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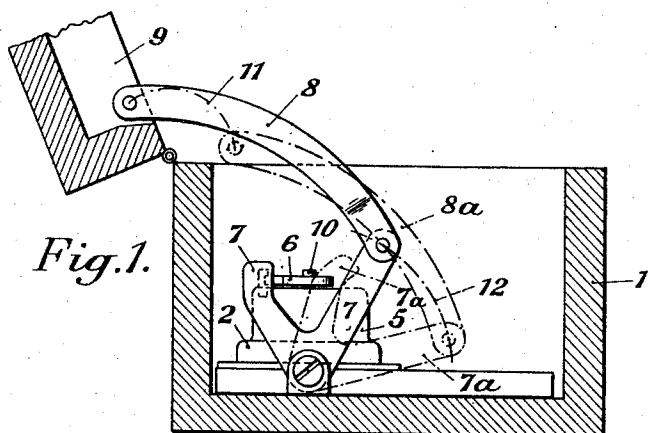
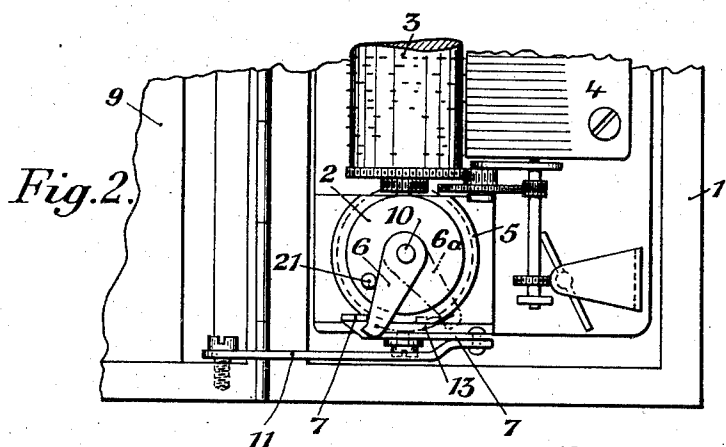
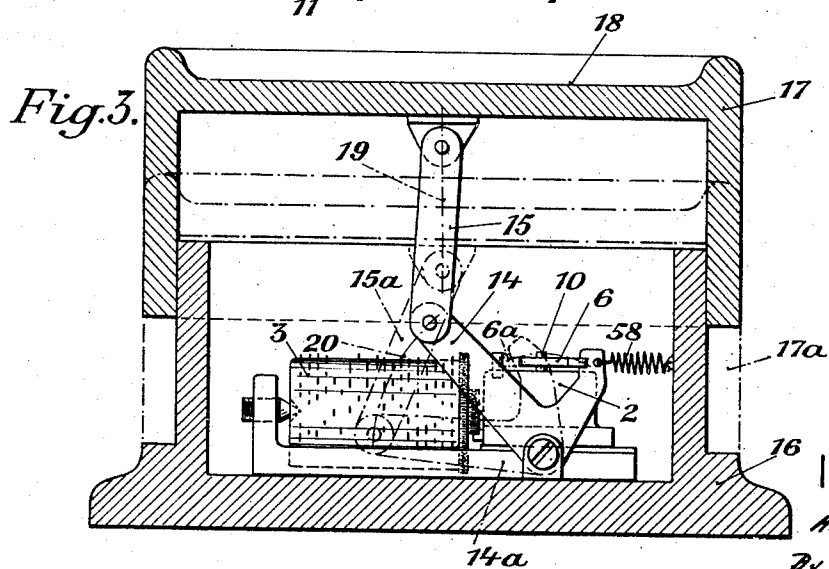
A. REUGE

1,876,753

MUSICAL BOX

Filed July 26, 1930

2 Sheets-Sheet 1



INVENTOR:  
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2 Sheets-Sheet 2

