

Dec. 20, 1966

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3,292,932

MULTIPLE SOUND EFFECT MECHANISM FOR DOLLS

Filed June 7, 1963

3 Sheets-Sheet 1

FIG. 1

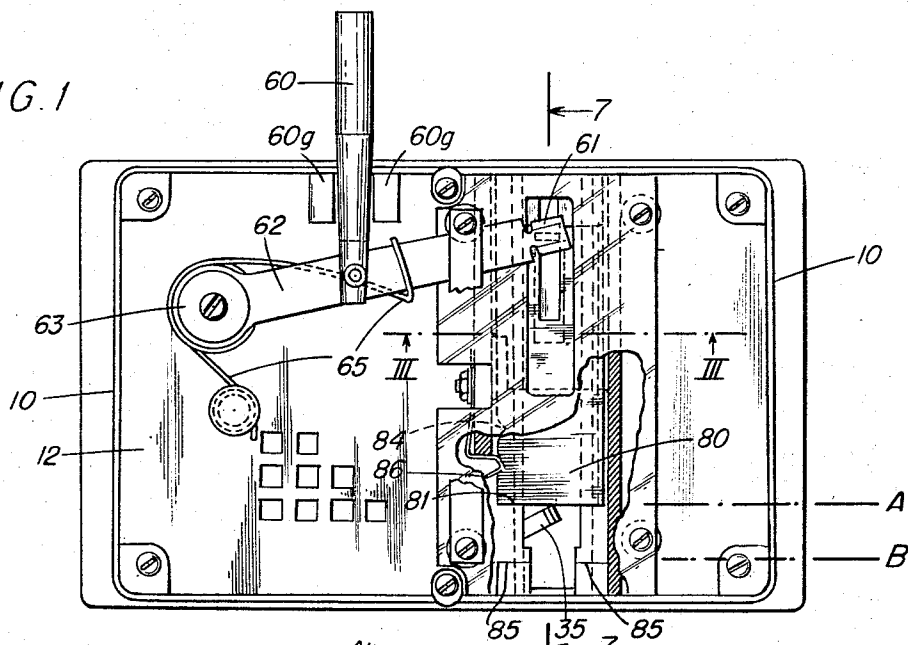


FIG. 2

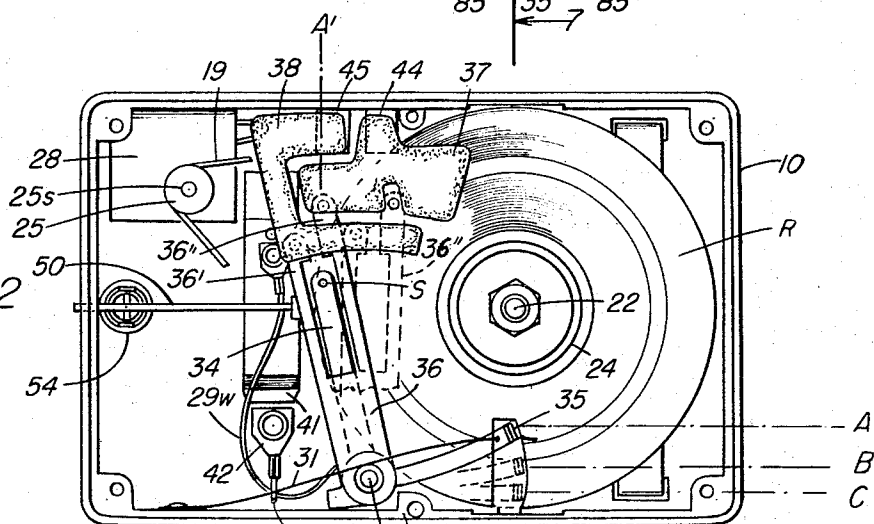


FIG. 3

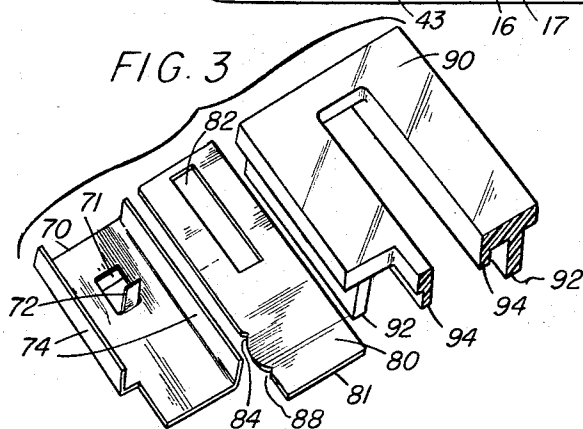
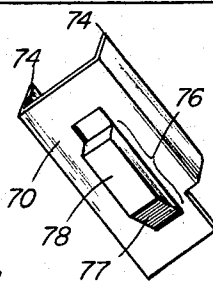


