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Mayer et al.

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[45] **July 17, 1973**

[54] **ACOUSTIC PHONOGRAPHIC APPARATUS**

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[52] **U.S. Cl.** ..... **274/9 R,** 274/1 A, 274/42 R

[51] **Int. Cl.** **G11b 25/04**

[58] **Field of Search** ..... 274/1 R, 9 R, 14 R, 274/42 R, 1 G, 7

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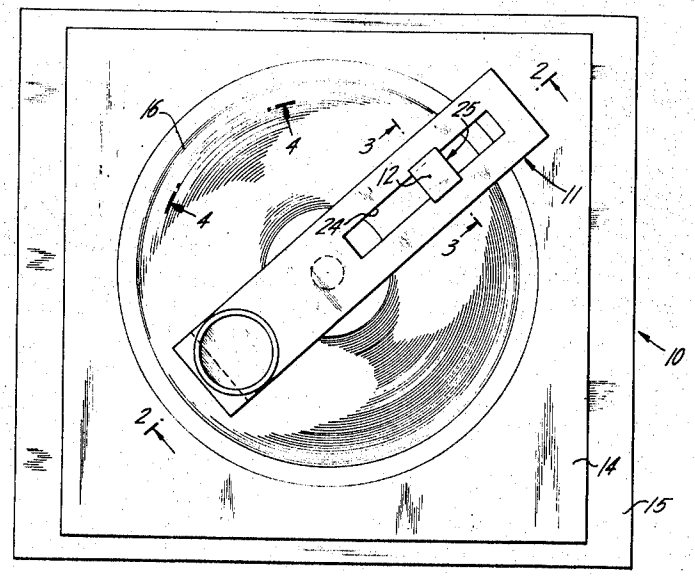
[57] **ABSTRACT**

An acoustic phonograph including a stationary vinyl coated paperboard phonograph record provided with a sound track of hill and dale configuration, an arm rotatably mounted on the record, and a needle carried by the arm engaging the sound track to cause the record to vibrationally flex and act as a speaker reproducing the sound recorded on the record.

2 Claims, 9 Drawing Figures



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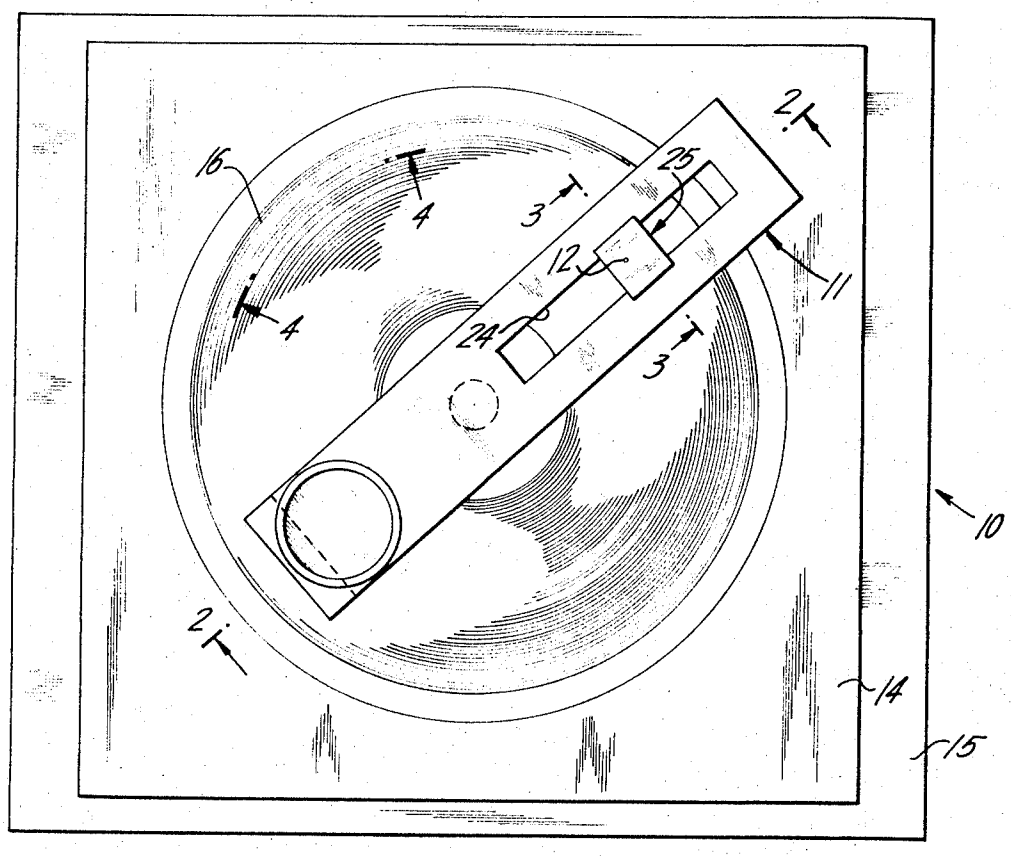
SHEET 1 OF 2

