Oct. 15, 1929. R. S. ARTHUR 1,732,036

APPARATUS FOR RECORDING AND REPRODUCING SOUND

Filed Feb. 5, 1926 2 Sheets-Sheet 1

Fig. 1.

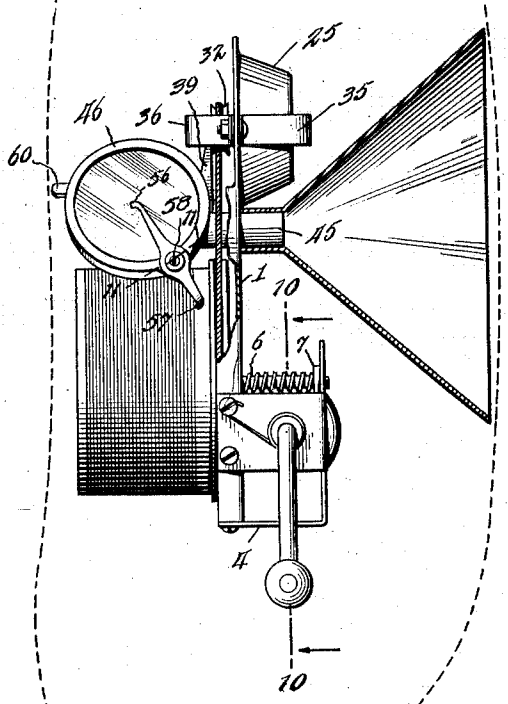
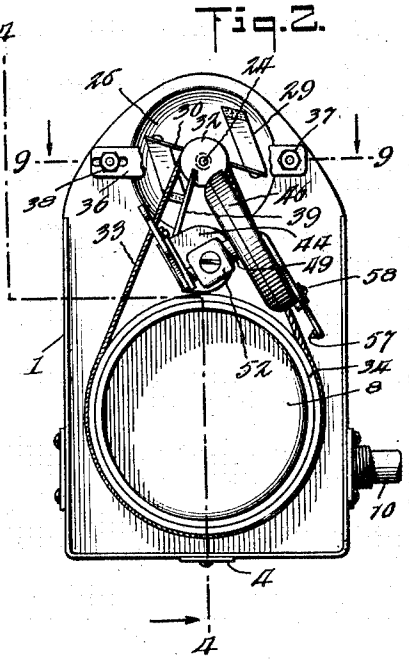


Fig. 2.



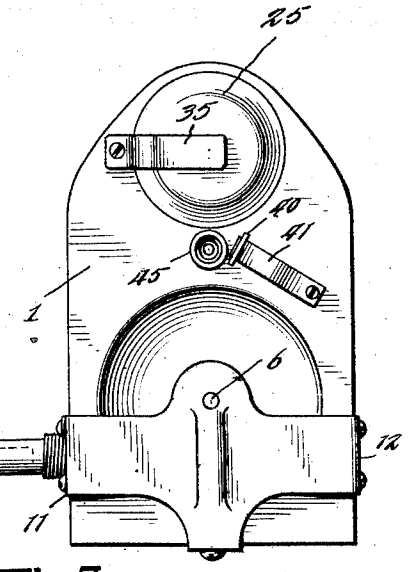


Fig. 3.

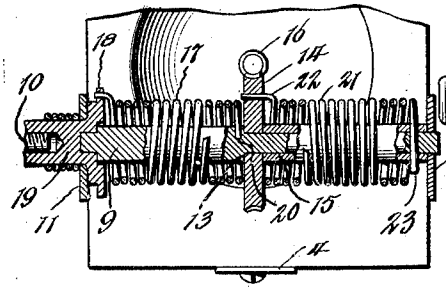


Fig. 10.

INVENTOR.
Richard S. Arthur
BY
Edwin S. Murdock
ATTORNEYS.

Oct. 15, 1929. R. S. ARTHUR 1,732,036

APPARATUS FOR RECORDING AND REPRODUCING SOUND

Filed Feb. 5, 1926 2 Sheets-Sheet 2

Fig.4.