FIG. 4



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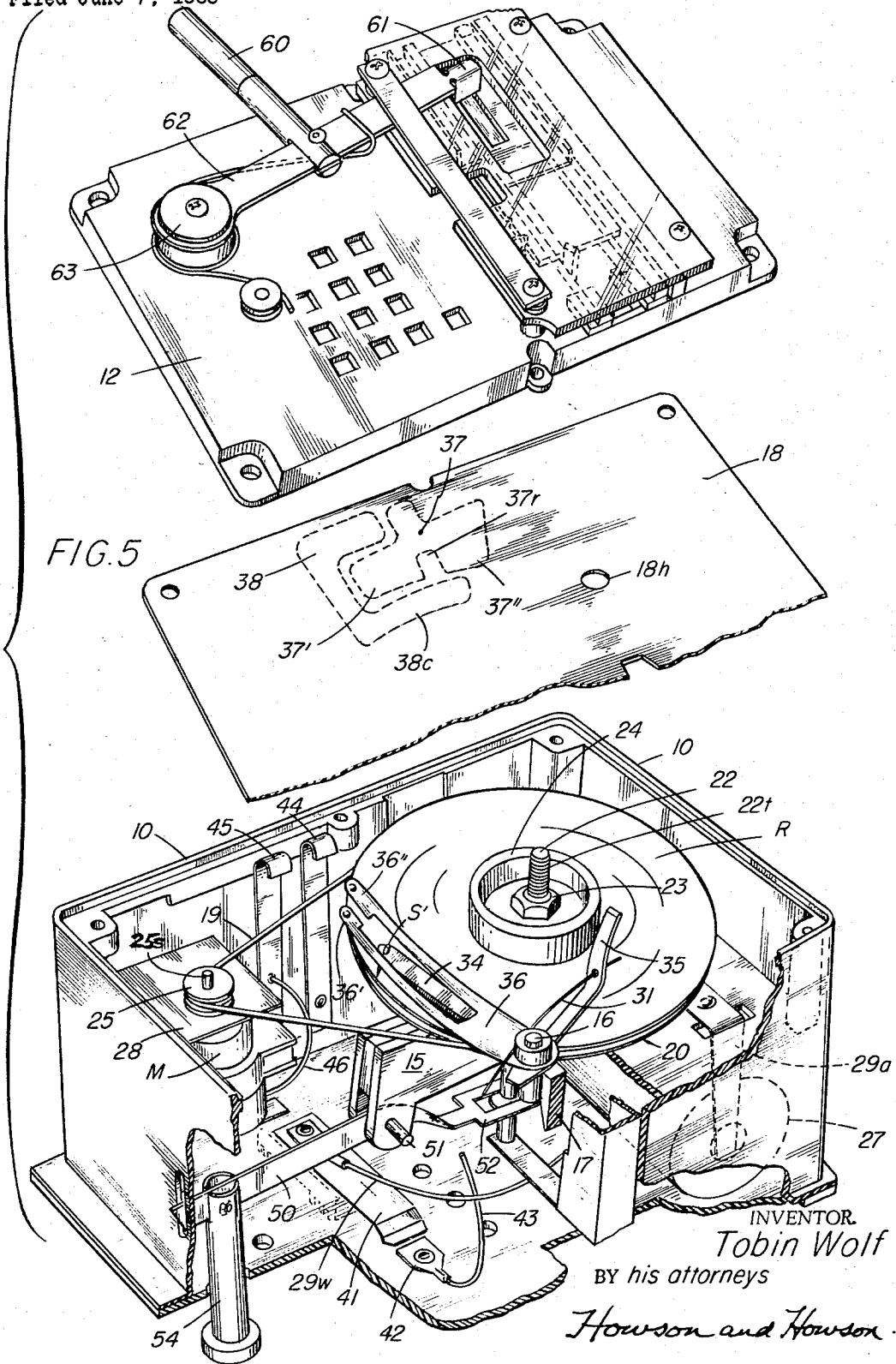
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MULTIPLE SOUND EFFECT MECHANISM FOR DOLLS