FIG. 1



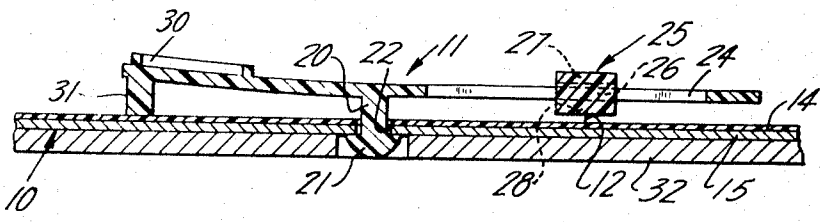


FIG. 2

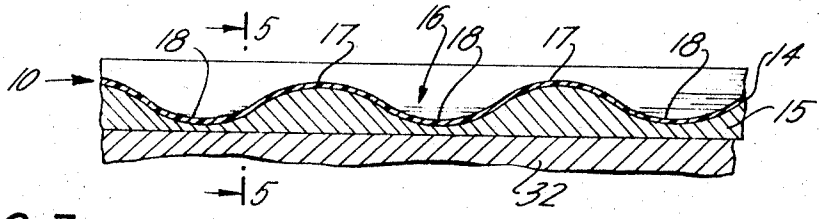
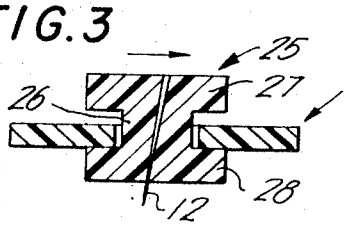


