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(19)

(54) GRAMOPHONE RECORD PLAYERS

(71) We, SONY CORPORATION, a corporation organised and existing under the laws of Japan, of 7-35 Kitashinagawa-6, Shinagawa-ku, Tokyo, Japan, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:

This invention relates to gramophone record players, and more particularly, but not exclusively, to toy-like record players.

Various toys are known having therein a miniature gramophone device; such as talking dolls or animals, talking cars and musical vehicles. The incorporation of such a gramophone device into the body of a toy makes the construction of such a toy rather complex, and moreover it is difficult to provide for sound reproduction of any substantial length or variety.

A further such toy-like gramophone device is described in UK patent no. 1 145 550. This device comprises a pair of guide rails formed on a special gramophone record member, a vehicle body having wheels to be guided by the rails, a spiral sound groove formed between the guide rails on the record member, and a cartridge member connected to the vehicle body and operative to reproduce a sound recorded in the sound groove on the record member as the vehicle body is driven along the rails.

With this device, where the gauge of the guide rails is fairly large, it may be possible to reproduce sound for a reasonably long time. However, it is required to provide the special record member with the two projecting guide rails, for each different sound to be reproduced. It is not possible to reproduce a conventional disc record as now on market, because such records lack the guide rails.

According to the present invention there is provided a gramophone record player for a stationary disc gramophone record having a spiral sound groove, said record player comprising a movable body to be placed on said record, drive means which can drive said movable body in a generally circular path on said record, a sound pick-up means for engaging said sound groove, said pick-up means being mechanically coupled to said movable body, and a sound groove following guidance member connected to said movable body and arranged to engage and follow said sound groove thereby modifying said circular path to a sprial path such that said movable body and said sound pick-up means follow said sound groove and said pick-up means derives a sound signal from said sound groove.

The invention will now be described by way of example with reference to the accompanying drawings, in which:

Figure 1 is a top plan view of a first embodiment of gramophone record player according to this invention with a disc gramophone record;

Figure 2 is an enlarged sectional view along line II-II of Figure 1;

Figure 3 is a sectional view along line III-III of Figure 2;

Figure 4 is a bottom plan view of the record player of Figure 1;

Figure 5 is an enlarged sectional view of a part of a guidance member of the record player of Figure 1 engaged with a sound groove of the record;

Figure 6 is a side plan view of a second embodiment of this invention with a disc gramophone record; and

Figure 7 is a side plan view of a third embodiment of this invention with a disc gramophone record.

In Figures 1 to 4, a movable body 2 which is designed and configured to look like a toy vehicle, in this case a bus, is placed on a conventional disc gramophone record 1 having a sprial sound groove 1*a*. The mov-

able body 2 comprises a chassis 2*a* having a pair of front wheels 3*a* and 3*b* having different diameters, and a pair of rear wheels 4*a* and 4*b* having different diameters. The movable body 2 further includes a battery 5, an audio amplifier 6, a motor drive circuit 7, a loudspeaker 8 and a motor 9 to drive the wheels 4*a* and 4*b* when powered by the battery 5 through the drive circuit 7.

The rear wheels 4*a* and 4*b* have conically tapered running surfaces, and are interconnected by a shaft 10 as shown in Figures 3 and 4. One of wheels 4*a* and 4*b*, for example the wheel 4*b* is driven by the motor 9 through a drive wheel 11 as shown in Figure 3, so that the movable body 2 is thereby driven. The diameter of the wheel 4*b*, which in use is placed on the radially outer side of the record 1, is greater than that of the wheel 4*a* which is placed on the radially inner side of the record 1, so that the movable body 2 when driven tends to follow a predetermined circular path, for example, 10 cm in radius.

