July 25, 1933. J. N. PEPIN 1,919,378

AUTOMATIC SWITCHING DEVICE

Filed May 27, 1929

Fig. 1.

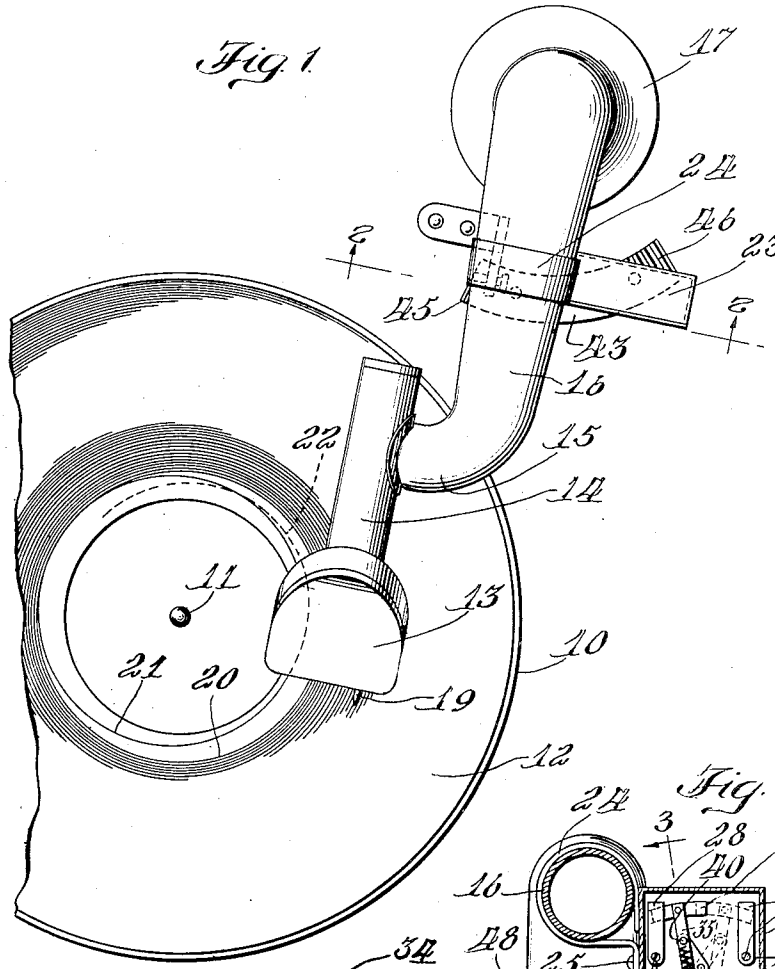


Fig. 2.

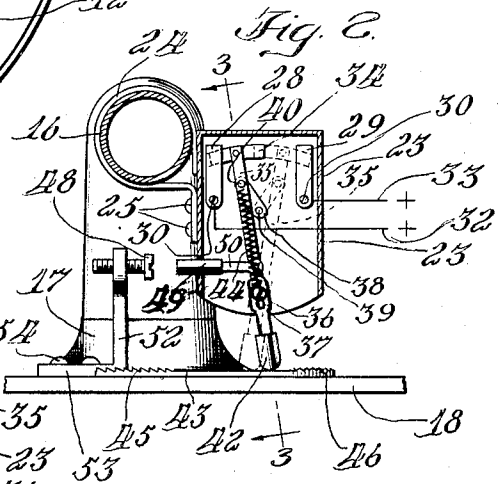
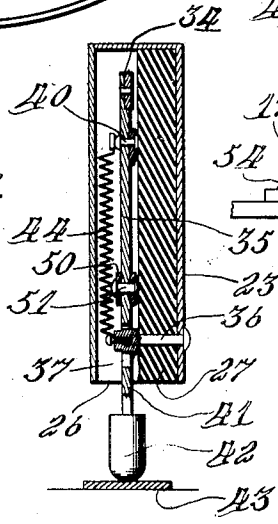


Fig. 3.



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AUTOMATIC SWITCHING DEVICE

Application filed May 27, 1929. Serial No. 366,281.

This invention relates to automatic sound reproducing devices and more particularly to switch control means therefor, although certain features thereof may be employed with equal advantage for other purposes.

