Feb. 25, 1941. B. E. MILLS 2,232,925

PERIODIC ACTUATING DEVICE FOR ELECTRICALLY OPERATED PHONOGRAPHS OR THE LIKE

Filed Aug. 19, 1936 3 Sheets-Sheet 1

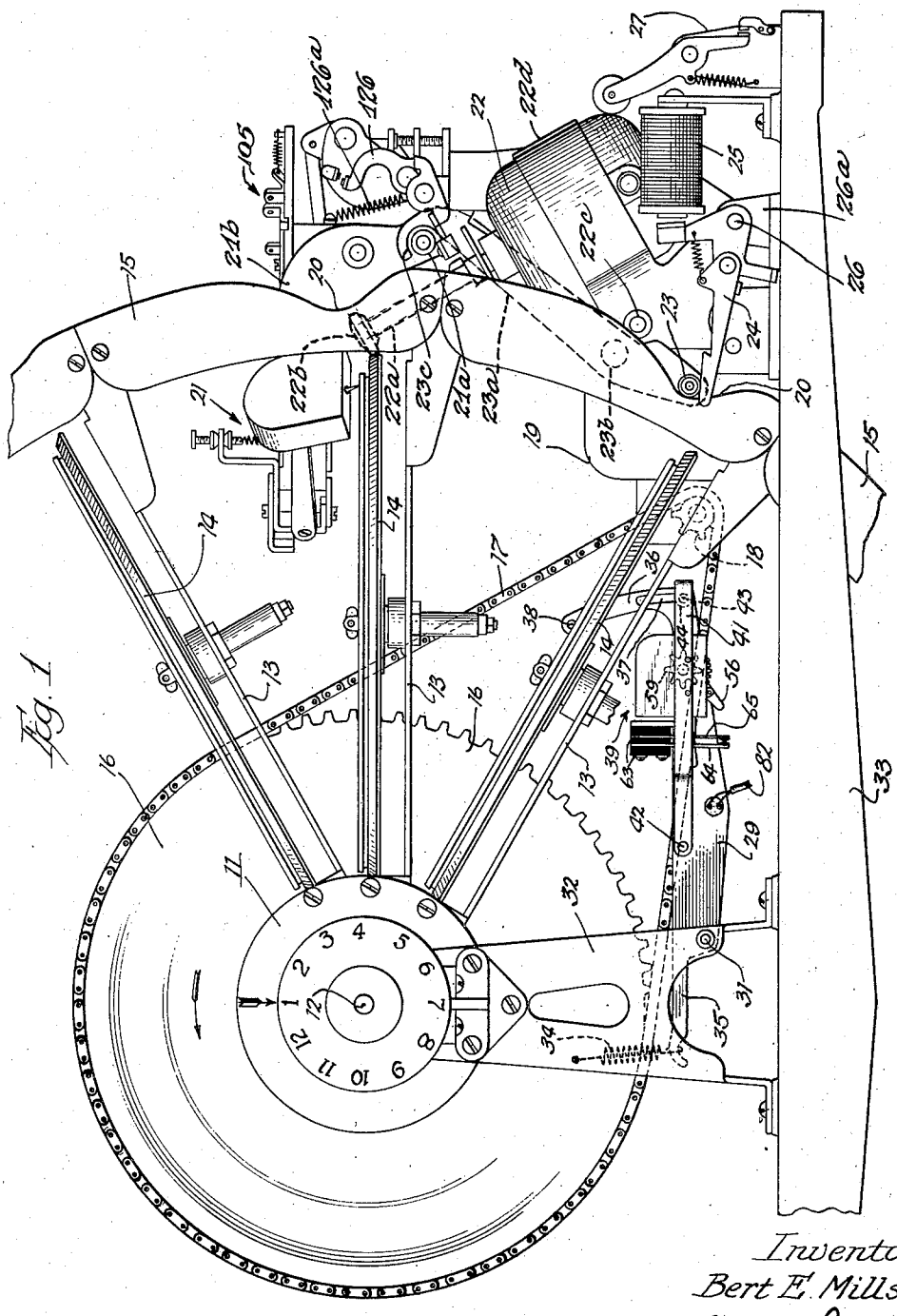


Fig. 1

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Filed Aug. 19, 1936 3 Sheets-Sheet 2

