

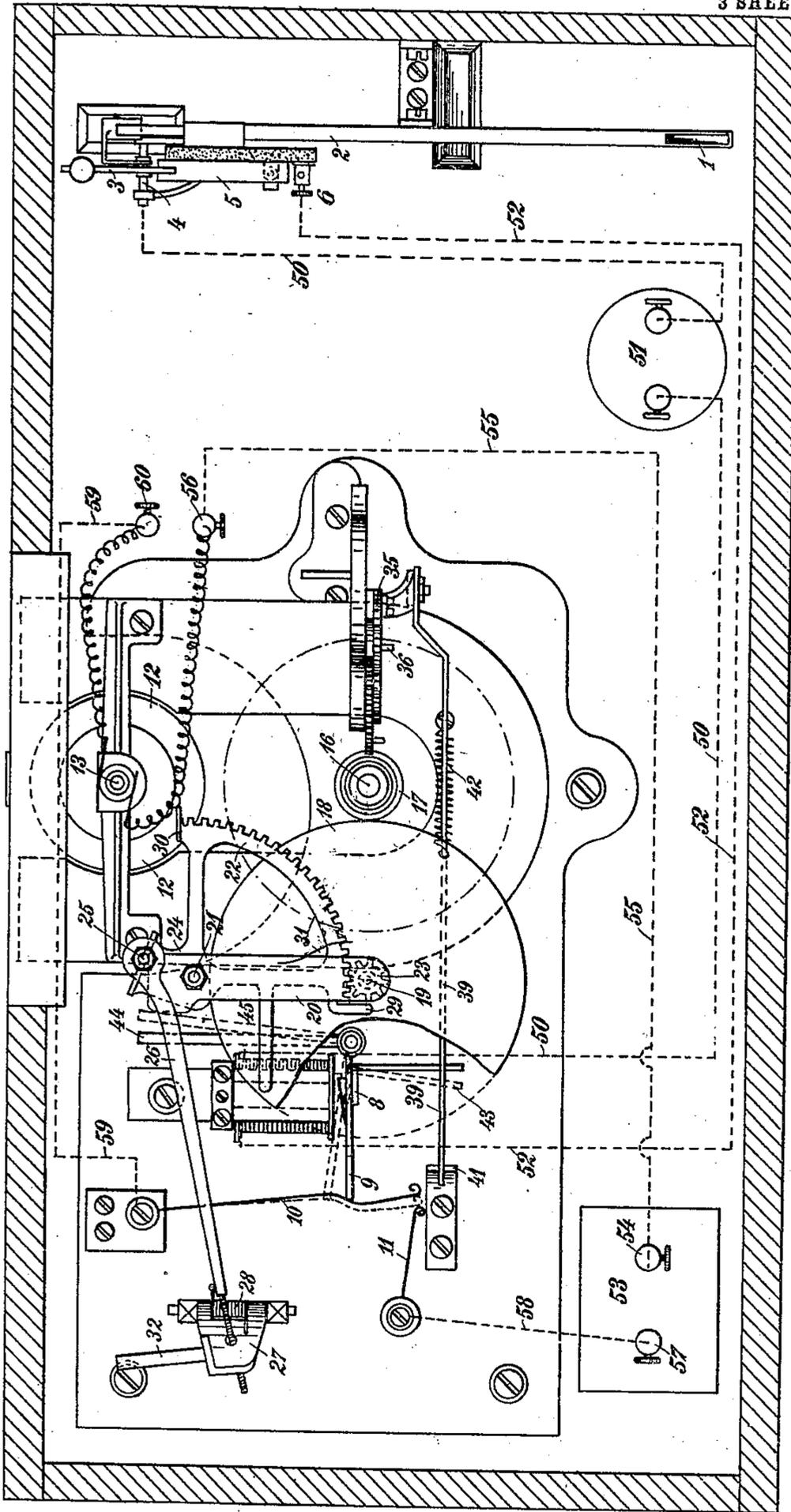
T. BIRNBAUM.  
ELECTRICALLY ACTUATED GRAMOPHONE.

APPLICATION FILED MAY 5, 1902.

