeds, tongues, or teeth of the comb, so that the sounding of the tongue or reed depends upon the operation of a mechanism located intermediately of the tune-sheet and the impact means for the comb.

A further object of the invention is to control the movements of the actuators for the impact devices electrically, so that one electric circuit after the other is closed through the intermediate mechanism (which includes said actuators) in accordance with the sequence of the notes of the tune-sheet.

A further object of the invention is to render the mounting of the tune-sheet in position less troublesome than heretofore by dispensing with the spur driving-wheel, so that by simply placing the tune-sheet over the center-pin and snapping the tune-sheet holder in position the tune-sheet is ready to be driven immediately without necessitating the usual care in causing the teeth of a spur-wheel to enter the perforations of the tune-sheet.

A still further object of the invention is to provide means for holding and quickly securing the tune-sheet in position on the center-pin of an upright music-box.

A still further object of the invention is to provide a reliable and unique damping device whereby the resonant tongues are damped just before being vibrated.

A still further object is to provide means for turning the tune-sheet by electricity and to automatically break the circuit at the end of a piece of music.

The invention consists of a music-box provided with a tune-sheet, impact devices for the comb-teeth, and a novel construction and

arrangement of the details of the electrically-controlled mechanism arranged intermediately of the tune-sheet and impact devices, whereby a responsively-quick impact is obtained.

The invention consists of means for driving the tune-sheet around, such means consisting of a pair of serrated drivers, one rotated by the motor and the other being arranged on the tune-sheet holder and both being in contact with opposite sides of a corrugated portion of the tune-sheet.

The invention further consists in providing the center-pin for the tune-sheets with a snap, so that when the invention is applied to an upright music-box in particular the tune-sheet will be retained on said center-pin.

The invention further consists of a damper which comprises two loose jointed sections—namely, a lever-section and a contact-section—and means for producing a frictional contact between said two sections.

The invention also consists of details and combinations of parts to be hereinafter described and then claimed.

In the accompanying drawings, Figure 1 is a plan of my improved music-box, parts thereof being broken away for clearness. Fig. 2 is a transverse section on line 2 2, Fig. 1. Fig. 3 is a transverse section at right angles to the latter on line 3 3, Fig. 1. Fig. 3^a is an enlarged detail showing one of the contact-pins more clearly. Figs. 4 and 5 are a sectional side elevation and a sectional edge view of the drivers for the tune-sheet. Fig. 6 is a plan view of the electromagnets and support. Figs. 7 and 8 are front and side views of the preferred form of governor for the motor. Fig. 9 is a detail view of the center-pin for the tune-sheet. Figs. 10, 11, and 12 are detail side elevations showing the dampers and hammers or impact devices in the various positions they assume during the playing of a piece of music. Fig. 13 is an enlarged detail section through the frictional portion of a damper on line 13 13, Fig. 12. Figs. 14, 15, and 16 are side elevations of the circuit maker and breaker which is operated from the tune-sheet, showing the same in completed, circuit position, in position in the act of cutting out, and in position after cutting out,

with tune-sheet removed. Fig. 17 is a side elevation of the same, showing the starting-lever in position for completing the circuit without being subject to the action of the stopping-lever; and Fig. 18 is a plan view of the same in the position shown in Fig. 14.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, Figs. 1, 2, and 3, A indicates the case of the music-box, which is of any desirable shape or size and is provided with the customary sounding-board A' and music-comb or sound-emitting device A². B is the tune-sheet or music-disk, provided with the struck-up notes *b*, as usual. The tune-sheet has a central hole to receive the center-pin C, which projects perpendicularly from the sounding-board A'. A loose supporting-disk C' is arranged to turn on the center-pin C, the same having a hub C², resting upon an annular flange or shoulder C³ of the pin, which hub receives a screw C⁴, the inner end of which moves in an annular groove C⁵ in the pin and prevents the disk from coming off. (See Fig. 9 in particular.) A short distance from the supporting-disk C' the end of the center-pin has a longitudinal side recess, (shown in dotted lines,) in which is pivoted a nose-shaped snap C⁶, which is normally projected by a spring C⁷. The object of this construction is to permit the disk to be readily sprung over the center-pin and held by the snap against accidental displacement. Fixed to the sides of the box are brackets *d*, which carry rollers *d'*, upon which the peripheral portion of the tune-sheet travels. When the tune-sheet is sprung onto the center-pin C, its peripheral portion will be supported in such a way as to cause the tune-sheet to be concaved or bent, as shown, so that when the snap C⁶ is pressed in lightly the tune-sheet will spring past the snap, so that it can be immediately removed from the box and another placed in position. The described construction of center-pin retains the tune-sheet whether the music-box be of the horizontal or vertical type.