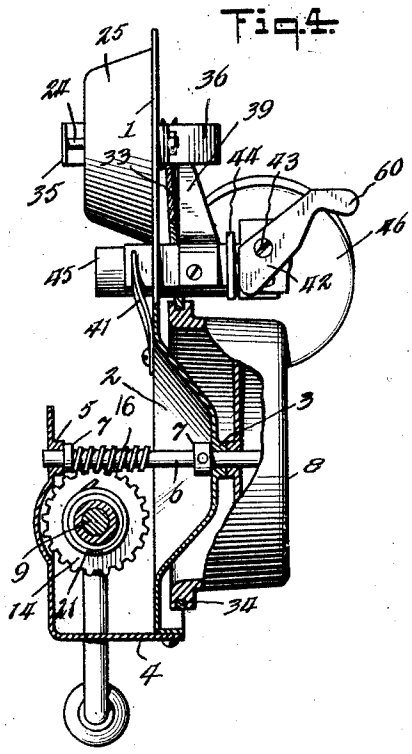


Fig.5.

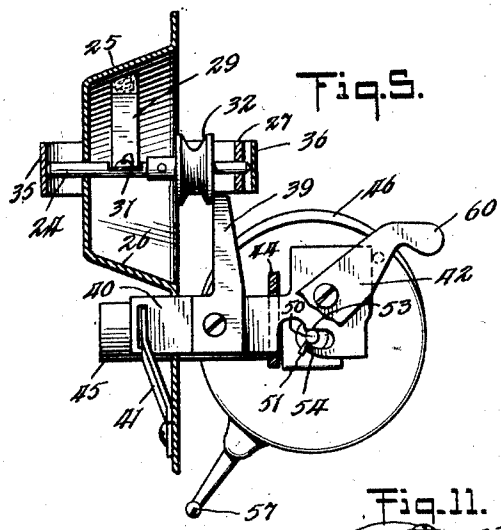


Fig.11.

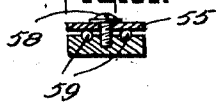


Fig.6.

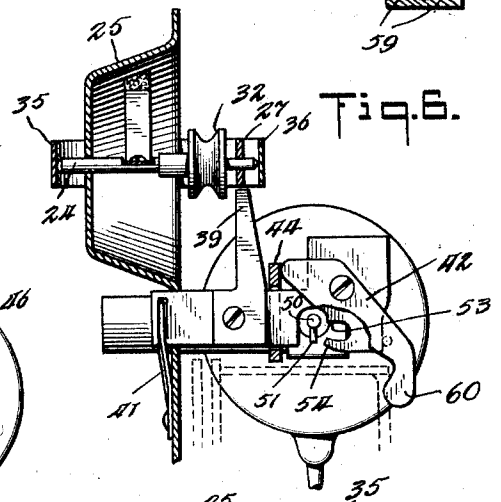


Fig.2.

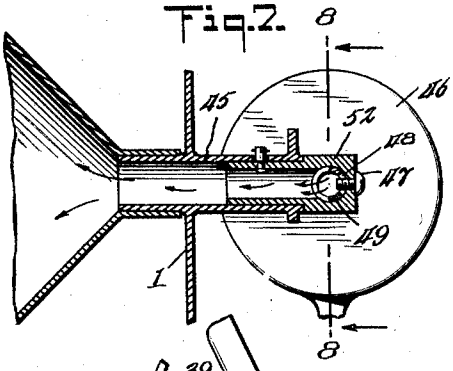


Fig.9.

