United States Patent

Raffaeli et al.

[15] **3,668,343**

[45] **June 6, 1972**

[54] SOUND PLAYBACK DEVICE WITH IMPROVED COIL SPRING PICK-UP ARM

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[22] Filed: **Jan. 30, 1970**

[21] Appl. No.: **7,181**

[30] **Foreign Application Priority Data**

May 3, 1969 Italy.....36888 A/69

[52] **U.S. Cl.** .....**200/52 R,** 200/DIG. 034, 200/11 K, 200/166 BA, 179/100.41 R, 274/46 D

[51] **Int. Cl.** **H01h 1/22**

[58] **Field of Search** .....200/11, 52, 166 B, 52 R, DIG. 034, 200/166 BA; 179/100.41 R; 274/46 D

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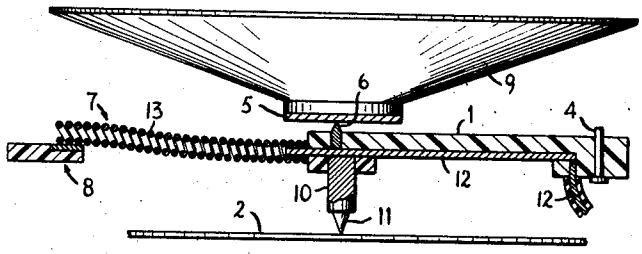
[57] **ABSTRACT**

A phonograph has a pivoted pick-up arm and a switch comprising a first contact member protruding from said arm and arcuately movable over at least one second contact member. Operation of said switch actuates circuits for the function of auxiliary devices during playback.

3 Claims, 4 Drawing Figures



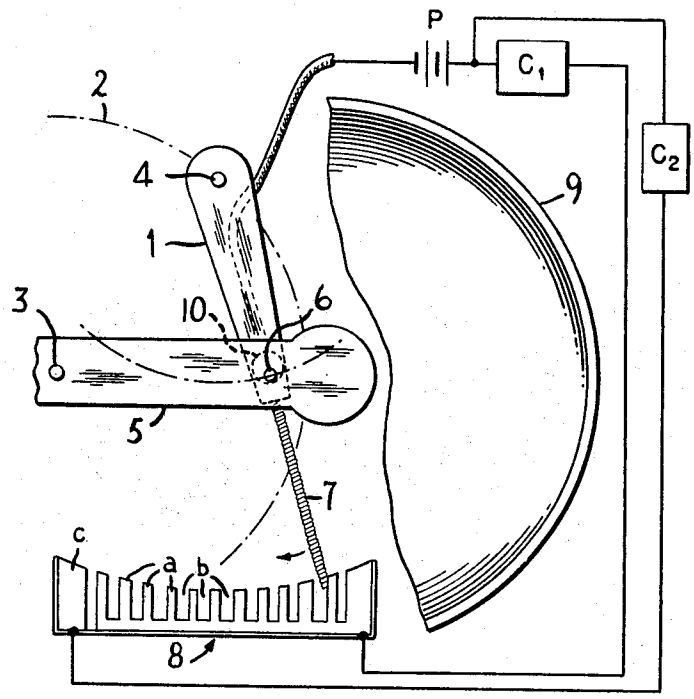


FIG. 1

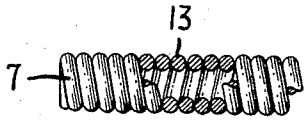


FIG. 4

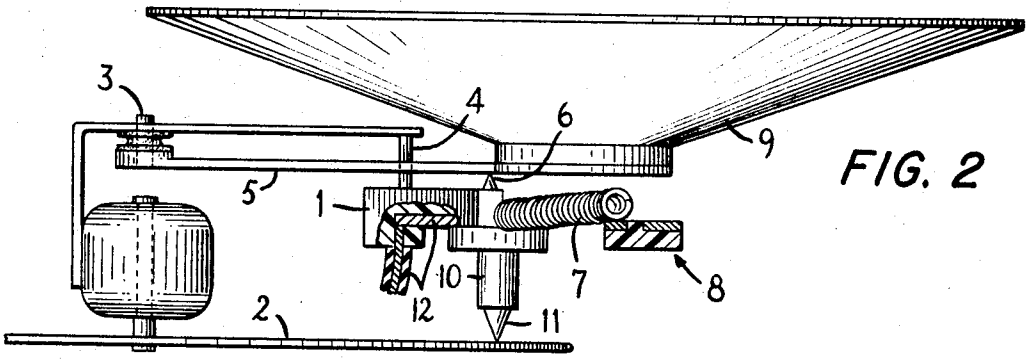
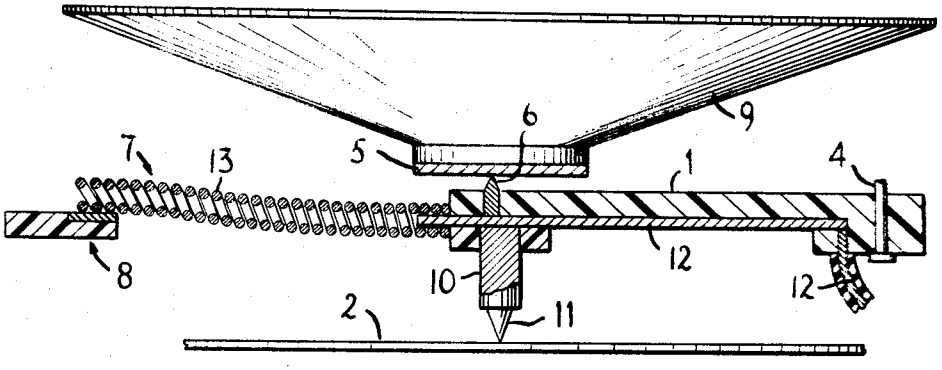


FIG. 2

FIG. 3



SOUND PLAYBACK DEVICE WITH IMPROVED COIL SPRING PICK-UP ARM

This invention provides a sound playback device comprising a pivoted pick-up arm and a switch, said switch comprising a first contact member on said arm and arcuately movable over at least one fixed second contact member.