A tune-sheet holder E is pivoted to a post E' at one side of the box and is provided at its outer end with a hole and a spring-catch E², so that the free end of the holder may be sprung over and retained on the lock-post E³, arranged at the other side of the box.

E⁴ E⁴ are the usual pressure-rollers on the tune-sheet holder.

The tune-sheet is preferably turned by electricity, and to this end a battery X is arranged in the box and by proper conducting-wires connected, respectively, with the motor F and with a circuit maker and breaker to be described. The motor may be of any approved type and is connected also with said circuit-maker. The armature-shaft of the motor has a worm extension *f'* in mesh with a worm-wheel F', that is carried by a short shaft F², journaled in a bracket F³, fixed to the base-plate of the electric motor. The

shaft F² carries a driving-wheel G, which has a corrugated circumference that engages with the serrated peripheral portion *b'* of the tune-sheet. Coöperating with the driving-wheel G and holding the tune-sheet against the same is a pressure-roller G', Figs. 4 and 5, mounted on the tune-sheet holder E, and which consists of a rectangular head *g*, fitting snugly onto the tune-sheet holder and which is provided with a transverse hole *g'*, a continuation of which is formed in the said head *g*, in which hole *g'* is located a pressure-spring *g*², one end of which is seated against the inner side of the said head, while the outer end bears upon a circular intermediate member *g*³, which has a rectangular hole *g*⁴, that is a trifle longer in one direction than the head and receives the same, so that it may be moved by the spring or against the pressure thereof laterally of the tune-sheet holder. A peripheral ring *g*⁵ is fitted snugly, yet loosely, on the intermediate member *g*³, so that it can freely turn thereon. The outer circumference of the ring *g*⁵ is toothed or serrated and engages the corrugated periphery *b'* of the tune-sheet. The spring *g*² forces the member *g*³ and the ring *g*⁵ toward the tune-sheet, so that the serrated portion of said ring positively engages the tune-sheet, and a pressure is exerted on that portion of the tune-sheet between the driving-wheel G and the pressure-roller G', whereby the tune-sheet will be carried around by the conjoint action of the said parts. The ordinary spur driving-wheel is thus displaced by the serrated wheel G and roller G', so that in the act of locking down the tune-sheet holder the parts will self-adjust themselves, thereby dispensing with the care ordinarily necessary in connecting the tune-sheet with the well-known spur driving-wheel.

The switch or circuit make and break of the motor-circuit is shown clearly in Figs. 14 to 18 and consists of support H, of insulating material, such as vulcanite, secured to the sounding-board or other suitable place and to which is pivoted at *h* a starting-lever H', having its upper end extended above the tune-sheet to form a handle, while its lower end is provided with a pin *h'*, adapted to strike one end of a rocking piece I, here shown in the form of a cam, arranged near the lower end of lever H' and pivoted at *h*² to the support H. Pivoted alongside the lever H' at *j* is a stopping-lever J, the movement of which in one direction is limited by a limit-pin *h*³ on the support H. The upper end of the stopping-lever terminates in juxtaposition to the edge of the tune-sheet B and is provided with an inwardly-extending projection *j'*, Fig. 18, which is adapted to be engaged by the shut-off lug *b*², projecting from the tune-sheet at the end of the piece of music thereon, so as to shift the lever J at the proper time, as hereinafter stated. The lower end of the stopping-lever J is arranged in contact with a pin *i* on that side of the pivot of the rocking piece

opposite the pin h' . The arrangement of the levers H' and J and rocking piece I is such that the lower ends of the said levers may contact the one with the other for the passage of an electric current, so that the tune may be played, as described hereinafter. The battery X is connected with the motor by wire f and the motor by wire f^5 with the fork f^3 , fixed on bracket H , Fig. 1. The fork f^3 is connected by spring-wire f^4 with lever J , and the other side of the motor is connected by wire f^2 with starting-lever H' .