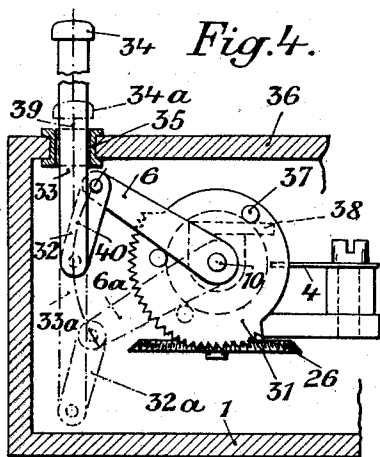
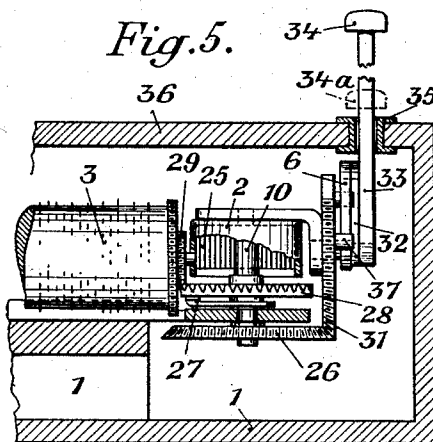
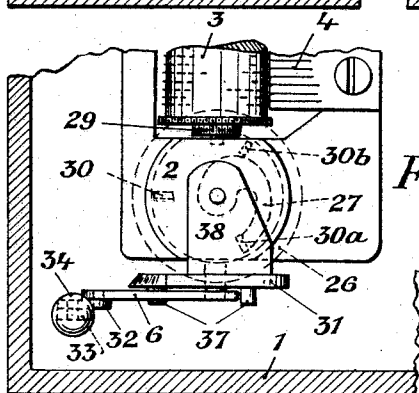
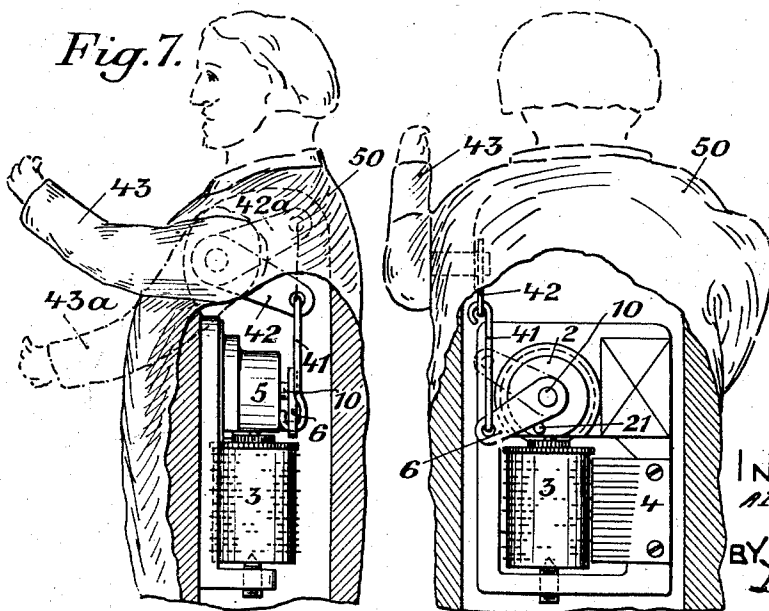


*Fig. 6.*

*Fig. 8.*



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## UNITED STATES PATENT OFFICE

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## MUSICAL BOX

Application filed July 26, 1930, Serial No. 470,958, and in Switzerland July 9, 1930.

It is well known to so mount musical apparatus in boxes, that the spring of the spring motor may be tensioned by means of particular winding keys and that the operation of the musical apparatus itself is started by the movements of the cover of the box. This results in a serious draw-back as the springs of musical boxes of this kind must be re-wound by particular movements by hand each time the spring motor has run down. During winding of the spring the winding key is moved in a closed circular path, so that after each revolution the several points of the path again coincide, so that this path has double or multiple points, that is to say, this path does cross itself and does not have single points only. A further draw-back consists in this, that musical instruments of this kind mounted in boxes are, after a short period of time, not re-wound again, so that they do not any longer fulfill their purpose as a means for entertainment or amusement.