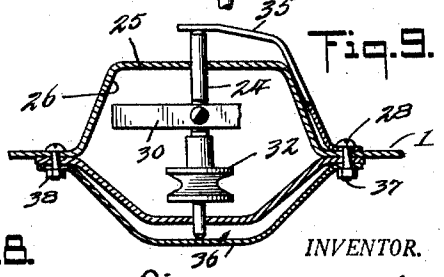
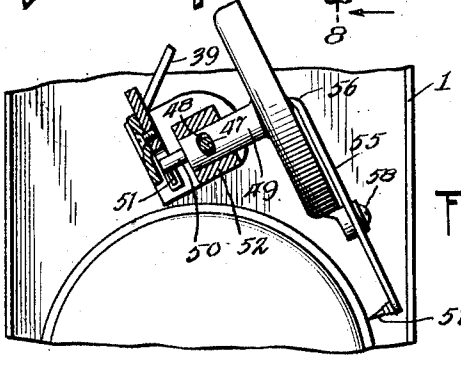


Fig.8.



INVENTOR.

Richard S. Arthur

BY

Edwin J. Murdock

ATTORNEYS.

Patented Oct. 15, 1929 1,732,036

UNITED STATES PATENT OFFICE

RICHARD S. ARTHUR, OF NEW YORK, N. Y.

APPARATUS FOR RECORDING AND REPRODUCING SOUND

Application filed February 5, 1926. Serial No. 86,239.

This invention relates to apparatus for recording and reproducing sound.

It is an object of this invention to produce an apparatus of this character, which, although sufficiently small for installation in a talking toy, is so constructed that the motion will be transmitted from the motor to the record carrier and to the operating parts without production of sound, and so that the record will be continuously moved in another direction to prevent chattering in the reproduction of sound.

In the drawings:

Figure 1 is a side elevation of one embodiment of my invention, a portion thereof being shown in section;

Figure 2 is an elevation looking at one face of the apparatus;

Figure 3 is a similar view looking at the opposite face;

Figure 4 is a side elevation partly in section, the section being taken on line 4—4 of Figure 2;

Figure 5 is a similar view showing the positions of the parts when the stylus is about to be depressed to its initial position;

Figure 6 is a view similar to Figure 5, but showing the relation of the parts prior to the lifting of the stylus from the record or the depression of the stylus to its initial position;

Figure 7 is a sectional view disclosing the manner of supporting the sound box;

Figure 8 is a similar view taken on the line 8—8 of Figure 7;

Figure 9 is a sectional view showing the manner in which the governor is mounted, the section being taken on the line 9—9 of Figure 2;

Figure 10 is a sectional view of the motor; and

Figure 11 is a sectional view on the line 11—11 of Figure 1.

The embodiment of the invention illustrated includes a face 1 which is provided adjacent to one of its ends with a struck up portion 2, having a bearing member 3 thereon, and carries at the same end a bracket 4 having a bearing member 5 aligning with the bearing member 3. A shaft 6 is mounted in the bearings 3 and 5, being prevented from longitudinal movement by collars 7 and supports at one end a record carrier 8. Rotary motion is imparted to this record carrier in the following manner: A shaft 9, having a crank handle 10 attached to one end thereof is mounted in bearings 11 and 12 on the bracket 4 and having one portion reduced to form a shoulder 13 against which an operating worm wheel 14, which is mounted on the reduced portion of the shaft, abuts, which worm wheel is loose upon the shaft and is prevented from longitudinal movement by the shoulder 13 and by a collar 15. The worm wheel engages a worm 16 on the shaft 6.

A coil spring 17 is attached at 18 to a coupling 19 between the shaft 9 and the crank 10, in which coupling the shaft 9 is adapted to rotate. The opposite end of the spring 17 is attached at 20 to the shaft 9. A second coil spring 21 is attached at 22 to the worm gear 14, and at its opposite end at 23 to the shaft 9. The result of this construction is when the crank handle 10 is turned it will rotate the coupling 19 relatively to the shaft 9 and in so doing will wind the spring 17. The attachment 20 of the spring to the shaft 9 acts as a stationary point during the winding operation.