The speed of the motor is controlled by a suitable governor (see Figs. 7 and 8 particularly) consisting of a head K , fixed on the armature-shaft and to which are pivoted at k a pair of weighted governor-arms K' K^2 , which are arranged at diametrically-opposite points and extend in opposite directions. They are connected by tension-springs k' k' with the hub portion of head K and are provided at their inner ends with outturned brake-fingers k^2 , which are adapted to be thrown by the undue speed of the motor against a circular brake-piece k^3 , projecting from one of the bearing-boxes of the armature-shaft. The higher the rate of speed the more forcible will the braking action be. The movement of the governor-arms in opposite direction is limited by stop-pins k^4 , projecting from the head K .

The impact devices and the intermediate actuating mechanism therefor are controlled by the notes b on the tune-sheet and actuated by electricity, said actuating mechanism comprising a bracket-support L , which extends across the sounding-board A' and is provided with parallel transverse guideways l , in the upper parts of which are guided the contact-pins l' , which project slightly above the support L and are beveled off, so as to be pressed down by and to permit the notes b of the tune-sheet to pass over them.

M indicates the stems of the armatures, which are provided with shoes M' at their lower ends and with toes M^2 at their upper ends, said stems being guided in the lower portions of the guideways l and passing through a slot a in the sounding-board. The toes M^2 of the armatures and stops l^2 on the contact-pins project into cut-outs or recesses which open from the guideways in the support L , so that the said toes may engage with the appropriate devices and the said stops l^2 with the upper closed ends or shoulders l^3 of the said recesses, whereby the upward movement of the contact-pins is limited. Suitably held between each pair of related contact-pins and armatures is a helical expansion-spring m^x , which has no effect on the armatures, but simply projects the engaging ends of the contact-pins into the path of the notes b . The armatures are normally raised by means of springs, such as m , secured to the sounding-board, and the free ends of which engage pins m' on the stems of the armatures.

Below the armatures or in any other position, according to the position of the other parts of the intermediate actuating mechanism, are arranged electromagnets, (preferably of the "bar" variety,) all mounted on one support, which consists of a bearer or bracket N , of non-conducting material, (see Figs. 2, 3, and 6,) in which are inserted the anchors n' of bar-electromagnets N' , that are provided at their inner ends with perpendicular poles n , separated a suitable distance from the armatures. The electromagnets are separated by air-spaces and are arranged in two sets, (one the same as the other, however,) which for convenience and uniformity of arrangement extend in opposite directions from the bearer N , those of one set alternating with those of the other. This arrangement produces a compact, simple, and economical structure. Secured to the under side of the bearer N by means of clips or equivalent fastenings p is a metallic rod P , to which is connected a wire q , leading from one pole of a battery X' . This rod P is also electrically connected with the electromagnets N by means of wires q' , coiled around the electromagnets, and said wires are led to and secured to a rod or bar R of insulation, r being the binding-screws for said wires. The resilient fingers or ends q^2 of said wires q' are extended beyond the binding-screws and project through holes l^4 in the support L into notches or recesses l^5 in the contact-pins l' , the said fingers q^2 being normally out of contact with the said contact-pins, excepting when one of the contact-pins is pushed in to act on said resilient contact-fingers. The other pole of the battery X' is connected with the support L by means of a wire q^3 and binding-screw q^4 . The metallic support L is preferably separated from the sounding-board by a rubber or other insulating strip L^2 .

The impact devices include means such as hammers and dampers. (Shown clearly in Figs. 10 to 13.) S indicates the hammers, which are pivoted by shaft S' to the supporting-rail S^2 , fixed to the sounding-board parallel with the support L , said hammers having hammer-heads S^3 , that are arranged so as to strike the comb A^2 . The tail ends S^4 of the hammers project under and are adapted to be engaged by the toes M^2 of the armatures. S^5 indicates a notched rest-rail for supporting the hammers, which fall thereon by gravity and are raised to strike the comb by the downward movement of the armatures.

The dampers consist of jointed levers composed of two sections, one a lever T , pivoted on shaft S' and designated a "lever-section," and the other an arm T' and designated a "contact-section," pivoted to the outer end of the lever T at t and carrying a damper-head t' , adapted to contact with the music-comb. The tail ends of the lever-sections T project likewise under the toes M' of the armatures, while the other ends of the lever-sections are extended beyond the pivot-shaft

S' and frictionally bear upon the contiguous hammers by means of laterally-extending friction-pieces or springs f^2 , bent slightly at their outer ends, so that in the normal position of the dampers (shown in dotted lines in Fig. 10) the said friction-pieces or springs will by means of tension-springs f^3 be caused to bear upon the sides of the hammers; but when the dampers are in the position shown in Figs. 12 and 13 the damper-arms or contact-sections T' will be loose and free from contact with the friction-pieces. Normally the dampers rest upon the rest-rail S⁵ between the hammers. Their action is to be described hereinafter.