The invention is particularly advantageous where it is desired to operate another electrically operated device for all or part of the time during sound playback.

Particularly, where the sound play-back device, for example a mechanical amplifying playback machine, is incorporated within a doll body for playing back sentences on small diameter records, the switch according to the present invention may serve, for example, to periodically control the movement of the movable eyes and tongue, as disclosed in Applicants co-pending U.S. Pat. application, No. 823,769.

The combination of a pointer switch with the pick-up arm of the sound playback machine enables a substantial saving since an existing motor is used for the pointer movement. Moreover, since the movement of the end of the metal contactor pointer is along an arc, the length of which depends upon the angle of excursion for the arm during playback and length of the pointer plus the playback arm, a large number of printed circuit fixed contacting members can be provided.

Where the switch is for successively closing and opening a single circuit, the spacing relationship of the contacting parts of the fixed contact member(s), can be varied to provide particular effects.

Finally, timing pf the playing of the sound playback machine and the operation of auxiliary devices connected thereto is provided in a simple manner.

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

FIG. 1 is a schematic plan view of a mechanical amplifying sound playback machine having a pointer switch and printed circuit contacting member according to the present invention ;

FIG. 2 is a schematic front view of FIG. 1 ;

FIG. 3 is a schematic side view of FIG. 1 ; and

FIG. 4 is an enlarged partly sectional view of the contact pointer of FIG. 1.

Referring to the drawings the sound playback machine comprises a movable arm 1 pivoted at 4 and provided at the upper part of its free end with a cone 6 (FIG. 2). Vibrations picked up by a stylus 11 on an extension 10 of arm 1 are transferred to an arm 5 pivoted at 3 and carrying a horn-type loud-speaker 9. The apex of cone 6 contacts arm 5 (FIGS. 2 and 3) and during sound playback of a conventional grooved record disc 2 described a circular path 14 in the direction of the arrow in FIG. 1. The vibrations picked up by stylus 11 are mechanically amplified since for the third class lever comprising fulcrum 3, lever 5 and a "resistance" provided by loud-speaker 9, the application distance for power supplied from cone 6 to fulcrum 3 is always less than application distance for the resistance. This type of economical and effective sound playback machine is widely used in talking dolls. Record 2 is generally driven by a very small electric motor, not shown in the drawing, through a belt drive.

According to the present invention, a pointer contact 7 is connected to the free end of playback arm 1, a lead 12 being welded to contact 7, through a hole within arm 1 and connected to a pole of battery P; the other battery pole is connected to a driven device C_1, the other end of which is connected to a contacting member 8 in a printed circuit. Contacting member 8 has a plurality of copper strips *a* of a certain width and spaced apart by spacings *b*. In the circuit of FIG. 1, whenever pointer 7 passes on a metal strip *a*, the circuit is closed and a current pulse passes to the driven device C_1. During the intervals of time when said pointer 7 is over a non-conducting space *b*, the circuit is open.

By varying the relationships between strips *a* and spacings *b*, a wide range of different series of current pulses passing through the driven device C_1 is provided. In the illustrated embodiment, the driven device C_1 is connected in parallel with a driving device C_2, said device C_2 being connected to a contact *c* separated from the other contact strips *a* of member 8 so that the movement of metal pointer 7 along contacting member 8 successively operates the two devices.

In the case of FIG. 1, the driven device C_2 comprises, for example, a small electromagnet which is operated when pointer 7 contacts the last contact *c* of member 8. Electromagnet C_2 may be used, for example, to restart the sound playback of record 2.

The applicants have found that the pointer 7 should have particular features in order not to disturb the operation of the sound playback machine.

Firstly, the pressure exerted by pointer 7 on contacting member 8 should be just sufficient to ensure a good electrical contact but not to create an excessive mechanical load on the driving motor for record 2 which would tend to change the revolution speed of the latter with resulting distortion in sound playback.

Secondly, the electrical resistance of the contact should be low to ensure minimum dissipating contact losses; in addition, a low contact resistance will also provide a better utilization of the power of battery P for driving the driven device C_1.

To this end, metal pointer 7 comprises a wire coil 13 (FIG. 4); the coil is internally hollow, so that pointer 7 has a tubular cross-section. Such a pointer is extremely flexible, but resilient and gives a good electrical contact with minimum load for the motor of the sound playback machine.

What is claimed is:

1. In a sound playback device for disc records, an improvement comprising, in combination, a pick-up arm having one end pivotally mounted on said device and having its other end disposed adjacent a rotatable record, a vibration pick-up head connected to said other end of said arm for contacting the record, sound reproducing means mounted in contact with said other end of said arm for producing sound in response to vibration of said pick-up head, a switch including a first contact fixed to said pick-up arm and a fixed second contact disposed for engagement by said first contact, a series connected load and potential source connected to said first and second contacts, whereby arcuate movement of said first contact upon pivotal movement of said pick-up arm during the playing of the record closes a circuit for said source and load when said first contact engages said second contact.

2. In a sound playback device for disc records as set forth in claim 8, the further improvement in which said first contact comprises a closely wound conductive wire coil connected at one end to said pick-up arm and having a free end for making resilient contact with said second contact member.

3. In a sound playback device for disc records as set forth in claim 9, a plurality of additional fixed contacts arranged in an arcuate path with said second contact and electrically connected thereto for successive engagement by said arcuately movable first contact.

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