It is also well known to tension the springs of spring motors, used for musical instruments mounted in boxes, by means of ratchets. Hereby the lever of the ratchet is, according to the ratio of gear, more or less often moved from the one end position into the other, so that the direction of the winding movement is changed at several points, whereby some or all of the points of the winding movement coincide with each other. This, however, results in the draw-back, that this winding movement, consisting of simple movements, for instance the opening of the cover of the box, or the movement of a member of a figure, may only be used for winding such musical instruments by transmission by means of special gears.

The present invention relates to musical instruments driven by a spring motor and the object of this invention is to obviate the disadvantages mentioned above. To obtain this purpose the winding of the spring of the spring motor is, according to the invention, effected by always unidirected movements in a path which has simple points only. The release or the operation of the musical box may be caused by the winding movement itself or by a movement following the winding

movement. The winding movement is preferably so limited, that at least no less than one piece of music is completely played from the beginning to the end. Finally the winding movement may be derived from the movements of the cover of the box.

In the accompanying drawings some constructions of musical boxes according to the invention are shown by way of example.

Figure 1 is a sectional view of a musical box provided with a device according to the invention, the front cover of the box being omitted; Figure 2 is a plan view of the device shown in Figure 1; Figure 3 is a sectional view illustrating a tumbler-support provided with a device according to the invention; Figures 4, 5 and 6 are sectional side views showing further examples of the use of the new device in connection with musical instruments mounted in boxes, and Figures 7 and 8 are side and back views representing the figure of a human body provided with a device according to the invention.

Mounted in the box 1 is a musical instrument comprising a spring motor 2, a needle drum or cylinder 3 and a comb blade 4. The spring motor 2 contains a spring not shown in the drawings which is arranged in the casing 5. This spring may be tensioned by means of a lever 6. One arm of a bell crank lever 7 contacts with the lever 6, while the other arm of said lever 7 is, by means of a link 8, connected to the cover 9 of the box.

The position of the several parts shown in full lines in Figures 1 and 2 corresponds to the untensioned position of the spring motor in which the cover 9 of the box is opened. When the cover 9 of the box is closed, the lever 8 is moved in the position 8a shown in dotted lines, whereby the lever 7 is brought into the position 7a indicated in dotted lines. By this movement the lever 6 which is directly mounted on the shaft 10 of the spring is pressed into the position 6a shown in dotted lines. In this position the spring of the spring motor is tensioned. When the piece of music is played, the lever is slowly returned from its position 6a into the position 6 and will be so arrested by the pin 21, that the musical instrument comes to a standstill as

soon as the piece of music has been completely played.

During the winding movement one end of the lever 8 moves in the path 11, the other end of this lever follows the path 12 and the lever 6 moves in the path 13. All of these paths 11-13 have such a form, that at no point do they cross each other and they also do not coincide in a series of points, that is to say, the paths consist of plane curves as this is the case, for instance, with a several times repeated complete circular movement during winding by means of a key. The winding movements performed in one path are always in the same direction, i. e. they do not at any of the several points change their direction of movement. By so forming the paths in which the members for tensioning the spring are moved, the advantage is obtained, that the winding movement for the springs of spring motors may, without the necessity of using special auxiliary devices, for instance, gear transmissions or similar gears, be derived from simple movements such as occur by the closing movement of the cover 9 of the box.

The interior of a support, for instance, a tumbler-support shown in Figure 3, may contain a musical apparatus, consisting of a spring motor 2, a needle drum or needle cylinder 3 and a comb blade not shown in the drawings and arranged behind the needle drum or cylinder 3. The lever 6 of the spring motor which, by means of the shaft 10, tensions the spring contacts against the bell crank lever 14 which, by means of the lever 15, is connected to the cover 17, surrounding the base member or foot 16.