It contemplates more especially the provision of novel switching means responsive to a reproducing tone arm for controlling the movements of an automatic sound reproducing device of the type more specifically described and claimed in my copending application Serial Number 366,282, filed May 27, 1929.

Numerous types of devices have heretofore been proposed for automatically controlling the operation of sound reproducing devices and record changing instrumentalities in timed relation therewith. These are, however, intricate in construction, expensive, not entirely dependable, and not automatically responsive to records of various styles now available to the public.

One object of the present invention is to simplify the construction and improve the operation of devices of the character mentioned.

Another object is to provide novel switching means automatically responsive to sound producing records of varied design.

Still another object is the provision of a simple and effective switching device for selectively controlling the power movement of instrumentalities necessary for operation in timed sequence and relation.

A further object is the provision of electrical control means for varied instrumentalities operable in timed individual sequence responsive to sound records of varied design.

A still further object is the provision of simple, dependable and sensitive switching means for controlling the movement of separately operable instrumentalities in timed relation.

Still a further object is the provision of simple and effective means for controlling the independent operation of independent instrumentalities in automatic timed relation.

Other objects and advantages will appear from the following description of an illustrated embodiment of the present invention.

In the drawing:

Figure 1 is a plan view showing one application for a switching device embodying features of the present invention.

Figure 2 is a sectional view taken substantially along line 2—2 of Figure 1.

Figure 3 is a sectional view taken substantially along line 3—3 of Figure 2.

The structure selected for illustration is adapted for connection to a motor for rotating the turntable and controlling the sound reproducing mechanism in timed sequence and relation with instrumentalities for automatically changing the records of an automatic sound reproducing device. As shown, the structure constituting a preferred embodiment of the present invention, comprises a turntable 10 which is fitted with the usual spindle 11 for aligning and retaining a record 12 thereon against the urge of centrifugal force occasioned by the rotary movement of the turntable 10. To this end the turntable 10 is geared to a motor clearly shown and described in the aforesaid copending application which embodies a structure of the type to be hereinafter more particularly described.

A sound box 13, in this instance having thereon an extension 14 communicates with a neck 15 constituting an integral portion of a tone arm 16 of any standard or approved construction. The tone arm 16 terminates in a flanged coupling 17 enabling its oscillatable and vertically movable association with a platform 18 constituting a portion of a cabinet (not shown). The sound box 13 includes the usual needle or stylus 19 which projects therefrom in a manner affording engagement with a standard record 12 disposed upon the turntable 10 for sound reproduction in the usual manner.

In addition to the oscillatable movement of the tone arm 16 for enabling the stylus 19 to traverse the extent of the record groove 20, it has vertical movement for elevation and descent by mechanism which is set in motion when the tone arm 16 encounters a stop or a predetermined motion is imparted thereto depending upon the particular terminus groove 21 or 22, eccentric or spiral, respec-

tively, that is employed on various records now produced for sale to the trade. Thereupon the tone arm 16 is gravitated or otherwise rotated toward the outer circumference of the turntable 10 so that the stylus 19 is returned to its initial position.

During this interim, the record changing mechanism is actuated for operation by either an independent auxiliary motor or by resort to a clutch which constitutes a connector for the turntable or record changing instrumentalities to a continuous single motor drive as commercial practice may dictate. This timed functioning of the reproducing and record changing instrumentalities, is controlled by a switching mechanism embodying features of the instant invention. The switching mechanism is, in the present embodiment, confined in a casing 23 which has a strap 24 secured to a side wall thereof to encircle the tone arm 16 intermediate the extremities thereof for supporting the casing 23 thereon. Fasteners such as the studs 25 detachably secure the strap 24 in position to tightly embrace the tone arm 16 for movement in unison therewith.

The switch casing 23 has an open bottom defined by the lower peripheral edge 26 thereof to enable the insertion of the switch elements therein. An insulator plate 27 is secured to the rear wall of the casing 23 in any suitable manner to sustain electrical contact terminals 28 and 29 secured in spaced position by threaded studs 30. Independent circuit wires 32 and 33 are electrically connected by the studs 30 to the contact terminals 28 and 29, respectively. A switch terminal 34 is secured to the extremity of a bar 35 for movement along an arc in the path of the terminals 28 and 29 to selectively contact with one or the other thereof, thereby independently energizing the electrical circuits which provide power for the sound reproducing or plate changing instrumentalities in timed sequential alternation or relation depending upon the requirements of any particular installation.