A gramophone record sound groove following guidance member 12 made of a flexible material, is fixed under the chassis 2*a*. More particularly, the guidance member 12 is formed by a plurality of brushes 12*a*, as seen in Figures 4 and 5. Each brush 12*a* comprises a plurality of bristles and terminates in a plurality of substantially linear outer end surfaces, the lengths of all these surfaces being arranged in the direction of the sound groove 1*a*, when the movable body is correctly positioned on the record 1, as shown in Figure 4. In this position therefore, the outer end portions of the brushes 12*a* contact with or engage in the sound groove 1*a* as shown in Figure 5 when the movable body 2 is correctly positioned on the record 1. This means that when the movable body 2 is driven, the guidance member 12 is engaged with the sound groove 1*a*, the pressure being such that the guidance member 12 is guided by and follows the sound groove 1*a*. The movable body 2 therefore travels in a spiral path corresponding to the spiral sound groove 1*a*. This path is coarsely determined by the radii of the wheels 4*a* and *b*, and finely determined by the cooperation of the guidance member 12 with the sound groove 1*a*. The front wheels 3*a* and 3*b* float above the surface of the record 1, so that they are just decorations.

A sound pick-up means 14 forming part of a sound reproducer has a stylus 14*a*, such as a pick-up cartridge, and is mechanically coupled to the movable body 2 by a tube or rod 13 through a universal joint 15. The pick-up means 14 is also electrically connected to the amplifier 6 by a suitable cable (not shown).

In operation, the movable body 2 and pick-up means 14 are placed on the record 1. The movable body 2 may for example by placed at a distance of 10 cm from the central of the record 1, and then the stylus 14*a* is engaged with the sound groove 1*a*.

Thus, when the motor 9 is energised, the movable body 22 is driven in a spiral path determined in part by the different diameters of the wheels 4*a* and 4*b*, and in part by the cooperation of the guidance member 12 with the sound groove 1*a*. More particularly, pointed ends of the bristles of the brushes 12*a* engage the sound groove 1*a* and contact the side surfaces of the sound groove 1*a* as shown in Figure 5. The front part of the movable body 2 is thus automatically guided so as to follow the sound groove 1*a* when the wheels 4*a* and 4*b* are driven. Any deviation from the correct course is corrected by the guidance member 12. If there were no guidance member 12, and the movable body 2 were placed on the record 1 as indicated by dotted lines in Figure 1, the movable body 2 would move along an arcuate path determined by the diameter of the wheels 4*a* and 4*b*, so it would not be possible to reproduce a correct sound.

The movable body 2 travels along the sound groove 1a at a predetermined speed approxiamtely appropriate to correct reproduction of sound therefrom. The pick-up member 14 therefore supplies a signal, derived from the sound groove 1*a*, to the amplifier 6, which supplies a signal to operate the loudspeaker 8. During operation, since the movable body 2 travels at a constant speed and in the predetermined spiral path, the pick-up member 14 with the stylus 14*a* picks up the sound as it traces the sound groove 1*a* and is shifted towards the centre of the record 1.

A second embodiment of the invention is shown in Figure 6. In this case the pick-up means 14 having the stylus 14*a* is provided within a car body 16. The car body 16 also houses the amplifier 6 for amplifying a sound signal picked up by the pick-up means 14 and the loudspeaker 8, which is located by a window of the car body 16.

A third embodiment of the invention is shown in Figure 7. In this case a movable body 2′ is designed and configured as a doll instead of a vehicle, and a loudspeaker 8′ is located near the doll's mouth. A pick-up means 14′ is enclosed in a body 16′ designed and configured as an animal, such as a dog. The dog's body 16′ is mechanically and electrially connected to the doll's body 2′ through a connecting rod 13′. A universal joint may be provided at the head portion of the dog's body 16′ or the hand portion of the doll's body 2′. With this arrangement, if animal sounds, or chattering of the doll, or

songs are recorded on a record 1', such sounds are reproduced by the loudspeaker 8'.

As a modification, the pick-up means may be detachably connected to a movable body, or may be loosely mounted on a movable body, and moreover provision may be made for the motor to be energised automatically when the guidance member is engaged with a gramophone record.