NO MODEL.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses  
 Thos. Howe  
 Arthur S. Bryant

Inventor  
 Theodore Birnbaum  
 by Foster & Freeman  
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No. 768,728.

PATENTED AUG. 30, 1904.

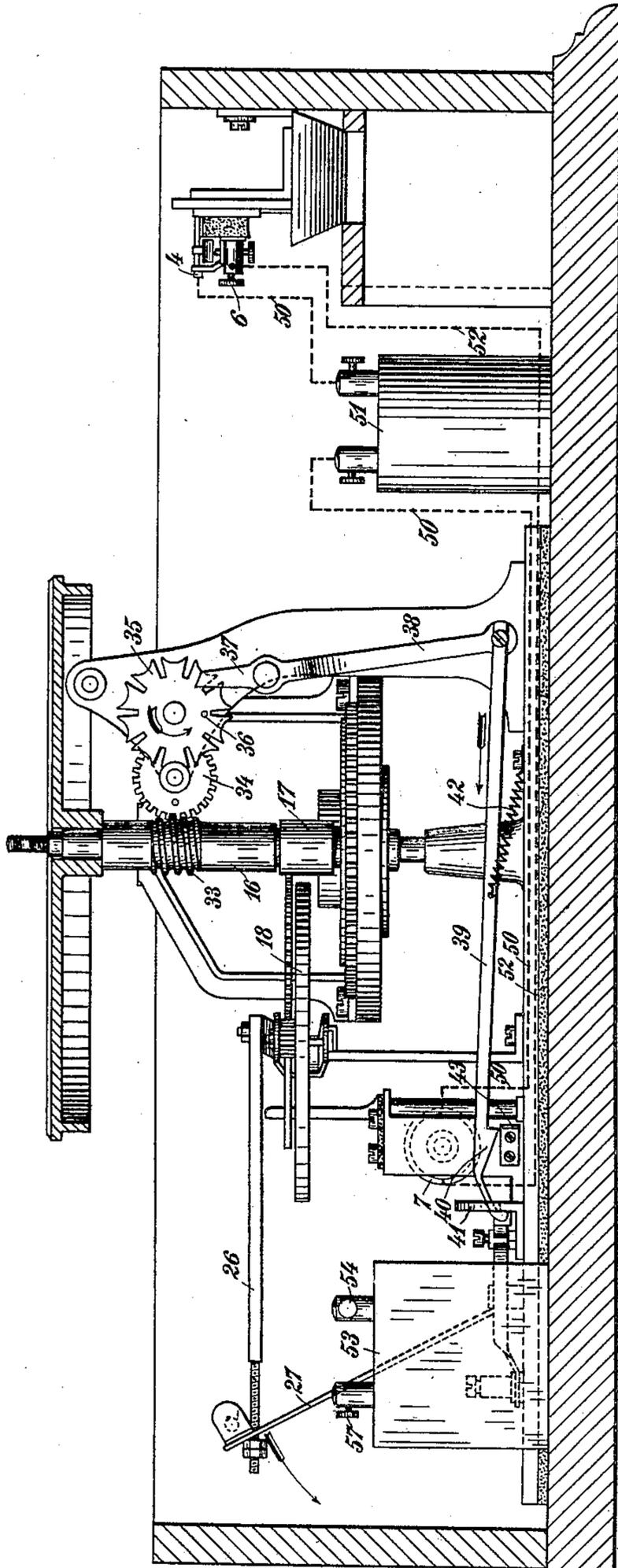
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3 SHEETS—SHEET 2.

Fig. 2.



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3 SHEETS—SHEET 3.

Fig. 3.