In consequence thereof, the terminal switch mounting bar 35 is pivotally supported on a pin 36 carried by the insulator plate 27, there being a slot 37 in the bar 35 to enable the longitudinal movement thereof within the limits defined by the slot 37 for a purpose which will more clearly appear hereinafter. The bar 35 is held in position and its rotary or oscillatory movement limited to insure contacting registry between the terminals 34 and 28 or 29 owing to a link 38. The link 38 is pivotally anchored at one extremity thereof to the plate 27 by means of a pin 39 positioned along a vertical median line above the pin 36. The other extremity of the link 38 is pivotally connected to the bar 35 as at 40 to limit the throw thereof on either side for exact registry and contact with the terminals 28 and 29.

As shown, the switching bar 35 has an extension 41 protruding through the open bottom of the casing 23 to receive a cap 42 on the extremity thereof. The cap 42 is rounded or otherwise shaped to normally contact with a quadrant or sector 43 which is curved to correspond with the circular path of movement of the bar 35 carried by the oscillatable tone arm 16. A coil spring 44 is tensioned between the pins 36 and 40 to normally urge the cap 42 of the bar 35 in frictional engagement or contact with the sector 43 to establish yielding contact therebetween.

The contacting surface of the sector 43 is provided with teeth 45 and 46 or otherwise roughened proximate to the ends thereof to effect the throw of the switch bar 35 from one contact 28 to the other contact 29 or vice versa. This occurs when the sound box 13 has approached the extreme position of its traverse. It will be apparent that movement of the tone arm 16 in a clockwise direction (viewed from Figure 1) incident to the operation of the motor which rotates the turntable 10 so that the stylus 19 follows the record groove 20, will cause the bar 35 to slide over the sector from its full line position (see Figure 2) so that the end cap 42 thereof will contact with the teeth 45. The teeth 45 are inclined in the directional movement thereof to slide thereover without effecting any reverse tendencies upon the bar 35. Any predetermined movement of the tone arm 16 such as a slight reversal or backward movement thereof as occasioned by the traverse of the stylus 19 in the groove eccentric 21, will throw or flip the switch bar 35 to its dotted line position (see Figure 2) for initiating the operation of the record changing instrumentalities. The teeth 46 are inclined oppositely relative to the teeth 45 to effect the return of the switch bar 35 to its full line position (Figure 2) for again initiating the operation of the turntable drive and simultaneously rendering the record changing instrumentalities inactive. This occurs responsive to outward movement of the tone arm 16 to the periphery of the record 12 whereupon a spring or other mechanism swings the tone arm inwardly to engage the record groove 20. The slight inward pivotal movement of the tone arm 16 is sufficient to throw the switch bar 35 for the purpose set forth, thereby automatically controlling independently operable instrumentalities in timed sequence and relation.

Now, then, certain standard records 12 have the tone groove 20 impressed on the surface thereof for termination in a spiral 22 rather than an eccentric 21, and as a consequence the tone arm 16 would not have any reverse movement of the type necessary to throw the switch bar 35 when the stylus 19 has traversed the

entire extent of the record groove 20 in the manner described hereinabove. So that the switch bar 35 may be operative with records 12 of this last named construction, a stop 48 is positioned in the path of a lug 49 carried by a bracket 50. The bracket 50 is fixed to the switch bar 35 by a rivet or other fastener 51 to project transversely thereof for engagement with the stop 48 to throw the switch bar 35.

This occurs when the stylus 19 rides in the spiral groove 22 after the record 12 has been reproduced incident to the traverse of the stylus 19 for the entire extent of the tone groove 20. As shown, the stop 48 is in threaded engagement with an upstanding bracket 52 which has an angular arm 53 riveted or otherwise secured to the platform 18 by means of fasteners 54, thereby enabling adjustment of the stop 48 to effect the throw of the switch 34 at any predetermined position of the stylus 19. Slight reverse movement of the tone arm 16 at any point intermediate the ends of the tone groove 20 due to any break or imperfection therein will throw the switch bar 35 to change the record in the usual manner.