WHAT WE CLAIM IS:

1. A gramophone record player for a stationary disc gramophone record having a sprial sound groove, said record player comprising a movable body to be placed on said record, drive means which can drive said movable body in a generally circular path on said record, a sound pick-up means for engaging said sound groove, said pick-up means being mechanically coupled to said movable body, and a sound groove following guidance member connected to said movable body and arranged to engage and follow said sound groove thereby modifying said circular path to a spiral path such that said movable body and said sound pick-up means follow said sound groove and said pick-up means derives a sound signal from said sound groove.

2. A record player according to claim 1 wherein said guidance member is made of flexible material, and a portion of said guidance member enters said sound groove when said recording player is placed on said record.

3. A record player according to claim 1 or claim 2 wherein said guidance member comprises a brush having outer ends which enter said sound groove when said record player is placed on said record.

4. A record player according to claim 1 wherein said guidance member comprises a plurality of brushes made of flexible bristles, each said brush having a plurality of substantially linear outer end surfaces, the lengths of said surfaces being parallel to one another and, when said record player is placed on said record, parallel to the general plane of said record and to the general direction of said sound groove, so as to enter said sound groove.

5. A record player according to any one of the preceding claims wherein said drive means comprises a motor enclosed within said movable body, and a pair of wheels secured on the same axle to be driven by said motor and having respective different diameters, whereby said generally circular path is determined by the difference between the diameters of said two wheels.

6. A record player according to claim 5 wherein said movable body encloses an amplifier for amplifying said sound signal and a loudspeaker for developing a sound in dependence on the signal supplied by said amplifier.

7. A record player according to any one of the preceding claims wherein said pick-up means is coupled to said movable body by a connecting means including an elongated member and a universal joint.

8. A record player according to claim 1 wherein said drive means comprises a motor and a pair of wheels to be driven by said motor, and said record player further comprises a second movable body enclosing said pick-up means, an amplifier for amplifying said sound signal, and a loudspeaker for developing a sound in dependence on the signal supplied by said amplifier, said second movable body being coupled to said first-mentioned movable body by a coupling means, including a universal joint.

9. A gramophone record player substantially as hereinbefore described with reference to Figures 1 to 5 of the accompanying drawings.

10. A gramophone record player substantially as hereinbefore described with reference to Figure 6 of the accompanying drawings.

11. A gramophone record player substantially as hereinbefore described with reference to Figure 7 of the accompanying drawings.

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4. A record player according to claim 1 wherein said guidance member comprises a plurality of brushes made of flexible bristles, each said brush having a plurality of substantially linear outer end surfaces, the lengths of said surfaces being parallel to one another and, when said record player is placed on said record, parallel to the general plane of said record and to the general direction of said sound groove, so as to enter said sound groove.

5. A record player according to any one of the preceding claims wherein said drive means comprises a motor enclosed within said movable body, and a pair of wheels secured on the same axle to be driven by said motor and having respective different diameters, whereby said generally circular path is determined by the difference between the diameters of said two wheels.

6. A record player according to claim 5 wherein said movable body encloses an amplifier for amplifying said sound signal and a loudspeaker for developing a sound in dependence on the signal supplied by said amplifier.

7. A record player according to any one of the preceding claims wherein said pick-up means is coupled to said movable body by a connecting means including an elongated member and a universal joint.

8. A record player according to claim 1 wherein said drive means comprises a motor and a pair of wheels to be driven by said motor, and said record player further comprises a second movable body enclosing said pick-up means, an amplifier for amplifying said sound signal, and a loudspeaker for developing a sound in dependence on the signal supplied by said amplifier, said second movable body being coupled to said first-mentioned movable body by a coupling means including a universal joint.

9. A gramophone record player substantially as hereinbefore described with reference to Figures 1 to 5 of the accompanying drawings.

10. A gramophone record player substantially as hereinbefore described with reference to Figure 6 of the accompanying drawings.

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