The operation of the music-box will now be described in its entirety, it being understood that the operation is the same in practical effects produced no matter what may be the position of the box, inasmuch as for different positions some slight alterations evident to skilled mechanics can readily be resorted to.

To prepare the box for playing a tune, the tune-sheet holder E is swung out and the desired tune-sheet B snapped over and centered upon the center-pin C, so that its peripheral portion rests on the guide-rollers d'. The tune-sheet is then held down in proper position so as to bring the notes b in position to strike the contact-pins l' by locking the holder E in position. The tune-sheet is thus concaved, as shown, and the construction of the center-pin C is such that on pressing the snap C⁶ in with one finger, when the holder is unlocked, the tension on the center of the tune-sheet is relaxed and the same by its own resiliency or action springs out, automatically disengaging itself from the center-pin, and can be immediately removed from the box and another quickly placed in position. To begin to play, the starting-lever H' is moved so that its inner end will be brought in contact with the stopping-lever J, its pin h' being also then in contact with the rocking piece I, as shown in Fig. 14. An electric circuit will thereby be formed, the current passing from the positive pole of the battery X through wire f, the motor, through wire f⁵, starting-lever H', stopping-lever J, and wires f⁴ f³ to the negative pole of said battery. The circuit can also be completed by throwing the starting-lever H' into engagement with fork f³, so that the current passes through wire f, the motor, wire f⁵, starting-lever H', fork f³, and wire f² back to the battery without passing through the stopping-lever J, in which case the tune will be played over and over without calling the stopping-lever into action. Ordinarily, however, the lever devices are used as an automatic cut-out switch or make-and-break and the first-described connection established. When this is done, the motor immediately is set in motion and the driver G turned through the worm-and-gear connection with the armature-shaft, so that by the conjoint action of the driver G and its superposed roller G' the

tune-sheet is positively and reliably revolved. As each successive note b comes in contact with its appropriate contact-pin l' the impact devices cause the comb to be sounded and the piece of music to be played, and while it is evident that the connections for causing the impact motion may be mechanical they are shown as electrical, and I desire it understood that all the other parts of the box are claimed irrespective of the construction of the mechanism between the tune-sheet and impact devices. The notes b will strike the end of the spring-actuated contact-pins and press the same in, thus depressing the fingers q² and making an electrical contact between the same and the metallic contact-pins. The electric circuit from battery X' is thereby established, the current flowing through wire q, rod P, wire q', electromagnet N', (corresponding with the depressed contact-pin,) depressed finger q², depressed contact-pin l', support L, and wire q³ back to the battery. The circuit being thus established, the proper electromagnet is excited and the pole-face n thereof attracts its appropriate armature M M', thus causing the toe M² of the latter to press upon the tail ends of and actuate the damper and hammer under it. When the next note b strikes a contact-pin l', another circuit is established in the same manner.

When the lever devices H' I J are used as an automatic cut-out switch, the lug b² on the tune-sheet will strike the upper end of the stopping-lever J at the end of a piece of music, oscillate said lever and the rocking piece I on their pivots, and cause the said rocking piece to move the lever H' into cut-out position (shown in Fig. 16) and stop the motor, in which position the lever J cannot come in contact with lever H' and close the circuit, owing to its being stopped by the pin h³, against which it is pulled by its spring f⁴.

The action of the damper and hammer when struck by the toe M² of the attracted armature is as follows: The normal position of the damper is as shown in dotted lines and of the hammer as shown in full lines in Fig. 10, in which position the tail end of the damper will be somewhat in advance of the tail end of the hammer, and the damper will therefore be the first to be moved. A slight inward movement of the toe M² of the armature, which takes place immediately upon the latter being attracted, lifts the damper into position (shown in full lines in Fig. 10) and brings the operative end l' of the damper in contact with the appropriate reed tongue or tooth of the comb A², and the same is thereby damped. The lifting of the outer contact section or arm T' of the damper is due to the frictional connection between the same and the lever-section T. During the damping action the damper straightens out into the position shown in full lines in Fig. 11, and just after this position the parts break joint and the contact section or arm T' falls upon the rest-rail S⁵ into the position shown in dotted lines