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FIG. 6

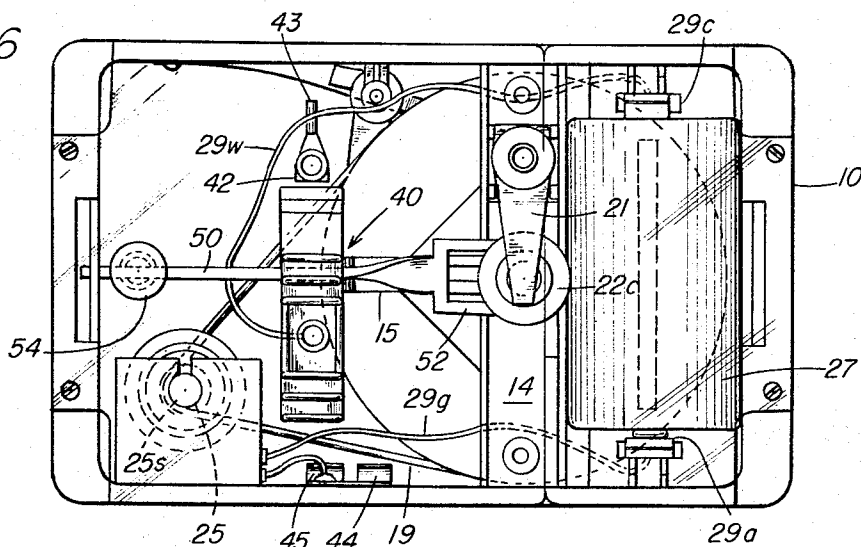


FIG. 8

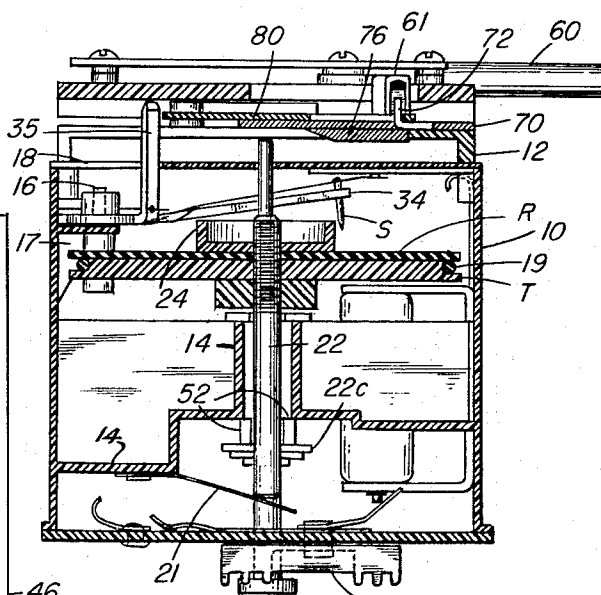
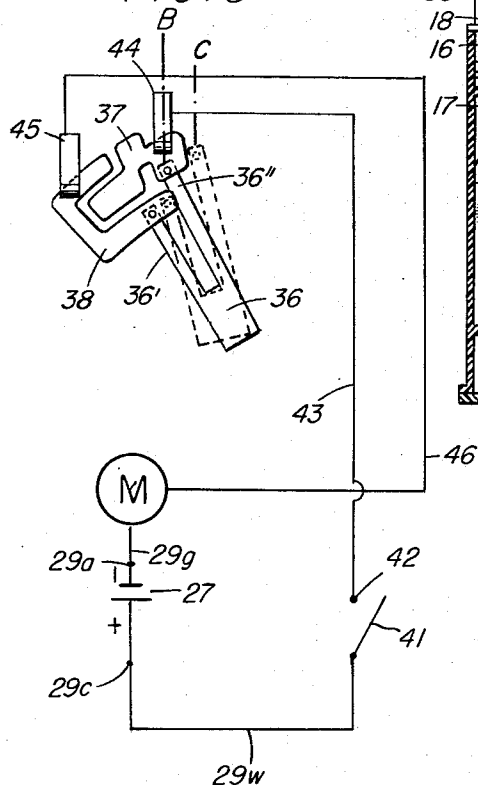


FIG. 7

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3,292,932 MULTIPLE SOUND EFFECT MECHANISM FOR DOLLS

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14 Claims. (Cl. 274-9)

This invention relates to multiple sound effect mechanisms and, more particularly, to such mechanisms useful in dolls and toys.

Heretofore, mechanisms have been provided for producing multiple sound effects in dolls and toys, but it was not readily possible to select the sound effect that it was desired to produce. Either the effects had to be produced in predetermined order or it was not possible to select which one would be produced. Thus, effects would be produced at random.

Thus, it is an object of the invention to provide a multiple sound effect mechanism particularly useful in toys and dolls wherein it is possible to select a desired sound effect at will.

Another object of the invention is to provide a multiple sound effect mechanism of the aforementioned type which utilizes a multi-groove phonograph record of miniature size wherein it is possible to set down the stylus at predetermined points or on predetermined tracks so as to produce sound from a selected track.