FIG. 4

FIG. 3



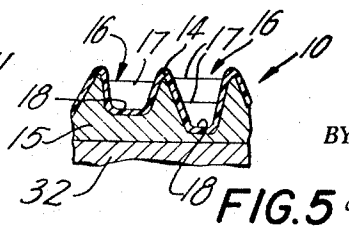


FIG. 5

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FIG. 6

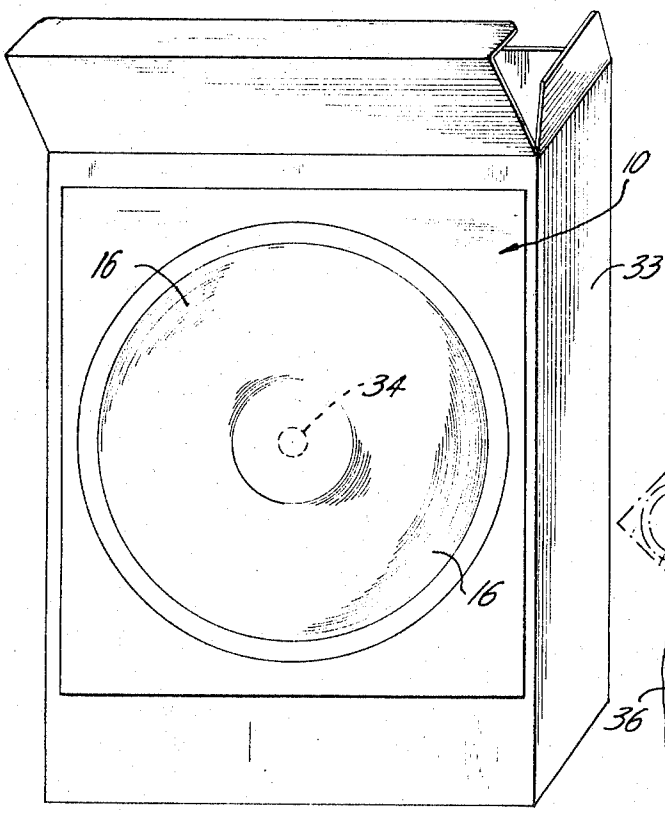

FIG. 7

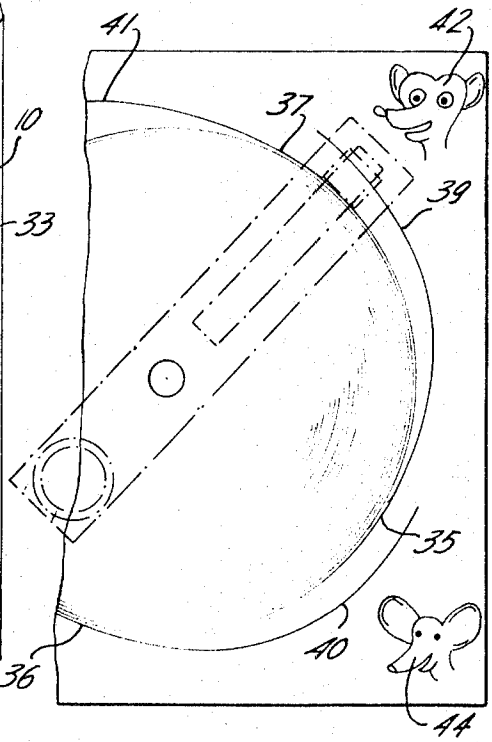

FIG. 8

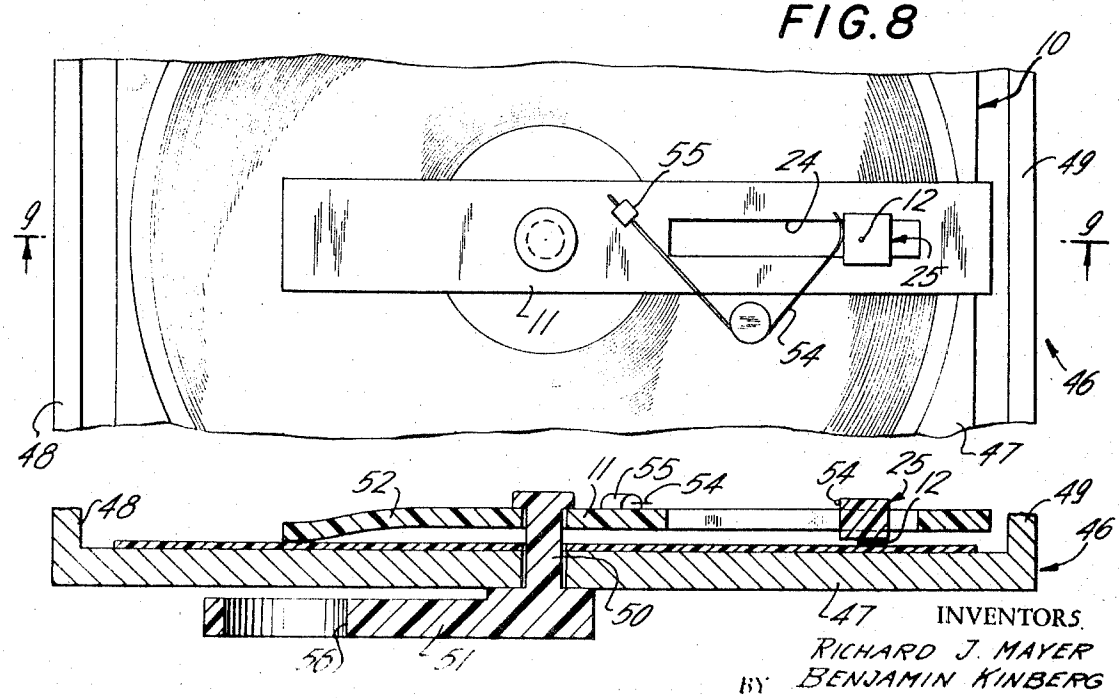

FIG. 9

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ACOUSTIC PHONOGRAPHIC APPARATUS

BACKGROUND OF THE INVENTION

The present invention relates to phonographic apparatus and more particularly to such apparatus of the acoustic type wherein the recorded sound is made audible by a speaker diaphragm being mechanically vibrated by the undulations formed in the sound track groove of the phonograph record.

SUMMARY OF THE INVENTION

It is an object of the present invention to produce acoustic phonographic apparatus which is of simple and inexpensive construction.

Another object is to provide such apparatus wherein the phonographic record acts as the speaker diaphragm.

Another object is to provide such apparatus which reproduces recorded sound loudly and with good fidelity.