If, for instance, a tumbler is placed on the surface 18 of the cover 17, the latter is depressed to the position 17*a* shown in dotted lines in which position the levers 14 and 15 occupy the positions 14*a* and 15*a* respectively. Hereby the lever 6 is pressed into the position 6*a* shown in dotted lines in which position the spring is tensioned. If now the tumbler is lifted, the cover 17 is pressed upward again under the action of a spring 58 and by means of the bell crank lever 14 and the lever 15. This results in the release of the spring motor 2 of the musical apparatus, so that by means of the needle drum or cylinder 3 and the comb blade a certain piece of music is played from the beginning to the end, whereupon the musical apparatus is arrested again by a special device. During the winding movement one end of the lever 15 is shifted in a straight-lined path 19, the other end of said lever is moved in a circular path 20 and the outer end of the lever 6 is moved in a circular path perpendicular to the plane of the figure. The straight-lined path 19, the circular path 20 and the circular path of the lever 6 do not

cross each other at any point and therefore have plane curves only.

The winding movements performed in these paths are always uniformly directed, so that no single parts may overlap themselves.

The musical apparatus shown in Figures 4, 5 and 6 consists of the spring motor 2, the needle drum or needle cylinder 3 and the comb blade 4 is mounted in a box 1 in such a manner, that the spring 25 of the spring motor 2 is tensioned by pressure exerted upon the pressure piece 34. The spring 25 of the spring motor 2 is carried by the shaft 10 upon which are fixed the bevel gear 26 and the locking pawl 27. Rotatably mounted upon the shaft 10 is a bevel gear 28 which drives the bevel gear 29 and thereby the needle drum or needle cylinder 3. The bevel gear 28 is provided with three locking notches 30, 30*a* and 30*b* which may be engaged by the outer portion of the locking pawl 27. The bevel gear 26 meshes with the toothed segment 31 which is connected to the lever 6 and therefore, by means of the lever 32 and the pressure pin 33, to the pressure piece 34. The pressure pin 33 is guided in the guide 35 of the cover 36 of the box in such a manner, that it may perform a straight-lined movement in its longitudinal axis only.

The operation of this musical apparatus is as follows:

On depressing the pressure piece or button 34 into the position 34*a* shown in dotted lines, the levers 33, 32 and 6 are moved into the positions 33*a*, 32*a* and 6*a* respectively shown in dotted lines. During the movement of the lever from the position 6 into the position 6*a*, the bevel gear 26 is, by means of the toothed segment 31, rotated about an angle of a little more than 120°, that is to say about a third of a revolution, whereby the spring 25 is proportionally tensioned. Upon the complete depression of the pressure piece 34, the locking pawl 27 engages the notch 30*b* next behind it. Upon release of the pressure piece 34 from the depressed position 34*a*, the spring 25 may expand again, whereby the toothed wheels 28 and 29 and therefore the needle drum or needle cylinder 3 are driven by means of the engaged locking pawl 27.

The toothed wheel 28 has three times as many teeth as the toothed wheel 29, so that the ratio of 1:3 exists between the spring motor and the needle drum or needle cylinder 3. The pin 37 is mounted in the toothed segment 31 in such a manner, that it again abuts a stop 38 as soon as a piece of music has been played to the end. If now, during a winding motion about an angle of 120° the spring of the spring motor is tensioned, the needle cylinder or drum 3 will, if the spring expands, be rotated about three times through an angle of 120°, i. e. about an angle of 360° or about one complete revolution, this on ac-

count of the ratio of 1:3 between the spring and the needle drum or cylinder 3. During this complete revolution the piece of music is again played from the beginning to the end, whereupon at the end the pin 37 again abuts against the stop 38 and thereby brings the needle drum or cylinder to a standstill.

During winding, the pressure piece 34 and the end of the lever 33 are moved in a straight-lined path 39, whereas the end of the lever 32 and the end of the lever 6 are caused to move along a portion of a circular path 40. All of the winding movements are always made in the same direction, so that none of the moving parts may cross each other. This device is particularly suitable for an article of amusement and for toys in which in connection with the pressure pin 34 a figure representing a human or animal body may be moved.

In a construction shown in Figures 7 and 8 a musical apparatus as described in connection with the other examples is mounted in the figure 50. The lever is, by means of other levers 41 and 42, connected to the arm 43 in such a manner, that, by depressing the arm 43 into the position 43a shown in dotted lines, the spring of the spring motor of the musical apparatus is tensioned. On release, the arm 43 slowly rises again into the original position 43 during which time the piece of music is played from the beginning to the end.