However, when the spring gets under sufficient tension, the continued actuation of the crank 10 will, through the spring 17, rotate the shaft 9 and transmit motion to the stationary end 23 of the spring 21. A continued actuation of the crank will thereafter place the spring 21 under tension, the attachment 22 at this time acting as the stationary point, due to the fact that the worm wheel 14 is at this time held stationary. The value of this construction is that the springs 17 and 21 will successfully operate to rotate the worm wheel 14, and will produce the same effect as if the worm wheel were located at one end of a spring in length equal to both of the springs 17 and 21. However, the particular disposition of the two springs enables the actuating means to be located compactly and to consume the minimum amount of space.

In order that the rotation of the record carrier 8 may be controlled, I have provided a governor therefor. This governor includes

a shaft 24 which finds its bearings in depression 25 formed in the base 1 and provided with a frusto conical wall 26, the purpose of which will later appear, and in a bracket 27 which bridges the depression 25 and is attached to the base 1 by suitable means 28. A pair of brake shoes 29 are mounted on a resilient carrier 30 which is secured to the shafts 24 and 31, the brake shoes being adapted to rotate in proximity to the wall 26 and being permitted by the resiliency of the carrier 30 to move outwardly to engage the frusto conical wall 26 under the centrifugal action developed by the rotation of the shaft 24. A pulley 32 is rigid with the shaft 24 and receives a driving element 33 which also passes around the record carrier 8, being mounted in a groove 34 on the base thereof. This driving element is in the form of a relatively light coil spring. The result of the use of a coil spring as a driving element between the record carrier and the governor is that while the record carrier is maintained at a uniform speed it is also permitted to continuously rotate in one direction, that is to say, its rotation is not interrupted periodically by the action of the governor. This effect being produced, there will be no chattering in the reproduction of the sound from the record.

In order that the governor may be set to regulate the rotation of the record carrier at different speeds, I have provided a spring 35 which bears against one end of the shaft 24, and a second spring 36 which bears against the opposite end of the shaft 24 is rigidly secured at 37 to the base 1 and adjustably secured at 38 to the base. By adjusting the spring 36, greater or less pressure will be exerted on the shaft 24 moving the shaft longitudinally so that the brake shoes 29 are moved closer to or further away from the frusto-conical wall 26 of the depression 25. Thus the brake shoes may be made to engage the adjacent surface of the brake drum when the shaft 24 attains various speeds.

The motion of the record carrier 8 may be prevented by a brake 39, which is carried by a slide 40, and is adapted to bear at one of its ends against the face of the pulley 32, so that in conjunction with the spring 35 it will exert such pressure on the pulley that the operation of the springs 17 and 21 will be prevented. This slide 40 is normally moved into such a position that the brake 39 will be in engagement with the pulley 32 by a spring 41, but the slide is adapted to be moved against the action of the spring 41 by a cam 42, which is pivoted at 43 on the slide 40 and is adapted to bear against the abutment 44 carried by the horn tube 45, which is mounted in the base 1 and extends from the sound box 46.

The sound box 46 is mounted on the tube 45 for a limited rotative movement, the movement being limited by an abutment 47 which extends into a slot 48 in the tube 49 which connects the sound box with the horn tube 45, as best shown in Figures 7 and 8. An arm 50 extends from the sound box to the tube 49 and is provided with an extending finger 51. The sound box tube 45 is made in two sections, one of the sections being stationary with the base 1, and the other section 52 being mounted for limited rotative movement on the first section, so as to permit the sound box to be swung pivotally with relation to the horn tube 45. The arm 50 is so disposed that it is adapted to be engaged by a cam 53 on the slide 40, so as to be moved by the cam to rotate the movable section 52 of the horn tube, and the finger 51 is adapted to be engaged by a cam 54 on the slide 40 so as to move the sound box about the axis of the tube 49 as a pivot.

The stylus 55 which engages the diaphragm at 56 to the diaphragm of the sound box, and is provided with a needle 57 on the end which is adapted to engage the record, is mounted at 58 in such manner that the vibrations incident to the travel of the needle in the groove of the record will be transmitted to the diaphragm. This method of mounting includes the pivoting of the stylus upon an anti-friction support such, for instance, as a pair of spherical elements 59 shown in Fig. 11, which are mounted in recesses in the frame of the sound box, the stylus being held in contact with these elements 59 by an adjustable attachment such as the screw 58.