Fig. 2

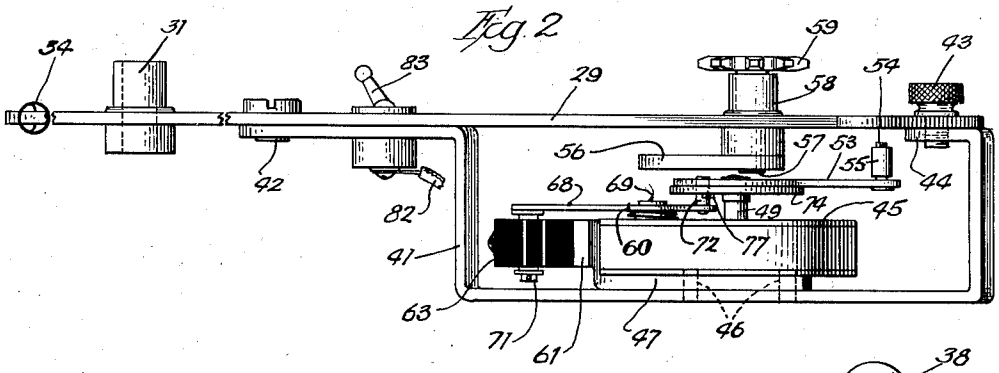


Fig. 3

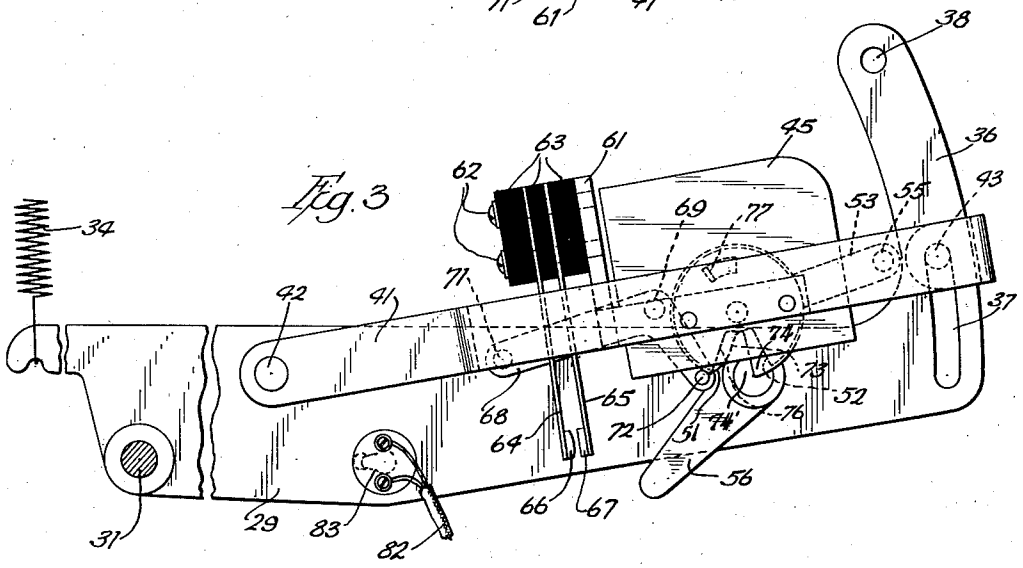
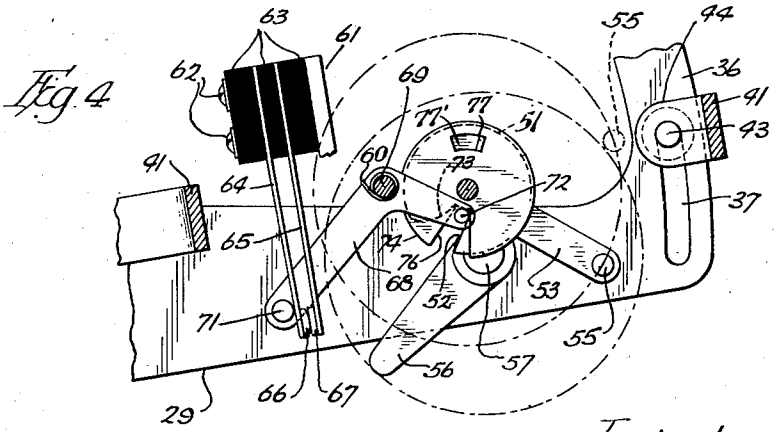