Another object is to provide such apparatus wherein the record forms a part of a package containing merchandise and the remainder of the apparatus is of a size to be stored within the package with the merchandise.

Another object is to provide such apparatus wherein the record has a plurality of sound tracks and means are provided for selecting a desired track in a simple manner.

Another object is to provide improved acoustic phonographic apparatus for use in a greeting card.

In accordance with the present invention, the foregoing objects are accomplished by providing in combination a record having a sound track thereon, a needle positioned to engage the sound track, means for providing relative movement of the needle and the sound track along the sound track, the record being formed and supported to be placed in vibration by the engagement of the needle and the sound track and to act as a speaker diaphragm to reproduce the sound recorded on the sound track.

BRIEF DESCRIPTION OF THE DRAWING

Preferred embodiments of the invention have been chosen for purposes of illustration and description and are shown in the accompanying drawing wherein:

FIG. 1 is a plan view of phonographic apparatus in accordance with the present invention including a record and a needle carrying rotatable arm.

FIG. 2 is a sectional view taken along line 2—2 on FIG. 1.

FIG. 3 is a sectional view taken along line 3—3 on FIG. 1.

FIG. 4 is an enlarged sectional view taken along line 4—4 on FIG. 1 showing the hill and dale configuration of the sound track.

FIG. 5 is a sectional view taken along line 5—5 on FIG. 4 showing an end view of two sound track grooves of the record.

FIG. 6 is an isometric view of a box which incorporates a record.

FIG. 7 is a partial plan view of a record according to the present invention having multiple sound tracks with the needle carrying arm shown in phantom in a position for selecting one of the sound tracks.

FIG. 8 is a sectional plan view of a modified form of the present invention usable in greeting cards.

FIG. 9 is a sectional view taken along line 9—9 in FIG. 8.

DETAILED DESCRIPTION OF THE INVENTION

Referring now to FIGS. 1 – 5, the present invention generally comprises a phonograph record 10 and an arm 11 rotatably mounted on the record and carrying a phonograph needle 12.

The record 10 is formed by laminating a thin sheet 14 of vinyl plastic about .001 inch in thickness to a sheet of paper or cardboard 15. A sound track in the form of a helical groove 16 is impressed upon the record by applying a metal "master record" against the surface of the vinyl sheet with sufficient pressure to emboss the sound track of the "master record" on the surface of the record.

The floor of the groove 16 is formed with vertical undulations including high points 17 and low points 18 corresponding to the sounds to be reproduced. The spacing of the undulations corresponds to the tone of the recorded sound while the magnitude of the undulations corresponds to the relative amplitudes of the sounds. This type of recorded sound track is commonly referred to as having a hill and dale configuration.

The arm 11 is provided with a central post 20 having a head 21 which is forced through an ppening 22 in the center of the record. On one side of the post 20, the arm is provided with a slot 24 in which a slide 25 is slidably mounted. The needle 12 is embedded in the slide 25. The slide has a center web portion 26 positioned within the slot and upper and lower flanges 27 and 28 each having a greater width than the slot 24. The slide is dimensioned to slide easily within the slot 24. As shown in FIG. 3 the needle 12 is inclined about 7° from the vertical in the direction of motion of the needle along the sound track groove. On the other side of the post 20, the arm is provided with a circular ridge 30 on the upper surface and a formation 31 on the lower surface in engagement with the record. The circular ridge receives the tip of a finger of the operator to facilitate the manual rotation of the arm 11. The formation 31 is sized to flex the arm to maintain downward pressure upon the lower flange 28 of the slide to maintain the needle in the groove 16 and restrain the needle against vertical movement as the needle moves along the sound track formed in the groove 16.

The record 10 is glued to a sheet of corrogated cardboard 32 to provide sufficient rigidity to allow the record to be hand held at one corner or edge while the arm 11 is rotated by the other hand. As the arm 11 is rotated clockwise, the needle 12 moves along the groove 16 engaging the high and low points 17 and 18 causing the record to vibrate up and down toward and away from the arm 11. The entire record is a speaker diaphragm and sound eminates from the entire record surface to produce a surprisingly high volume. As the needle follows the spiral groove, the slide 25 slides along the slot 24 toward the center of the record. When the needle reaches the inner end of the sound track, the arm 11 is flexed by hand to lift the needle 12 from the groove, and the slide is returned to the outer edge of the grooved portion of the record.