By the present invention the advantage is obtained, that the winding movements and the release of the spring of the spring motor may be derived from other simple movements, for instance, the opening and closing movements of the cover of a box, by the most simple means without necessitating for this purpose any special gears.

The device according to the invention may, of course, also be used in combination with other articles, for instance, in combination with saving-boxes, cigar- or cigarette-boxes or dispensers for cigars or cigarettes. Finally other musical instruments, for instance, instruments having fifes, barrel-organs or gramophones which are driven by spring motors may be constructed according to the invention.

What I claim is:

1. A musical box comprising a casing, a motor in the casing, a musical apparatus mounted in the casing, an actuator associated with the casing for winding the motor, means in cooperation with the actuator and the motor for winding the motor, and an arresting device for the last-named means positioned and proportioned to contact with the first-named means so that the first-named means will wind the motor only to such an extent that the motor will completely operate the musical apparatus to completely play the desired selection to then stop the operation of the motor.

2. A musical box comprising a casing, a motor in the casing, a musical apparatus mounted in the casing and driven by the motor, and a plurality of levers for winding the motor which have pivot points so that the levers are capable of being moved without changing the direction of the movement in the same plane curves which never cross each other.

3. A musical box comprising a casing, a musical apparatus in the casing, a motor in the casing for driving said musical apparatus, and means for winding said motor, said winding means being adapted to release the motor for operating said musical apparatus by the winding movement, said winding means including a plurality of levers which have pivot points so that the levers are capable of being moved in the same plane curves which do not cross each other and without changing the direction of movement.

4. A musical box comprising a casing having a swinging cover, a musical apparatus in the casing, a motor in the casing for driving the musical apparatus, a lever pivotally mounted in the casing and adapted to wind the motor, and a second lever pivotally connected to the cover and the first-named lever, said levers moving in the same plane curves which do not cross each other and the second-named lever upon movement of the cover winding the motor to operate the musical apparatus to completely play the desired selection.

5. A musical box comprising a casing having a swinging cover, a musical apparatus in the casing, a motor in the casing for driving the musical apparatus, a lever pivotally mounted in the casing and adapted to wind the motor, a second lever pivotally connected to the cover and the first-named lever, said levers moving in the same plane curves which do not cross each other and the second-named lever upon movement of the cover winding the motor to operate the musical apparatus to completely play the desired selection, and means for stopping the motor when the selection is completed.

6. A musical box comprising a casing having a swinging cover, a musical apparatus in the casing, a motor in the casing for driving the musical apparatus, a bell-crank lever pivotally mounted in the casing and cooperating with the motor, and a lever pivotally connected to the cover and the bell-crank lever, said levers moving in the same plane curves which do not cross each other and the second-named lever upon movement of the cover winding the motor to operate the musical apparatus to completely play the desired selection.

7. A musical box comprising a casing having a sliding cover, a musical apparatus in the casing, a motor in the casing for driving the musical apparatus, a lever pivotally mounted

in the casing and adapted to wind the motor, and a second lever pivotally connected to the cover and the first-named lever, said levers moving in the same plane curves which do not cross each other and the second-named lever upon movement of the cover winding the motor to operate the musical apparatus to completely play the desired selection.

8. A musical box comprising a casing having a push rod therein, a musical apparatus in the casing, a motor in the casing for driving the musical apparatus, a lever pivotally mounted in the casing and adapted to wind the motor, and a second lever pivotally connected to the rod and the first-named lever, said levers moving in the same plane curves which do not cross each other and the second-named lever upon movement of the rod winding the motor to operate the musical apparatus to completely play the desired selection.

9. A musical box comprising a casing, a spring motor in the casing, a musical apparatus mounted in said casing, an actuator associated with the casing for winding the motor, means connected to the actuator and the motor for winding the motor, and means for actuating the musical apparatus from the motor, both of said means being so proportioned that the first-named means will wind the motor only to such an extent that the second-named means will completely operate the musical apparatus to completely play the desired selection.

In testimony whereof I have affixed my signature.

ALBERT REUGE.

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