Fig. 4



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Filed Aug. 19, 1936 3 Sheets-Sheet 3

Fig. 5

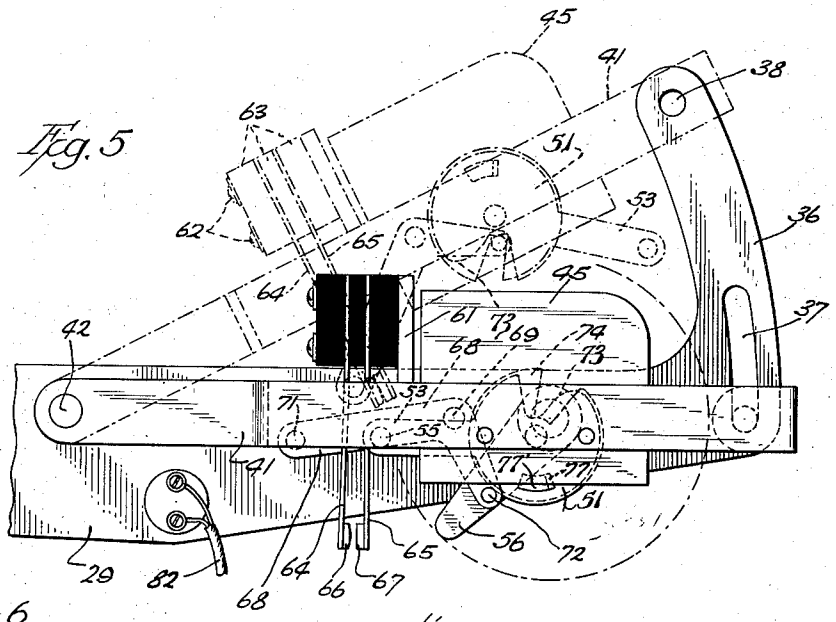
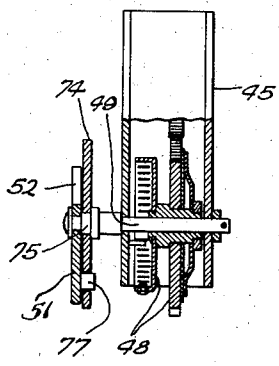


Fig. 6



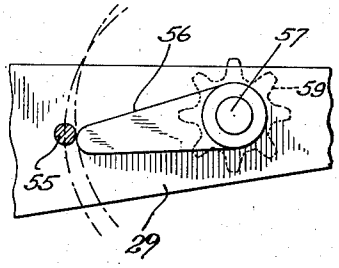
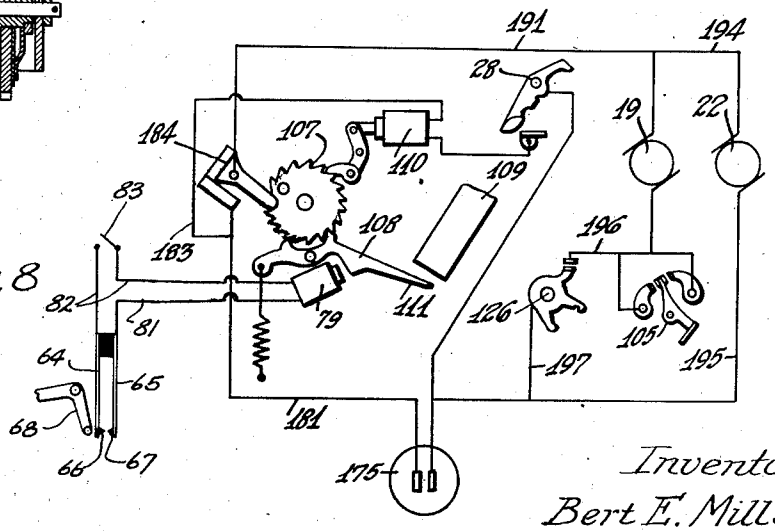