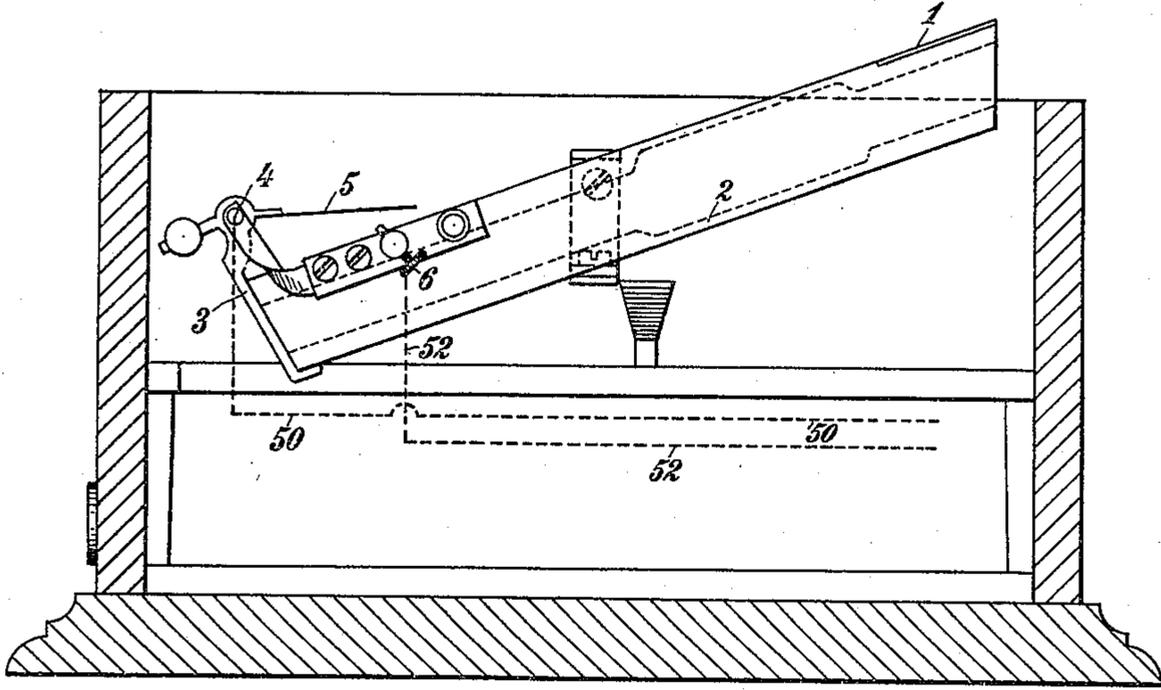


Fig. 4.

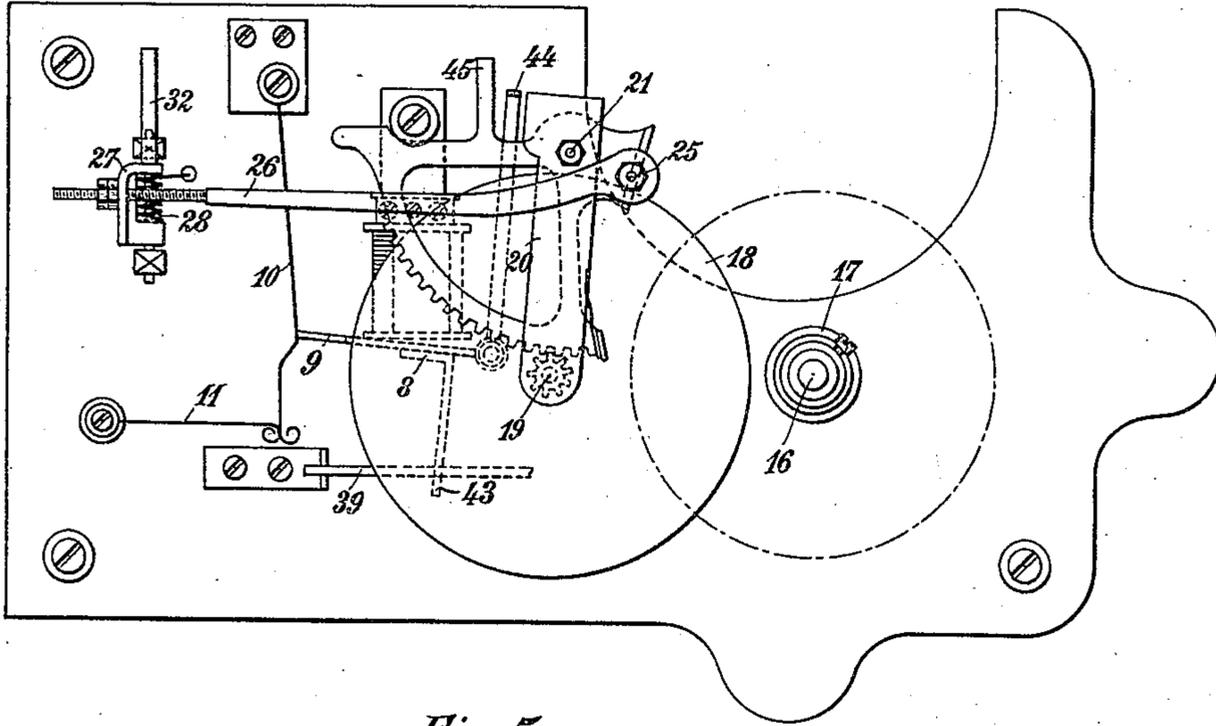
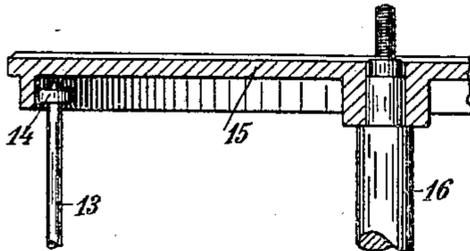