Another object of the invention is to provide a multiple sound effect mechanism of the aforementioned type in which the selection of the effect to be produced is by the pressing of one or another of control devices which can be readily differentiated by a child so that the child may make the proper sound effect come forth at the desired time.

Another object of the invention is to provide a multiple sound effect mechanism of the aforementioned type in which the stylus is separated from the record during the selection of the effect which it is desired to produce.

Another object is to provide in a mechanism of the aforesaid type for automatically starting the play of the selected sound effect as the control or selecting device is released, and for automatically stopping as the play ceases, regardless of which sound effect has been played. A related object is to provide upon termination of the play of any sound effect for the mechanism to be in condition for direct selection and play of any sound effect without need for any preparatory acts.

Other objects and advantages of the invention will appear as it is described in connection with the accompanying drawings.

In the drawings:

FIG. 1 is a side elevation view, partly broken away, of a mechanism embodying the invention.

FIG. 2 is a view similar to FIG. 1 with the cover and actuating mechanism removed and with the sound plate shown as if transparent.

FIG. 3 is an exploded perspective view of parts of the actuating and positioning mechanism removed from FIG. 2.

FIG. 4 is a perspective view of the cam plate reversed in position from FIG. 3.

FIG. 5 is an exploded perspective view, partly broken away, of the mechanism illustrated in FIG. 1.

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FIG. 6 is a side elevation view of the opposite side of the mechanism of FIG. 1.

FIG. 7 is a transverse section view taken along line 7-7 of FIG. 1.

FIG. 8 is a circuit diagram of the electrical connections embodied in the mechanism of the preceding figures.

In general, the invention comprises a multi-groove phonograph record driven by a motor energized from a dry cell battery. The mechanism is provided to set the stylus on the record as desired on selected grooves inwardly from the periphery so that a predetermined cry or sentence or sound effect will be played in accordance with manual control or manipulation, as by pushing one button or another of the mechanism. The pushing of the selected button, lever or member separates the stylus from the record and positions the stylus for setting down on the selected groove. It also closes the switch to start the motor and record running. On reaching the end of the groove, a switch contact likewise reaches the end of its movement over a conductor and moves off the conductor to stop the motor.

By pressing the same button as previously pressed, the same effect may be repeated; or another effect may be produced by pressing another button which locates the stylus at the proper place on another track on the record and simultaneously starts the motor running.

Referring to the drawings, the operating parts are housed in a housing 10 which may conveniently be of molded plastic material and of rectangular shape, but may be of any suitable shape for incorporation in a doll or toy.

Supported within the housing is a toy-size circular phonograph turntable T. The turntable is mounted fixedly on an axially movable spindle 22 rotatively supported in a bearing in a transverse member or strut 14 which may be molded integrally with the housing 10 or otherwise secured between the longitudinal side walls of the housing.

For driving the turntable, an elastic belt 19 is trained around the periphery of the turntable and around a pulley 25 on a motor shaft 25s driven by a miniature low voltage electric motor M mounted in a U-shaped metal frame 28 which is affixed to the side wall of the housing.

Mounted fixedly on the turntable is a miniature multi-groove disc-type phonograph record R of conventional synthetic molded material. To secure the record on the turntable, the turntable spindle 22 may have a screw-threaded portion 22t extending through the central aperture of the record. Upon the spindle and record, a cup-shaped molded washer 24 is placed and a nut 23 is screwed on the spindle.

A stylus S adapted to ride in the grooves of the record is mounted permanently on a phonograph tone arm 34 as by press fitting or other suitable means. The tone arm is of L-shape and is pivotally mounted at its center on a pivot pin 16 mounted in or molded on a protuberance 17 extending from the side wall of the housing.

As the stylus S rides in the record grooves, sound effects are produced which are amplified by a sounding board or plate 18 fitting within the margins of the side walls of the housing 10 and secured thereto, as herein-after described. The sound plate 18, as seen in FIG. 5, is preferably of thin stiff material such as molded plastic or fiber which is electrically non-conductive. (In FIG. 2, the sound plate is shown as if transparent so that the parts of the mechanism which are located beneath it may

be seen.) The sound plate 18 is engaged by the end of the stylus S which extends through and protrudes slightly beyond the opposite side of the tone arm from the record and stylus point so that it may slide over the sound plate while engaging it and while the stylus tracks the grooves of the record.