Fig. 7

Fig. 8



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Patented Feb. 25, 1941 2,232,925

UNITED STATES PATENT OFFICE

2,232,925

PERIODIC ACTUATING DEVICE FOR ELECTRICALLY OPERATED PHONOGRAPHS OR THE LIKE

Bert E. Mills, Oak Park, Ill., assignor to Mills Novelty Company, Chicago, Ill., a corporation of Illinois

Application August 19, 1936, Serial No. 96,713

6 Claims. (Cl. 194—15)

This invention relates to electrically operated phonographs or like machines, and has for its primary object the provision in such an apparatus of a periodic actuating device whereby the machine may be caused to operate automatically after a predetermined time has elapsed since a former operation thereof.

Machines of this character are frequently located in restaurants and other public places and are usually coin-controlled, being adapted to be played whenever a customer inserts a coin either through a coin slide upon the instrument or a wall-box or other coin-receiving device suitably located in the room.

In case the machine is not played for a considerable period of time customers may not be aware of its presence, or it may not occur to them to play it, although they might desire to do so if reminded of it by hearing a record played. The device of my invention serves to cause automatic operation of the instrument at certain times even though a coin has not been inserted, thus stimulating use of the machine through the power of suggestion.

Detailed objects and advantages of the invention will be apparent from the following description taken in connection with the accompanying drawings, wherein I have disclosed the preferred form in which I have thus far contemplated applying the principles of the invention.

Referring to the drawings:

Fig. 1 is an elevational view of a portion of a phonograph apparatus to which the device of my invention is applied;

Fig. 2 is a top plan view of the device;

Fig. 3 is a side elevation thereof;

Fig. 4 is a view from the same angle as Fig. 3, but with certain parts broken away for convenience in illustration and with the operating mechanism shown in a different position;

Fig. 5 is a view corresponding to Fig. 3 but with the parts in still further operating positions, said view also illustrating in dotted lines the inoperative position of the device;

Fig. 6 is a detailed sectional view of the clock mechanism and the control cam associated therewith;

Fig. 7 is a detailed view of the clock winding member in relation to the clock member actuated thereby; and

Fig. 8 is a schematic view of the clock-controlled switch and a wiring diagram showing the relation of the manually operable switch to be hereinafter described.

The portion of the phonograph shown in Fig. 1 comprises a record carrier including a hub 11 mounted on a shaft 12 and having record supporting members 13 radiating therefrom, said members rotatably supporting record tables 14 and being connected at their outer ends with a ring 15 extending around the entire record carrier, the structure being thus in the general form of a ferris wheel. A relatively large sprocket 16 is mounted on the shaft 12 and is driven by means of a chain 17 taking over a small sprocket 18 driven from a motor 19 positioned in the frame.

The playing mechanism includes the record table 14, a tone arm and pick-up device, generally indicated at 21, adapted to be brought into place automatically when a record is presented at the playing station shown at the center in Fig. 1, and to be removed upon completion of playing of a record, and a record drive mechanism including a motor 22, a drive shaft 22*a*, and a drive wheel 22*b* on the end of the shaft 22*a*, engageable with the edge of the record table 14 at the playing station.

The motor 22 is pivoted at 26 to a bracket 26*a* mounted on the frame member 33, and tends to move by gravity toward the record carrier. It is moved to inoperative position by the cam 20 formed by the outer edge of the ring 15, engaging a roller 23 mounted on a lever 23*a* pivoted at 23*b*, the lever 23*a* in turn engaging a roller 22*c* on the motor bracket 22*d*, so that as the cam 20 moves the roller 23 outwardly, the motor 22 will swing away from the record table 14.