Fig. 5.



Witnesses  
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# UNITED STATES PATENT OFFICE.

THEODORE BIRNBAUM, OF BERLIN, GERMANY.

## ELECTRICALLY-ACTUATED GRAMOPHONE.

SPECIFICATION forming part of Letters Patent No. 768,728, dated August 30, 1904.

Application filed May 5, 1902. Serial No. 106,039. (No model.)

*To all whom it may concern:*

Be it known that I, THEODORE BIRNBAUM, managing director, a subject of the King of Great Britain and Ireland, at present residing at Ritterstrasse 36, in the city of Berlin, in the German Empire, have invented certain new and useful Improvements in Electrically-Actuated Gramophones, of which the following is a specification.

The invention is shown on the accompanying drawings.

Figure 1 is a plan view with the cover removed. Fig. 2 is a side elevation of the apparatus, the containing-box being sectioned to show the interior. Fig. 3 is an end view of the apparatus, the containing-box being shown in section, showing the coin-actuated mechanism. Fig. 4 is a plan view of a portion of the apparatus, showing the parts in different relative positions from those shown in Fig. 1; and Fig. 5 is a vertical section of a part of the gramophone-disk, showing the relation of the disk to adjacent parts.

The apparatus is so constructed that the insertion of a coin operates to close an independent electric circuit for exciting an electromagnet, the armature of the electromagnet actuating an electric motor for the operation of the apparatus and keeping the electric motor in operation even after the electromagnet has lost its magnetism by the disengagement of the coin and of the circuit-closing contact of the starting-electromagnet, while at the ceasing of the operation of the apparatus connected to the coin-freed delivery mechanism—that is to say, after the reproduction of the piece of music or the like corresponding to the impressions of the sound-plate—the apparatus is stopped automatically, so as to be ready for a new operation by the insertion of another coin.

The cover of the casing is provided with a slot 1, through which the coin is dropped upon the chute 2, along which it descends. At the lower extremity of the chute the coin strikes against a bent lever 3, pivoted at 4 in such a manner that the arm 5 of the bent lever, which is included in an electric circuit, contacts with the screw 6, which is also included in the circuit, thus closing said circuit.

The axis 4 of the lever 5 is connected to the line 50, which leads to the electromagnet 7 by

way of the electric battery 51. From the contact-screw 6 an electric conductor 52 also leads to the electromagnet 7. Thus if after inserting a coin into the slot 1 the arm 5 touches the screw 6 in consequence of the rotation of the lever 3 the circuit is closed by way of the conductors 50 and 52, and the electromagnet 7 thus becomes excited. By this electromagnet the armature 8 is attracted, and the extension 9 of this armature presses the spring 10 against the spring 11, and thus closes a second circuit for actuating the electromotor 12. The vertical shaft 13 of the electromotor is provided at its upper extremity with the friction-disk 14, operating to rotate the gramophone turning disk 15, which is keyed to the shaft 16. The current for the second circuit is furnished by the battery 53. One terminal, 54, of this battery is connected to the contact-screw 56 of the motor 12 by means of the conductor 55. The other terminal, 57, of the battery 53 is connected to spring 11 by means of the conductor 58, while the spring 10 is connected to the second contact-screw 60 of the motor 12 by means of a conductor 59. Hence if, as above explained, the spring 10 is forced against the spring 11 the circuit of the battery 53 is closed and the electromotor is actuated. If the spring 10 is withdrawn into the initial position from the position shown in dotted lines in consequence of the retracting of the armature 8 from the electromagnet 7, the circuit is interrupted between 10 and 11 and the motor is stopped.