Referring to FIG. 6, there is shown a box 33 of merchandise such as breakfast cereal or cookies which incorporates a record member 10 on the outer surface thereof. The record 10 can be either glued to the outer surface of the box or the vinyl film can be laminated di-

rectly to the wall of the box and the sound track embossed directly into the wall of the box. In either case, a circular perforated line **34** is provided in the center of the recording by which an opening is formed to receive the post of the needle carrying arm shown in FIGS. **1** and **2**. The arm **11** is packaged within the box with the merchandise to provide a completely self-contained composite phonograph and package of merchandise.

In FIG. **7** there is shown a record **10** containing a plurality of separate interleaved shound track grooves **35, 36** and **37**. Each of the grooves **35, 36** and **37** start at a different point on the periphery of the record and have a lead-in portion **39, 40** and **41** respectively for intercepting the needle and guiding it into the main portion of the groove containing the sound track.

Each of the grooves contain a different recorded message and a symbol is provided on the record at the beginning of each groove to aid in positioning the needle so that it is guided into the groove containing the message selected by the operator. As shown in FIG. **7** the record is provided with representations **42** and **44** of different characters adjacent to the lead-in groove portions **39** and **40**. The sound tracks of the grooves **35** and **36** could be messages about these characters or the voices of these characters. To hear the message associated with the character **42**, the operator positions the arm **11** so that it points toward that character with the slides **25** at the outer end of the groove **24** as shown by the dot dash lines. Upon rotation of the arm in a clockwise direction, the needle is guided into the groove **35** and the message recorded thereon is audibly produced.

With reference to FIG. **8**, there is shown a modification of the present invention wherein the record **10** is positioned within a shallow cardboard box **46**, a portion of which is shown in the drawings. The box **46** has a front wall **47**, side walls, **48** and **49**, a rear wall (not shown), and top and bottom walls (not shown). The record **10** is glued to the inner face of the front wall **47** to form therewith a speaker diaphragm. In this embodiment, the arm **11** is rigidly mounted on a shaft **50** which extends through the wall **47** from a crank **51** positioned outside of the box **46**. The arm **11** is provided with a curved portion **52** which engages the surface of the record. The length of the shaft **50** is insufficient to allow the curved portion **52** to assume its natural shape, and, therefore, the portion **52** is flexed into a partially straightened condition and thereby causes the arm **11** to press the needle **12** against the record. A return spring **54** is carried by a formation **55** on the arm **11** and engages the slide **25** to urge the slide radially outwardly. The crank **51** is provided with an opening **56** for receiving the finger tip of the operator.

Rotation of the crank **51** causes the arm **11** to move the needle along the groove on the record. As the needle engages the sound track, the record and the wall **47** vibrate as a unitary speaker diaphragm. As the needle moves inwardly along the helical groove, the spring **54** is tensioned. When the needle reaches the inner end of the groove, the free end of the crank **51** is moved away from the wall **47** to cause the shaft **50** to tilt. The curved portion **52** of the arm **11** is thus flexed so as to relieve the pressure on the slide **25** and lift the needle out of the record groove. The spring **54** then returns the slide **25** to its starting position at the outer end of the slot **24** and the apparatus is reset to be played again.

It will be seen from the foregoing that the present invention provides acoustic phonographic apparatus which is of simple and inexpensive construction wherein the record acts as the speaker diaphragm to reproduce recorded sound loudly and with good fidelity. It will further be seen that this invention provides such apparatus which readily adapts itself to use in connection with merchandise packages and greeting cards and lends itself to multiple track recording.

We claim:

1. Phonographic apparatus comprising in combination a record member having a track thereon and being formed and edge supported so as to be placed in vibration and act as a speaker diaphragm in response to interaction of a needle and said track, said record member forming an inwardly facing surface of a box-like structure, a needle adapted to engage and interact with said track when moved along said track, a shaft extending through the box-like structure at the center of said record member, an arm mounted on one end of said shaft within the box-like structure and having means for mounting said needle for movement along said arm on one side of said shaft, and a crank member mounted on the other end of said shaft outside the box-like structure and having means on the other side of said shaft diametrically opposite from said needle mounting means for manual rotation of said arm thereby moving said needle along said track.

2. Phonographic apparatus according to claim **1** wherein said track is a helical groove to cause said needle to be moved radially inwardly upon rotation of said arm, a spring is mounted on said arm to engage and urge said needle mounting means radially outwardly, and said crank member being operative to tilt said shaft so as to lift said needle out of engagement with said groove allowing said spring member to move said needle mounting means.

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