Simultaneously, the hooked upper end 23*c* of the lever 23*a* will engage a roller 21*a* on the tone arm bracket 21*b*, causing the tone arm assembly 21 to swing upwardly away from the record.

The record drive motor 22 is arranged in the main circuit of the electrical system, so as to run continuously until the main circuit is opened by a suitable multiple coin control, adapted to cause continued operation of the phonograph through a number of playing cycles corresponding to the number of coins that have been deposited.

The complete electrical system is illustrated in my prior Patent No. 1,911,707, to which reference is made for further understanding of the phonograph mechanism generally illustrated in Fig. 1.

In Fig. 8 of the present disclosure, only those portions of the electrical system which are deemed necessary to a full description of the present invention are included. The main circuit, beginning with a plug 175 connected to a source of electrical energy, includes the wires 181 and 183, the coin-controlled master switch 184, the wires 191 and 194, the record drive motor 22, and the wire 195.

The multiple coin mechanism is disclosed in detail in my prior Patent No. 1,864,144, dated June 21, 1932. It includes a ratchet device 107, adapted in an initial position to hold the master

switch 184 open, and to be ratcheted one step away from this position for each coin deposited, by a pawl 108 acted upon by coins delivered from coin chute 109. The switch 184 may correspond to the switch 24, 27, 51 in said Patent No. 1,864,144, and the ratchet 107, pawl 108 and coin chute 109 may be constructed and arranged to operate in manner similar to their counterparts 10, 38 and 18 in said patent.

A cut-off switch 28 is closed each time the tone arm is moved to inoperative position, said switch 28 serving to energize a solenoid 110 which moves the ratchet one step toward switch opening position for each cycle of playing operation. Said cut-off switch and the operating elements therefor may correspond to the switch 101, 102, and operating elements 96 and 99 shown in Figs. 4, 5, 6, and 7 of said Patent No. 1,911,707.

The record-changing motor 19 is stopped and started for each cycle of operation. Accordingly, while it is included in the main circuit, in parallel with the motor 22, it is individually controlled by two switches 105 and 126. The latter, which may be termed the running switch, is closed from the time the tone arm is partially lifted from the record in the initial stage of record changing, until the tone arm is again approaching the record near the end of the record changing operation. The switch 126 is controlled by the upper end of the tone arm control lever 23*a* (see Fig. 1) being urged to closed position by a spring 126*a*, and allowed to close when the upper end of lever 23*a* moves forwardly in the tone arm lifting operation. It is opened by the return of the lever 23*a* to its inoperative position shown in Fig. 1.

The switch 105 serves to close the circuit to motor 19 at the completion of the playing of a record, it being so associated with the tone arm as to be closed when the pick-up 21 moves onto the idling groove at the end of the playing groove of the record. The record carrier will then commence to rotate and will move the lever 23*a* to a position to close the switch 126, which maintains the circuit closed while the switch 105 opens with the moving of the tone arm to an inoperative position. Since the tone arm will not again reach the extended position in which switch 105 closes until the end of the next playing operation, the circuit is opened as the tone arm moves into position for playing the next record, and the carrier will accordingly stop with the next record table positioned at the playing station. Said switch 105 may correspond to the switch similarly numbered in said Patent No. 1,911,707, and may be connected and operated in substantially the manner therein shown.

When records have been played for all coins deposited, the main circuit will be opened as hereinbefore described. This breaking of the main circuit takes place when the record carrier is intermediate two playing positions, and the tone arm is in a raised inoperative position. To this end, the cut-out switch 28 is also associated with the tone arm, and is operated as the tone arm is raised to inoperative position.

The present invention becomes operative only when the phonograph has been inactive for an extended interval of time, and is operative to actuate the record changing and playing mechanism while the coin control remains inoperative—i. e., when the coin receiving arm 111 of the member 108 remains unengaged by a coin. To this end, the device of my invention provides an auxiliary switch 64, 65, connected by means of wires 81, 82 to a solenoid 79, adapted to move the ratchet 107 one step away from switch opening position, the same as if the ratchet had been operated by a coin, and thereby cause the master switch to be closed.