In the accompanying drawings the upper gramophone turning-plate 15 is not shown in Fig. 1 for the sake of clearness of illustration. The electromagnet 7 is excited only for the short time during which the contact of the arm 5 and screw 6, Fig. 3, is effected. As soon as the armature is attracted and the spring 10 has been forced sidewise, so as to assume the position shown in dotted lines, the armature, with its extension 9, remains in the dotted position under the influence of the spring 10—that is to say, in the position corresponding to the attraction of the magnet, though the exciting of the said electromagnet 7 has ceased.

At the lower extremity of the shaft 16 of the gramophone turning disk a friction-ring

17 is mounted, which makes contact with a laterally-arranged friction-disk 18, which is rotatable on the shaft 19, rotatably journaled on an arm 20, which in its turn is arranged 5 rotatably about the shaft 21 in the frame of the apparatus.

On the shaft 21 is rotatably mounted a toothed segment 22, engaging with the toothed wheel 23 upon the shaft 19. The toothed segment 22 is provided with an arm 24, extending 10 beyond the rotating center 21 and to which a rod 26 is linked at 25, the free end of which is connected to a lever 27, rotatably mounted upon the bed-plate of the apparatus, the said 15 lever being acted upon by a spring 28, which tends to turn the lever 27. By pushing the rod 26 forward or backward, respectively, the lever 27 and any parts positively connected thereto may be turned downward and lowered. 20 The upper end of the said lever 27 is rotatably connected to a staple or yoke of substantially rectangular shape and to which the free extremity of the rod 26 is suitably and rotatably secured. In the free ends of the staple a rod 25 is journaled on which a spring 28 is wound, one end of which is secured to the framing of the apparatus, while the other end is attached to the staple. By this means the staple on the reciprocation of the rod 26 will be rocked 30 or tilted, and the lever 27 will thereby be free to be rocked or swung downward in its turn.

The toothed segment 22 is provided at one end with a stop 29 and with a stop 30 at the other end, the stops serving to limit the rotation of the segment, the stop 29 impinging 35 against the toothed wheel 23 in one position, as shown in Fig. 1, while in the other position, (shown in Fig. 4,) where the friction-disks are not in engagement with each other, 40 the stop 30 strikes against the spring 31, attached to the arm 20, as shown in Fig. 4. The action of the spring 28 upon the end of the rod 26 operates in the normal or starting position to keep the friction-disks 17 18 in engagement with each other by exerting a pull 45 on the projection 25, which in the normal position, in which the stop 29 impinges against the free extremity of the lever, is rigidly connected with the lever 27, which causes the 50 arm 20, with the disk 18, to be moved in the direction of the shaft 16. In the position shown in Fig. 1 the toothed segment 21 is turned in the direction of the shaft 16. Thus the operation of the apparatus—that is to say, 55 the rotation of the shaft 16—will also cause the rotation of the friction-disk 18 by means of the friction-ring 17. This results in the rotation of the toothed segment 22 by means of the wheel 23, which is connected to the 60 disk 18. The arm 26, which is linked to the segment 22 at 25, is thereby moved in the reverse direction of the arrow, so that the stud 25 describes an arc about the shaft 21 until the stud 25 has been moved beyond the dead-