Pivotally mounted and held on the pivot pin 16 on top of the tone arm 34, as by a collar swaged on the tone arm, is a flexible arm 36 stamped from thin sheet metal which moves as a unit with the tone arm. The flexible arm 36 constitutes the movable switch arm of an automatic switch which is provided for starting and stopping the motor M when the desired record track is selected and is traveled by the stylus S. This spring arm 36 has bifurcations 36', 36'' at its outer or free end adapted to wipe over thin, spaced fixed-contact plates 37 and 38 mounted on the sound plate 18. The fixed contact plates are shaped as illustrated in FIGS. 2 and 8 and are adapted to be bridged during two separate, but continuous arcuate paths of the travel of the switch arm as its bifurcations 36', 36'' wipe over the contact plates while the tone arm and switch arm move as a unit as the turntable and record turn.

Referring to FIGS. 5, 6 and 8, power for the motor M is supplied by a dry cell battery 27 such as a heavy-duty flashlight battery located in a compartment formed in one end of the housing 10. See FIG. 6. Bent leaf-spring contacts 29a, 29c are mounted on opposite end walls of the compartment for engagement with the center and body contacts of the dry cell.

One of such battery contacts 29a is connected by a wire 29g to one motor terminal. The other battery contact 29c is connected by a lead wire 29w to the movable contact 41 of a conventional manually operable sliding contact type of power control switch 40 for establishing or for deactivating the motor circuit when the device is either to be put in operative condition or is to be deactivated. The other or fixed contact 42 of the power control switch 40 is connected to the contact 37 of the automatic stop-and-start switch by a wire 43 through a spring-brush contact 44 which is one of a pair of parallel spring-brush contacts mounted on the inside of the wall of the housing 10. The other fixed contact 38 of the stop-and-start switch is connected through the second brush-contact 45 to the second motor terminal by wire 46.

The aforementioned spring-switch arm 36 is adapted to bridge the fixed contacts 37 and 38 of the automatic switch as the tone arm comes down on and continues to track the first track or comes down on and continues to track the second track of the record; and it moves off one fixed contact and ceases its bridging function at the end of each track. For such purposes, contact plate 38 is C-shaped and the contact plate 37 is in the form of a short-legged T, with one portion of the head extending between the arms of the C of the contact 38. The spring-brush contacts 44, 45 engage the contact plates 37, 38 when the sound plate is placed over and assembled on the housing.

The bifurcation 36' of the switch arm 36 is shorter than bifurcation 36'' and slides over the contact 38 and remains in continuous contact therewith during the whole arcuate movement of the tone arm and switch arm. The bifurcation 36'' slides over the contact plate 37 (clockwise in FIGS. 5 and 8) from one end to a recess or interruption 37r in the path of the bifurcation 36''. This recess is so positioned with relation to the unitary travel of the switch arm and tone arm that the power to the motor will be interrupted and the motor will stop automatically when a predetermined position of the tone arm is reached. As will hereinafter appear, this predetermined position is at the end of one track or one sound effect produced by the record and stylus.

The mechanism illustrated is devised for use with a record having two discrete annular tracks or track areas to give two different sound effects, the track for one effect

being nearer the center of the record than the other and being connected to the former by the run-off groove of the latter. As usual, there is a run-on groove on the outer periphery of the first track and the run-off groove at the inner end of the second track.

In order to bias the stylus toward the outermost groove of the first track of the record R, the tone arm 34 is biased by a spring 31 which may be a thin wire spring that is anchored to the wall of the housing at one end with its other end engaging an outwardly or upwardly bent end or finger 35 of a radial extension from the pivot portion of the tone arm, in a position to overlie and be spaced from the record. Alternatively, a coiled tension spring or any other suitable spring may be used for the arm bias. In any case, the spring should exert only light pressure so as not to interfere with the tracking of the stylus in the grooves of the record.

Normally the stylus is maintained in engagement with the record grooves by a leaf-spring 21 overlying and pressing at one end on the end of the phonograph spindle. This leaf-spring extends radially and is anchored at its other end on an abutment or raised portion 14a of the housing strut 14 and exerts an axial pressure of the record toward the tone arm.

To separate the record from the stylus when desired, the record, spindle and turntable, as a unitary assembly, are axially movable against the bias of the spindle spring 21. For that purpose, a collar 22c is affixed to the spindle near the spring-pressed end against the inner surface of which the bifurcated end 52 of a lever 50 may press. The lever is pivotally mounted on a pivot pin 51 extending between two arms of a bearing slot in a bracket 15 extending longitudinally of the housing and laterally from the mid-portion of the housing strut 14 with which it may be molded, if desired, or otherwise affixed. On the opposite end of the lever 50, a manually engageable pin or button 54 is mounted pivotally or as a fixed part thereof to extend outwardly of the housing through an aperture in the cover of the housing.