Said device is supported upon a bracket 29 which is pivoted at 31 to an upright 32 on the frame 33 of the machine, and is yieldingly held in the position shown in Fig. 1 by means of a spring 34 secured at one end to a hooked extension 35 on the bracket 29 and at the other end to the upright 32. The opposite end of said bracket 29 has a vertical portion 36 which is slotted, as indicated at 37, and has an aperture 38 at the upper end thereof.

The clock mechanism, generally indicated at 39, is mounted upon a metal strap 41 which is pivoted at 42 to the member 29 and is adapted to be adjustably secured at its opposite end to the arm 36 by means of a thumb screw 43 extending through the slot 37 in said arm 36 and through a return portion 44 on the end of the strap 41 opposite the end which is pivoted to the member 29. The portion of the strap 41 which supports the clock mechanism and associated parts is of U-shaped formation, as shown clearly in Fig. 2. The clock mechanism is contained in a housing 45 which is secured to said strap by means of screws 46 which also secure in place a plate 47 interposed between said housing 45 and strap 41. The clock mechanism contained in said housing may be of standard form, being diagrammatically shown at 48 in Fig. 6. Said mechanism includes a shaft 49 protruding from the front of said housing 45 and carrying at its outer end a disc 51, which is notched as indicated at 52, and has an arm 53 projecting therefrom, the outer end of said arm having a pin 54 projecting laterally therefrom and a roller 55 being mounted on said pin.

For purposes of winding the clock mechanism, I provide an arm 56 mounted on the inner end of a shaft 57 extending through a bearing 58 in the bracket 29, and carrying at its outer end a sprocket 59 which is normally in mesh with the driving chain 17 of the record carrier rotating mechanism. Upon actuation of said arm 56, which occurs upon each operation of the record changer, said arm engages the roller 55 and moves the arm 53 in counterclockwise direction, as the clock mechanism is shown in the drawings, until said arm 56 passes beneath said roller 55, as shown in Fig. 7 of the drawings. This will rotate the shaft 49, which is offset from the shaft 57 and wind the clock, the extent of winding upon a particular operation being governed by the adjustment of the strap 41 carrying the clock mechanism in relation to the bracket 29 upon which said arm 56 is mounted, this adjustment being effected by means of the screw 43 in slot 37. Obviously the arm 53 will be carried further away from its intial position when the screw 43 is in a lower position than when it is in a higher position on the arm 36, and said arm adjacent said slot 37 may be graduated, if desired, to indicate different positions corresponding to the time which it is desired to have the clock mechanism operate before unwinding, which of course is proportional to the winding of said mechanism.

The plate 47 has an extension 61 extending upwardly and at right angles to the portion of said plate attached to the strap 41 (see Figs. 3 and 5) and attached to said plate by means of screws 62 and insulation 63 are two switch arms 64, 65

having contacts 66 and 67, respectively, at their lower ends. Said arms 64, 65 are made of spring material so that the switch is self-opening, the normal position of said members being shown in Figs. 3 and 5.

A switch closing member 68 is pivoted at 69 on the casing 45 of the clock mechanism and is of bell-crank formation, having a roller 71 on the outer end of one arm thereof and a pin 72 on the end of the other arm. Said bell-crank member 68 is normally urged in counterclockwise direction, viewing Figs. 3 to 5, inclusive, by means of a spring 60 positioned on the pivot 69. The pin 72 thus bears upon the periphery of the disc 51 and is adapted to drop into the notch 52 when said disc is in position to permit this to occur. The roller 71 on the other arm of said bell-crank member is adapted to bear against the switch arm 64 to close the switch when said pin 72 is in said notch 52, as shown in Fig. 4 of the drawings.