center. In this moment the spring 28 causes 65 the rotation of the arm 20 upon the shaft 21, so as to disengage the friction-disk 18 from the ring 17 and to arrest the disk in its position which is shown in Fig. 4 of the drawings. The friction-disk 18 remains in this 70 position until the apparatus is stopped. The friction-disk 18, the segment 22, and the rod 26, which are only moved at the beginning and at the ending of the operation of the apparatus, serve to lower the arm 32, with the 75 sound-box, upon the sounding-plate—that is to say, they serve to insert the needle or stylus of the sound-box into the sound-lines by the change of the relative positions of the pivots 25 and 21 due to the rotation of the segment 80 22, which on the starting of the apparatus is effected by the rotation of the gramophone turning disk, while at the end of the operation of the apparatus this rotation, which results in the lifting of the sound-box, is effected by 85 a special stop or abutment, as will be hereinafter described. I am aware that this part is old, and no special claim is made to it; but it is essential to provide means whereby the sound-box is made to move, this movement being 90 effected, for instance, by a lateral extension 32 of the upper part of the lever 27. On the other hand, it is necessary to raise the sound-box when the apparatus is stopped, which is done by the reverse movement of the rod 26 95 and of the arm or projection 32, respectively.

The throwing out of operation of the apparatus after the reproduction of the piece of music contained upon the sounding-plate is effected in the following manner: The shaft 16 100 of the gramophone turning disk is provided with a worm 33, engaging with the worm-wheel 34. The worm-wheel 34 actuates a ratchet-wheel 35, the perimeter of which corresponds to the extent of the piece of music— 105 that is to say, when the ratchet-wheel has made one revolution the stylus of the sound-box has got to the end of the sound-lines. The ratchet-wheel 35 is provided with a pin 36, placed in the path of the two-armed lever 110 37 38. The arm 38 of this lever is connected to a rod 39, which serves to throw the apparatus out of operation and is provided at its extremity with a projection 40. The end of the rod 39 is peculiarly curved downward and 115 slides in a slot of a vertical plate 41. The spring 42 tends to pull the rod 39 in the direction of the arrow. Upon moving the rod 39 by means of the pin 36 in a direction reversely to the rotation of wheel 35 when the 120 piece of music is finished, the pin acting upon the lever arm 37, the rod 39 will be moved in the reverse direction of the arrow as soon as the arm 36 glides off from the arm 37, so that the rear part of the rod, with its projection 40, in 125 consequence of the peculiar bent of this rod, is lowered in the slot of the plate 41 by means of the tension of the spring 42. During this

movement the projection 40 strikes against an arm 43, which is connected to the armature 8 of the electromagnet 7. By the movement of the arm 43 the armature 8 is pulled off  
5 from the electromagnet, which has already lost its magnetism. The extension of the armature 8 enters the curve of the spring 10, thus causing the latter to return to its initial position and to break the contact with the spring  
10 11. This results in the interruption of the current which actuates the electromotor and in the stopping of the apparatus.

Upon the rotating shaft of the armature 8 an arm 44 is provided, which, if the armature  
15 is moved away from the electromagnet on the stopping of the apparatus, strikes against the arm 45 of the segment 22, thus turning the segment 22 back somewhat and allowing the stud 25 to move beyond the dead-center. As soon  
20 as this is done the arm 26 is moved back by the action of the spring 28 into its initial position, and the friction-disk 18 and the segment 22 are moved likewise in the direction toward the shaft 16. This results in the raising of the  
25 sound-box by means of the arm 32 in the manner above described. Thus the whole apparatus is stopped and the several parts are also returned to their initial position, so that they are ready for a new operation upon the  
30 insertion of a coin.

What I claim, and desire to secure by Letters Patent of the United States, is—

1. In an electrically-actuated gramophone in combination a momentarily-closed starting-  
35 circuit and an independent working circuit, an electromagnet on said starting-circuit and an electromotor on said working circuit, spring-actuated means on the working circuit to retain the armature of the starting-electro-  
40 magnet in operative position after the ceasing of the starting-circuit, a gramophone turning disk operatively connected to the working electromotor and a swinging lever, operatively connected to the sound-box and stylus and  
45 stops on the starting-magnet armature capable of engagement with the said stops on the swinging lever.

2. In an electrically-actuated gramophone the combination with an electromotor working  
50 circuit and a gramophone turning disk operated by said circuit of an independent starting-circuit and means to momentarily close said starting-circuit, an armature-lever displaced by the starting-circuit and engaging  
55 with retaining means on the working circuit, a rocking lever and sound-box-actuating means on said rocking lever capable of engagement with said armature-lever and means on said lever capable of operative engagement  
60 with the gramophone turning disk.