Thus, as the button 54 is pushed, the lever tilts. Its bifurcated end, being in engagement with the spindle collar 22c, moves the spindle, turntable and record axially away from the stylus. This separates the record from the stylus, as shown in FIG. 7. If the stylus was engaged with the record at the inner end of the first track, i.e. in the run-off, run-on groove between the first and second tracks, or with the run-off groove of the second track, the biasing spring 31 will immediately cause the tone arm and switch arm unitarily to move counterclockwise in FIGS. 2 and 5 and to return to normal or outermost position over the outer edge of the record. It will then be in position to engage the run-on groove of the first track when the button 54 is released and the leaf-spring 21 presses the record against the stylus again.

At the same time the tone arm 34 was moved to its outer position, the movable arm 36 of the automatic switch was moved unitarily with it axially and pivotally so that when the manually operated button 54 is released, the switch arm 36 will reengage with and will bridge the fixed contacts 37, 38 of the automatic switch completing the circuit, as shown in FIG. 2 in full lines, to the motor and causing the turntable and record to turn and the first sound effect to be produced.

As the stylus runs off the first or outer track of the record, the motor and turntable are stopped as the finger 36'' of the switch arm of the automatic switch runs into the recess 37r of the contact plate 37.

In order to produce the sound effect from the inner or second track of the record, a second manually operable pin or button 60 and mechanism are provided. This consists of a second manually operable lever 62 of stamped sheet metal or molded synthetic material pivotally mounted at one end on a boss 63 extending outwardly from a front cover or plate 12 of molded synthetic or other suitable material which overlies the sounding board

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18 and is secured to the housing 10 at its marginal edges by screws or otherwise so as to hold the sound board 18 firmly in place at its edges only between the cover plate and the housing, in position for the stylus end to engage it during the record play, as hereinbefore indicated.

The button 60 may be pivotally or frictionally attached to the lever 62 midway along its length and extend outwardly through a hole in the wall of the housing 10 or between guides 60g on said wall. The button is biased outwardly by a spring 65 anchored to the housing wall at one end and acting at its other end against the lever 62 to move it counterclockwise (in FIG. 1).

The free end 61 of the lever 62 is formed to embrace a tongue 72 bent outwardly at one end of an opening 71 stamped in a slidable actuating or cam plate 70. This cam plate and a positioning plate 80, which it moves, are guided by a guide member 90 located over and secured to the cover plate 12 with the cam and positioning plates between the cover 12 and the guide member 90.

The cam plate 70 is channel shaped with the tongue 72 extending up centrally therein. The positioning plate 80 which is rectangular and has a rectangular aperture 82 extending lengthwise from near one end toward the center, lies within and slides on the transverse portion of the channel of the cam plate 70 with the side walls 74 of the channel guiding the movement of the positioning plate.

The tongue 72 extends through the positioning plate aperture 82 permitting relative movement of the latter with respect to the former.

The guide member 90 has a flat plate portion overlying the positioning and cam plates with integral parallel depending guide rails 92 lying outside the walls of the cam plate to guide longitudinal movement thereof. Another pair of parallel guide rails 94 between the cam guide rails 92 is of lesser height than the rails 92 so as to permit passage of the positioning plate 80 between them and the transverse part of the cam plate.

The positioning plate 80 establishes the position of the bent-up end or finger 35 of the tone arm (and hence of the stylus over the record) by abutment of the end 81 of that plate 80 with the finger 35 (see FIG. 1).

In the position shown in FIG. 1, the tone arm finger 35 is in position A wherein the stylus is in the run-on groove of the outer track of the record (see also FIG. 2); or the stylus is over that groove if the button 54 is depressed. At the same time, the automatic switch is positioned in a similar position A' with the long contact bifurcation 36'' engaging fixed contact plate 37 (assuming that the button 54 is no longer depressed). If the power switch is closed, the motor will start and will produce the sound from the outer track of the record. The record and motor will stop when the moving contact 36'' reaches the recess in fixed contact 37, shown in dotted lines in FIG. 2.

If it is then desired to play the inner track of the record, the button 60 is manually depressed. This moves the lever 62 and, by reason of the end 61 embracing the tongue, moves the cam plate 70 lengthwise (downwardly in FIG. 1). Recalling that when the button 54 (for playing the outer record track) was depressed that action itself separated the record from the stylus, a similar action must take place when the inner track button 60 is depressed.