Various changes may be made in the embodiment of the invention herein specifically described without departing from or sacrificing any of the advantages thereof as defined in the appending claims.

I claim:

1. In a phonograph mechanism, the combination with an electric control circuit therefor, a rotatable support adapted to receive sound records thereon, a sound box mounted for oscillatory movement in operative connection with said record, an electric switching device for said circuit, and means for actuating said switching device responsive to a change in directional movement of said sound box in any position thereof over predetermined areas adjacent the center and periphery of said record.

2. In a phonograph, the combination with a plurality of electric circuits for affecting the actuation of independent mechanisms for said phonograph, of a rotatable support adapted to receive a sound record thereon, an oscillatable sound box adapted to engage with said record, a switching device for selectively and alternately making and breaking said circuits, and means for automatically controlling said switching device responsive to a change in directional movement of said member irrespective of the position thereof over predetermined areas adjacent the center of the record in respect to one of said circuits and the periphery of said record in respect to the other of said circuits.

3. In a phonograph, the combination with a source of electric energy, and a plurality of electric circuits, of an oscillatable member, a switching device for alternately connecting said source to one or the other of said circuits, frictional means responsive to a change in directional movement of said member for automatically actuating said switching means irrespective of the position of said member over a predetermined area, and additional means for actuating said switching means responsive to a predetermined position of said member when no change in directional movement is imparted thereto.

4. In a phonograph mechanism, the combination with an electric control circuit therefor, of an oscillatable member, a switching device in said circuit operatively associated with said member, a sector confronting said switching device, and a switch actuator in engagement with said sector to affect the movement of said actuator responsive to a change in directional movement of said member for controlling said mechanism through the electric circuit therefor.

5. In a phonograph mechanism, the combination with an electric control circuit therefor, of an oscillatable member, a switching device in said circuit operatively associated with said member, a sector confronting said switching device in all positions of said member, a switch actuator in engagement with said sector, and means for establishing a resilient contact between said actuator and sector to affect a throw of said switching device responsive to a change in directional movement of said member, whereby said phonograph mechanism will be controlled through the making and breaking of said circuit.

6. In a phonograph mechanism, the combination with electric control circuits therefor, of an oscillatable member, an electric switch in said circuit, spaced terminals for connection to the different circuits, a movable terminal for contact with one or the other of said spaced terminals to connect an electric source of power with one or the other of said circuits, and means operatively connected to said movable terminal to affect the movement thereof responsive to a change in directional movement of said member.

7. In a phonograph mechanism, the combination with electric control circuits therefor, of an electric switch, spaced stationary terminals connected with said circuits, a pivoted member constituting the third terminal arranged to contact with one or the other of said spaced terminals, and a toothed sector adapted to be engaged by said member to affect the movement thereof for alternately making and breaking said circuits responsive to a change in directional movement between said member and sector.

8. In a phonograph mechanism, the combination with a turntable for receiving a sound record thereon, of a pivotally mounted tone arm having a reproducer adapted to engage with the sound grooves of said record, an elec-

tric circuit for controlling said mechanism, a switching device in said circuit operatively connected with said arm, a friction plate, means connected with said switching device for engagement with said plate for controlling the circuit upon a change in directional movement by said tone arm upon the reproducer reaching the end of the sound grooves in said record, and a stop associated with said plate in the path of movement of said means for actuating said switch upon said reproducer reaching a predetermined position with respect to said record.

9. In a phonograph mechanism, the combination with a plurality of electric control circuits therefor, of a sound record, a pivoted tone arm, a reproducer on said tone arm for engaging with the sound grooves of said record, a switching device for alternately opening and closing said circuits, a friction plate, and a member for alternately making and breaking said circuits connected with said tone arm and in engagement with said plate, said member being actuably responsive to a change in movement of the tone arm upon the reproducer reaching the end of the record grooves and reversible with respect to said circuits upon a change in directional movement of the tone arm when the reproducer reaches a position adjacent the periphery of said record.

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