in said figure as the friction piece or spring ² is released from contact with said contact section or arm T'. The damper is thus brought out of action, while immediately thereafter the toe M² of the armature strikes the tail end of the hammer, so that the operative end of the hammer is brought with a smart quick blow against the appropriate comb-tongue, as shown in Fig. 12, the reaction being instantaneous, so that the hammer is separated sufficiently from the tongue to permit it to freely vibrate and emit a tone corresponding with the position of the note b, which set the parts in motion. When the armature assumes its position of rest, the hammer and damper also fall into normal position. The action of the dampers and hammers is instantaneous with the establishment of the circuit and there will be no lag, the sound emitted from the music-comb due to the damper-and-hammer action being clear cut and distinct, so that the quality of tone is improved and the possibility of rendering a very difficult piece is increased.

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

1. In a music-box, the combination, with the music-comb, the tune-sheet, and means for moving the same, of a set of pivoted hammers, a set of dampers, coöperating with and arranged alternately with the hammers, both sets being located in a plane under the said tune-sheet and extending out opposite the comb, and intermediate actuating mechanism controlled by the tune-sheet for operating the hammers and dampers, substantially as set forth.

2. In a music-box, the combination, with the music-comb, the disk-shaped tune-sheet, and means for turning the same; of a set of pivoted hammers, a set of pivoted dampers, alternating and coöperating with the same, both sets being located in a plane under the said tune-sheet and extending out opposite the comb, a source of electricity, and intermediate actuating mechanism connected with the latter, the circuit through which mechanism is established by the tune-sheet so as to effectuate the operation of the hammers and dampers, substantially as set forth.

3. In a music-box, the combination, with the sound-emitting device, the tune-sheet, and means for moving the tune-sheet, of a source of electricity, electromagnets, contact-pins, circuit connections, means operated by the tune-sheet, through said contact-pins, for completing the electric circuit through the electromagnets, armatures, a set of hammers, and a set of dampers, alternating with the hammers and operating therewith, substantially as set forth.

4. In a music-box, the combination, with the sounding-board, the sound-emitting device, the tune-sheet, and means for moving the latter; of a source of electricity, electromagnets, spring-actuated contact-pins, cir-

cuit connections, means for closing the circuit through the medium of the tune-sheet and contact-pins, armatures passing through the sounding-board, means for guiding said armatures, and impact devices operated by said armatures, substantially as set forth.

5. In a music-box, the combination, with the sound-emitting device, the tune-sheet, and means for moving the latter; of a source of electricity, a metallic support, electromagnets, contact-pins, circuit connections, means operated by the contact-pins for closing the circuit through said support and magnets, armatures provided with projecting toes, and impact devices operated by the toes of said armatures, substantially as set forth.

6. In a music-box, the combination, with the sound-emitting device, the tune-sheet, and means for moving the latter; of a source of electricity, electromagnets, circuit connections, contact-pins engaged by the tune-sheet, armatures, springs interposed between the latter and said pins, means operated by the contact-pins for closing the circuit, and impact devices operated by said armatures, substantially as set forth.

7. In a music-box, the combination, with the sounding-board, the sound-emitting device, the tune-sheet, and means for moving the latter; of a source of electricity, electromagnets arranged under the sounding-board, circuit connections, spring-actuated contact-pins, spring-actuated armatures passing through said sounding-board, means for guiding said armatures, means for closing the circuit through the action of the tune-sheet on said contact-pins, and impact devices for the sound-emitting device, operated by the armatures, substantially as set forth.

8. In a music-box, the combination, with the sound-emitting device, tune-sheet, and means for moving the latter; of a source of electricity, electromagnets, a metallic support arranged on the sounding-board, contact-pins, armatures, said pins and armatures being guided rectilinearly in said support, and said contact-pins being adapted to close the circuit when depressed by the tune-sheet, and impact devices operated by said armatures, substantially as set forth.

9. In a music-box, the combination, with the sound-emitting device, tune-sheet, and means for moving said tune-sheet; of a source of electricity, electromagnets, a metallic support arranged between the tune-sheet and sounding-board, spring contact-fingers, circuit connections, contact-pins, guided in said support and adapted to operate said fingers to complete the circuit, armatures passing through the sounding-board and guided in said support, and impact devices operated by said armatures, substantially as set forth.