For that purpose, on the underside of the cam plate is a cam rib 76 extending lengthwise of the cam plate along its center line and having a surface 77 at one end inclined to and leading from the inner surface of the cam plate to a flat top surface 78 of the rib. As the cam plate is moved when the button 60 and lever 62 are depressed, the inclined cam surface 77 engages the end of the phonograph spindle over the record and moves the spindle axially along with the record and turntable causing the record to move away from the stylus. For that purpose, a hole 18h is formed in the sound plate 18 for the end of the spindle 22 to extend through adjacent the cam.

As the flat surface 78 of the cam rib rides over the spindle end, it maintains separation of the stylus and

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record. This permits the tone arm bias spring to act, returning the tone arm to outermost position.

To locate the tone arm finger 35 and, thus, the tone arm in position over the run-in groove of the inside track, it is necessary to stop the tone arm from moving all the way to position the stylus over the outer track beginning, or if the tone arm moves that far, then to move it inward to a position over the run-on groove of the inner track. This is done by the positioning plate 80.

Referring to FIG. 1, since the position A shows the location of the tone arm in the run-on groove of the outer track (as represented by the finger 35), position B is the location of the tone arm finger 35 to put the stylus over the run-on groove of the inner track, and the switch arm 36 with bifurcation 36'' over the righthand portion of the fixed contact plate 37.

When the button 60 is depressed and has first moved the cam plate tongue 72 along the slot 82 of the positioning plates 80 (without moving the positioning plate), the cam 76 has caused separation of the stylus and record so that the tone arm finger 35 (if not already against the upper end of the positioning plate 80 as shown in the drawings) will snap into that position under bias of tone arm biasing spring 31.

But as the tongue 72 moves along slot 82, it eventually pushes the positioning plate until it is stopped by stops 85 in position B. Hence, when the button 60 is released, the tongue 72 is moved reversely along positioning-plate slot 82 without at first moving the positioning plate reversely.

To hold the positioning plate against reverse movement by frictional drag of the cam plate, a notch 84 is provided in the side of positioning plate near one end for engagement by a spring detent 86 with a V-bent end adapted to be received in the notch 84. The detent may be affixed at its opposite end to the guide rail 92 of the guide member 90. A similar notch 88 is provided spaced from the notch 84 to hold the positioning plate in position A.

As the return movement of the cam plate proceeds firstly the cam rib 76 moves from engagement with the spindle 22 permitting reengagement of the stylus and record and automatic switch contacts 36'' and 37 by spindle-biasing spring 21. This starts the play of the inner groove. Then tongue 72 engages the opposite end of the slot 82 overcoming the hold of the detent 86 and returning the positioning plate to the positions of FIGS. 1 and 5.

The device is now ready for depression of either the actuating buttons 54 or 60 to select either the outer or inner sound tracks of the record.

From the foregoing, it will be apparent that the invention provides a completely enclosed sound producing mechanism for dolls or toys in which a stylus is normally biased and maintained in engagement with a phonograph record of the type having inner and outer tracks or track areas which are discrete and can be played successively or in any desired order by depressing one or the other of two separate and independent manually operable members or buttons. Also during the selection, the record and stylus are separated in each case by the pressure applied to the button. While the tone arm is normally biased to take a position to be ready to play the outer track area, actuation of the button and its positioning means for playing the inner track overcomes such bias to the extent of locating the stylus over the inner track.

Further, the completion of the play automatically stops the motor and record with the parts ready to be moved to play either of the sound effects without need of any preparatory operations or manipulations in advance of the selecting of the desired sound effect by depression of its button; and on release of the button, the circuit is closed automatically to start the play.

Many modifications within the scope of the invention will occur to those skilled in the art. Therefore, the invention is not limited to the specific form and configuration of parts shown and described.

What is claimed is:

1. In combination with a toy, sound reproducing mechanism completely enclosed therein including a disc record having a plurality of discrete annular track areas at different distances from its center, mechanism including an electric motor and battery to rotate said record, switching means for making and breaking a circuit between said battery and motor, means operable by manual pressure from outside the toy to select at will any track area whose sound effect it is desired to reproduce regardless of the pre-existing position of said sound reproducing mechanism, and means controlled by said selecting means to close said switching means and initiate the playing of the sound effect from any selected track area.

2. A combination as claimed in claim 1 wherein the manually operable means includes separate manually operable elements for each track area, each of which initiates the playing after said selection.

3. A combination as claimed in claim 2 having means to separate said record from the reproducing mechanism during said selection and to reconnect it thereafter concomitantly with initiation of the playing.

4. A combination as claimed in claim 3 wherein the separate manually operable elements cause the separation of the record from the reproducing mechanism.

5. A combination as claimed in claim 1 having means to separate said record from the reproducing mechanism during said selection and to reconnect it thereafter concomitantly with initiation of the playing.