When the parts are in the positions illustrated in Figure 6 of the drawings, the needle of the stylus is engaged in the last portion of the sound groove, and is ready to be swung to its initial position for a re-playing. This is accomplished by moving the cam 42 into the position illustrated in Figures 4 and 5 of the drawings. When the toe of the cam 42 engages the abutment 44, as shown in Figure 6, the brake 39 will be held out of engagement with the pulley 32, but when the cam 42 is moved into the position illustrated in Figures 4 and 5, the slide 40 is released and the spring 41 moves the same so that the brake 39 engages the pulley 32 and stops the rotation of the record carrier. The movement of the slide 40 also brings the cam 53 into engagement with the arm 50, which engagement being a tangential one, results in the movement of the finger and the rotation of the sound box 46 about the axis of the tube 49 as a pivot, the movement being limited by the abutment 47 in the slot 48.

This movement of the sound box raises the needle 57 from the record. The cam 54, after the raising of the needle from the record, engages the finger 51 and rotates the tube 49 about its axis as a pivot. This rotation of the tube restores the needle 57 to its initial position, that is, ready to begin its movement in the sound groove (see Fig. 1).

It is to be noted that the cam 42 is provided

with a detent at 60 which, when the cam is swung to the position it occupies when the record is being played, overhangs the edge of the record as shown in Figure 6. This insures the disengagement of the needle 58 of the stylus from the record before an attempt is made to remove the record or, in other words, should an attempt be made to remove the record, the movement of the record will operate the cam 42 and lift the needle from the record 1.

It will be seen that I have constructed a device wherein the operation of the movable parts will be accomplished with practically no noise and wherein the record will be protected from destruction by premature removal, wherein the record carrier will attain a continuous predetermined motion in one direction, and wherein the chattering of the record will be absolutely obviated.

What I claim is:

1. In an apparatus of the class described, the combination with a record carrier shaft, of means for rotating the same including resilient means for initially actuating the shaft and resilient means acting through the first mentioned resilient means for subsequently actuating the shaft.

2. In an apparatus of the class described, the combination with a record carrier shaft, of means for rotating the same including an actuating shaft, a gear connection between the two shafts, the gear on the actuating shaft being loosely mounted thereon, a spring attached to the actuating shaft and to the gear, and a spring attached to the shaft and to a rotary winding element.

3. In an apparatus of the class described, the combination with a record carrier shaft, of means for rotating the same including an actuating shaft, a gear connection between the two shafts, the gear on the actuating shaft being loosely mounted thereon, a spring attached to the actuating shaft and to the gear, and a spring attached to the shaft and to a rotary winding element, each of said springs being helical and having their axes coincident with that of the gear on the actuating shaft.

4. In an apparatus of the class described, the combination with a record carrier, of means for rotating the same, and governing means for the carrier including a centrifugal governor and a yieldable connection between the carrier and governor.

5. In an apparatus of the class described, the combination with a record carrier, of means for rotating the same, a governor therefor, said governor including a rotary shaft, a centrifugal braking element, a drum adapted to cooperate therewith, and a coil spring passing around the shaft and carrier and frictionally engaging each.

6. In an apparatus of the class described, the combination with a record carrier, of means for rotating the same, a governor therefor, said governor including a rotary shaft, a centrifugal braking element, a drum adapted to cooperate therewith, and a coil spring passing around the shaft and carrier and frictionally engaging each, said braking element and drum being relatively adjustable to vary the space between them.

7. In an apparatus of the class described, the combination with a record carrier, of means for rotating the same, and means for governing the speed of rotation including a governor shaft, and a coil spring passing around the carrier and shaft and frictionally engaging each.

8. In an apparatus of the class described, the combination with a record carrier, of means for rotating the same, and means for governing the speed of rotation including a governor shaft, and resilient means passing around the carrier and shaft and frictionally engaging each.

RICHARD S. ARTHUR.