10. In a music-box, the combination, with the sound-emitting device, a disk-shaped tune-sheet, and means for turning the tune-sheet; of a source of electricity, electromagnets, a support on the sounding-board extending

- along the same, laterally from the axis of the tune-sheet, and provided with transverse guideways, circuit connections, contact-pins guided in said ways and adapted to complete the circuit through said support, armatures, and impact devices operated by the latter, substantially as set forth.
11. In a music-box, the combination, with the sound-emitting device, tune-sheet, and means for moving the tune-sheet; of a source of electricity, electromagnets, a support provided with transverse guideways, circuit connections, contact-pins guided in said ways, and adapted to complete the circuit through said support, armatures guided also in said ways, and impact devices operated by the armatures, substantially as set forth.
12. In a music-box, the combination, with the sound-emitting device, the tune-sheet, and means for moving the latter, of electromagnets, means controlled from the tune-sheet for sending an electric current through said magnets, hammers, dampers, the tail ends of the dampers being normally in advance of the tail ends of the hammers, and armatures each provided with means for engaging successively the tail end of a damper and the corresponding hammer, substantially as set forth.
13. In a music-box, the combination, with the sound-emitting device, tune-sheet, and means for moving the latter; of bar electromagnets, a bearer for said magnets, which magnets project alternately in opposite directions, means controlled from the tune-sheet for sending an electric current through said magnets, armatures, and impact devices operated by the armatures, substantially as set forth.
14. In a music-box, the combination, with the sound-emitting device; of pivoted hammers, pivoted dampers, the tail ends of which are arranged in advance of the tail ends of the hammers, all of the tail ends being free and arranged in juxtaposition and a single actuating device for each pair of dampers and hammers for successively engaging the tail ends of the dampers and hammers, substantially as set forth.
15. In a music-box, the combination, with the sound-emitting device; of hammers, dampers, a support to which the same are pivoted on a common axis alongside each other, and means for operating the hammers and dampers, substantially as set forth.
16. In a music-box, the combination with the sound-emitting device; of hammers, dampers composed of sections, one of which is in frictional engagement with the dampers, and means for operating the hammers and dampers, substantially as set forth.
17. In a music-box, the combination, with the sound-emitting device, of hammers, jointed dampers, friction pieces or springs between the sections of the dampers, and operating means, substantially as set forth.
18. In a music-box, the combination, with the sound-emitting device, of hammers, dampers, composed of pivoted sections, the sections of said dampers being in frictional connection with each other, and suitable operating means, substantially as set forth.
19. The herein-described damper, consisting of sections, and a frictional connection between the sections, substantially as set forth.
20. The herein-described damper, consisting of sections, one section having a friction-spring engaging the other section, substantially as set forth.
21. In a music-box, a center-pin for the tune-sheet, provided with a snap, substantially as set forth.
22. In a music-box, a center-pin for the tune-sheet, provided with a snap and a spring, in the center-pin, acting on said snap, substantially as set forth.
23. In a music-box, a center-pin provided with a loose disk thereon, and a spring-actuated snap separated from the disk a sufficient distance to enable the snap to engage the tune-sheet, substantially as set forth.
24. In a music-box, the combination, with the tune-sheet provided with a corrugated peripheral portion, of means for engaging said corrugated peripheral portion to turn the tune-sheet, substantially as set forth.
25. A tune-sheet for music-boxes, the same having a corrugated peripheral portion, substantially as set forth.
26. In a music-box, the combination, with the tune-sheet having a corrugated peripheral portion, of the driver, and the tune-sheet holder provided with a roller cooperating with said driver, said roller and driver being peripherally serrated, substantially as set forth.
27. In a music-box, the combination, with the tune-sheet having a corrugated peripheral portion, of the driver, the tune-sheet holder, and a yielding roller on said holder, said driver and roller being peripherally serrated, substantially as set forth.
28. In a music-box, the combination of the tune-sheet, and means for moving the same, comprising a source of electricity, a motor, a switch consisting of a cooperating pair of levers and an intermediate coacting rocking piece, circuit connections, and means for acting on said switch for automatically breaking the circuit, substantially as set forth.
29. In a music-box, the combination of the tune-sheet, a motor therefor, a source of electricity, a starting-lever, a stopping-lever for engaging the same, circuit connections, and a rocking piece between and engaged by the said levers, substantially as set forth.
- In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.
- JOSEF NATTERER.
- Witnesses:
GEO. L. WHEELOCK,
M. H. WURTZEL.