6. The combination as claimed in claim 1 having means to automatically open said switching means on completion of the play of the selected track area.

7. In combination with a toy, sound reproducing mechanism completely enclosed therein including a disc record having a plurality of discrete annular track areas at different distances from its center, means to reproduce the sound effects from any track area including a stylus for tracking both track areas, an electric motor, an electric battery and switching means controlling the current flow between said motor and battery, manual pressure means operable from outside the toy to select and to initiate playing of the sound effect from any track area, means to open said switching means at the end of the track area on completion of the play of that track area with the stylus in contact with the record, said selecting means comprising two separate manually operable elements, means actuated by one of said elements to locate said stylus over and to start the playing of one track area regardless of the previous location of said stylus, and means actuated by the other of said elements to locate said stylus over and start the playing of another track area regardless of the previous location of said stylus.

8. A sound reproducing mechanism comprising a housing, an axially movable rotatable spindle mounted in said housing, a phonograph record having a plurality of discrete annular track areas at different distances from its center mounted on said spindle and movable therewith, a tone arm pivotally mounted in said housing, a stylus mounted on said tone arm engageable at one end with said record, a sound diaphragm mounted on said housing and engaged by the opposite end of said stylus as the stylus tracks the grooves of said record, means to position said stylus for engagement with an inner or an outer track area selectively, and means operable from outside said housing to actuate said positioning means.

9. A sound reproducing mechanism comprising a housing, an axially movable rotatable spindle mounted in said housing, a phonograph record having a plurality of discrete annular track areas at different distances from its center mounted on said spindle and movable therewith, a tone arm pivotally mounted in said housing, a stylus mounted on said tone arm engageable at one end with said record, a sound diaphragm mounted on said housing and engaged by the opposite end of said stylus as the stylus tracks the grooves of said record, means operable from

outside said housing to disengage said stylus and record, and means to position said stylus to play an inner or outer track area selectively on reengagement of said stylus and record.

10. In combination with a toy, sound reproducing mechanism completely enclosed therein, including a disc record having inner and outer discrete annular track areas at different distances from its center, means including a stylus to reproduce the sound effects from any track area, a plurality of manual pressure means operable from outside the toy to select and to initiate playing of the sound effect from any track area, means normally biasing said stylus and record into engagement, means normally biasing said stylus to a position over the outer track area, one of said plural manual pressure means including positioning means to locate said stylus against its bias in position over said inner track area, and cam means separating said stylus and record during said locating action.

11. In combination with a toy, sound reproducing mechanism completely enclosed therein, including a disc record having inner and outer discrete annular track areas at different distances from its center, means including a stylus to reproduce the sound effects from any track area, a plurality of manual pressure means operable from outside the toy to select and to initiate playing of the sound effect from any track area, means normally biasing said stylus and record into engagement, means normally biasing said stylus to a position over the outer track area, one of said plural manual pressure means including a manually operable element, positioning means to locate said stylus against its bias in position over said inner track area, cam means separating said stylus and record during said locating action, and means on said positioning and said cam means interengaging after predetermined movement of said cam means to locate said stylus over said inner track.

12. In combination with a toy, sound reproducing mechanism completely enclosed therein, including a disc record having inner and outer discrete annular track areas at different distances from its center, means including a stylus to reproduce the sound effects from any track area, a plurality of manual pressure means operable from outside the toy to select and to initiate playing of the sound effect from any track area, means normally biasing said stylus and record into engagement, means normally biasing said stylus to a position over the outer track area, one of said plural manual pressure means including a manually operable element, positioning means to locate said stylus against its bias in position over said inner track area, cam means operable by said element to separate said stylus and record, and means on said positioning means and said cam means interengaging after said cam means has caused separation of said stylus and record to locate said stylus over said inner track.

13. In combination with a toy, sound reproducing mechanism completely enclosed therein, including a disc record having inner and outer discrete annular track areas at different distances from its center, means including a tone arm and stylus to reproduce the sound effects from any track area, a plurality of manual pressure means operable from outside the toy to select and to initiate playing of the sound effect from any track area, means normally biasing said stylus and record into engagement, means normally biasing said stylus to a position over the outer track area, movable switching means moving as a unit with said tone arm, fixed switching means engageable by said movable switching means after depression and release of either of said manual pressure means to start rotation of said record and disengageable automatically by said movable switching means as said stylus finishes the play of the sound effect of the selected track area to stop rotation of said record.

14. The combination as claimed in claim 13 having means normally biasing said stylus and record into engagement and said movable contact means toward said fixed contact means, depression of either of said manually

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operable elements overcoming said bias and separating said stylus and record and said fixed and movable contact means.

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