3. In an electrically-actuated gramophone the combination with a gramophone turning  
65 disk and a sound-box of a rocking lever, a toothed segment rotatable on the pivot of said rocking lever and an extension of said seg-

ment beyond said pivot and operatively connected to said sound-box, stops on said segment capable of engagement with said rocking lever, a momentarily-closed starting-circuit and a lever displaced by said starting-  
70 circuit and capable of engagement with said toothed segment and means on the end of said rocking lever capable of engagement with said gramophone turning disk.

4. In an electrically-actuated gramophone  
75 an electromotor working circuit and an independent starting-circuit, a sound-box, a rocking lever and a toothed segment capable of independent rotation on the same pivot, an extension of said segment yieldingly con-  
80 nected to the sound-box, engagement means of said segment with the rocking lever and gearing intermediate of the segment and of the gramophone turning disk.

5. In an electrically-actuated gramophone  
85 in combination a gramophone turning disk working circuit, an independent momentarily-closed starting-circuit, a two-armed lever displaced by said starting-circuit and retaining  
90 means on said working circuit to keep said lever in position after the ceasing of the starting-circuit, means capable of operative connection with said gramophone turning disk and engaging with each of the arms of said lever, substantially as described.

6. In an electrically-actuated gramophone,  
95 the combination with an electromotor working circuit and a rotating shaft operatively connected to said electromotor and a gramophone turning disk keyed to said shaft, of a  
100 spring-pressed rod operated by said shaft, a lever capable of engagement with said spring-pressed rod and means on said working circuit to yieldingly retain said lever in position.

7. In an electrically-actuated gramophone  
105 a momentarily-closed starting-circuit, an independent electromotor-operating working circuit, a lever intermediate between said circuit and means on the working circuit to retain said lever in position, an extension or  
110 projection on said lever and a spring-pressed temporarily-actuated rod engaging with said projection.

8. In an electrically-actuated gramophone,  
115 a gramophone-turning-disk-operating shaft, a sound-box and stylus, a momentarily-excited starting-electromagnet, an elbow-lever serving as an armature for said electromagnet, a working circuit and an electromotor on said  
120 working circuit operatively connected to the gramophone-turning-disk-operating shaft, contact-springs on said circuit, one of said springs engaging with said elbow-lever and retaining the same in position, a rocking lever,  
125 a friction-roller at the end of said rocking lever and a friction-roller on the gramophone-turning-disk-operating shaft, a segment on the same pivot with the rocking lever and a projection or extension on said segment and linked  
130 to the sound-box and means on said segment

to engage with said elbow-lever, substantially as described.

9. In an electrically-actuated gramophone turning disk in combination a momentarily-closed starting-circuit and an independent working circuit, an elbow-lever displaced by said starting-circuit and spring-contacts on the working circuits in engagement with said elbow-lever, a gramophone-disk-operating shaft rotated by said working circuit, a spring-pressed rod capable of engagement with said elbow-lever, an intermediate lever linked to said spring-pressed rod, a rotating disk or ratchet-wheel geared to said shaft, and a pin on said disk or ratchet-wheel, temporarily engaging with said intermediate lever, substantially as described.

10. In an electrically-operated gramophone, a momentarily-closed starting-circuit and an independent working circuit, an elbow-lever operated by said starting-circuit and retained by said working circuit, a gramophone-disk-turning shaft operated by said working circuit, a rocking sectional gear, capable of en-

25 gagement with said shaft and with said elbow-lever, a rod capable of reciprocating movement, linked to said sectional gear, a swinging lever arranged in a vertical plane with relation to the base of the apparatus and a spring connection between said swinging lever and said rod and a sound-box fixed to said swinging lever. 30

11. In an electrically-operated gramophone a gramophone turning disk, a sound-box, a tilting lever, a contact-piece in the path of said tilting lever, the contact and the lever being connected to a source of electric energy, an independent working circuit and means substantially as described on said working circuit for operating said gramophone turning disk and said sound-box. 35 40

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

THEODORE BIRNBAUM.

Witnesses:

WOLDEMAR HAUPT,  
HENRY HASPER.