When the clock mechanism is wound by action of the arm 56 on the roller 55 carried by the arm 53 on said disc 51, which is rigid with the shaft 49, said pin 72 rides out of said notch 52 upon a rounded surface 73 on one side of said notch, and it will be evident that the distance the disc 51 is rotated will depend upon the adjusted position of the strap 41. The paths of movement of the outer end of the member 56 and the roller 55 on the member 53 are shown in dotted lines in Figs. 4 and 7, from which it will be evident that when the roller 55 has been moved to the dotted line position shown in Fig. 4 (or, in case of a different adjustment, to the position shown in Fig. 7), the member 56 will pass inside said roller, thus allowing the clock mechanism to begin to unwind, the disc 51 moving therewith back to its original position. When it reaches said position, the pin 72 on the member 68 will drop into said recess, permitting said member 68 to be rotated in counterclockwise direction by the spring on the pivot 69, thereby closing the switch, as shown in Fig. 4.

For the purpose of causing a sudden snap action in the closing of the switch, I provide an inner disc 74 freely mounted on a collar 75 on the shaft 49 and having a notch 74' corresponding to the notch 52 in the disc 51 but having two straight side walls 76 instead of having one of said walls rounded as in the case of the cam portion 73 on said member 51. Said disc 74 has limited movement relative to the disc 51, which has a lug 77 projecting therefrom into a slot 77' in the disc 74, the length of said slot determining the extent of relative movement of said discs. When the clock mechanism is wound, the pin 72 rides on the cam surface 73 of the disc 51, the member 74 being readily moved in clockwise direction, viewing Fig. 4, relative to said disc 51 so that it will not interfere with the gradual rise of the pin 72 out of the recess 52 in said disc 51. Upon the return of said discs toward the position of Fig. 4, however, the pressure between the pin 72 and the periphery of the disc 74 will hold the latter back so far as permitted by the stop 77 so that said members 51 and 74 will assume the relationship shown in Fig. 4. When the pin 72 reaches the edge of the recess in the member 74 it will then drop into said recess and into the aligned recess 52 in the member 51 with a sudden snap action, thus closing the switch contacts 66, 67 quickly. This causes the circuit controller including the member 107 previously mentioned to operate, thereby closing the playing circuit, causing the record carrier to move the record into playing position and causing the playing of such record, the movement of the record carrier causing a further actuation of the arm 56 by reason of the intermeshing relationship between chain 17 and the sprocket 59, thus rewinding the clock mechanism.

The wire 82 includes a manual switch 83, a mechanical embodiment of which is shown in Figs. 2 and 3. By means of this manual switch, the circuit may be opened, if desired, so that operation of the mechanism hereinbefore described will have no effect upon the playing circuit. Furthermore, if it is not desired to use the device, the clock mechanism and associated parts, including the arm 53, may be moved out of the sphere of action of the member 56 by lifting the strap 41 to the position shown in dotted lines in Fig. 5, in which position the thumb screw 43 may be inserted through the aperture 38 in the bracket 29 and screwed into the threaded return portion 44 of said strap 41, in manner which will be evident from viewing said Fig. 5.

The operation of the device, it is believed, will be apparent from the foregoing description, but may be briefly summarized as follows:

With the clock mechanism in position for operation and adjusted to provide a desired time interval between the winding of the clock and the closing of the switch 66, 67 to cause an automatic playing of the machine, the first rotation of the record carrier will wind said clock mechanism to the extent permitted by the adjustment. If there is no playing of the machine for the interval of time for which the clock mechanism is set, it will be caused to play automatically when the clock mechanism unwinds to the point of permitting the pin 72 to drop into the recess 52 in the disc 51. The movement of the record carrier incident to the positioning of said record will immediately rewind the clock. If a coin should be inserted to play the machine before the clock mechanism again unwinds, the latter will be rewound by the action of the member 56 on the roller 55 carried by the arm 53, so that the automatic playing of the instrument is caused only when the full period of time for which the clock is set elapses without an intervening play initiated by insertion of a coin by a customer. The relationship of the members 51 and 74 is such that the closing of the switch occurs with a quick snap action, as previously described, but the pin 72 on the switch closing member 68 may be gradually moved out of the notch 52 in said member 51 by reason of the rounded side 73 of said notch 52 and the loose mounting of the member 74 in relation to the disc 51. The circuit in which the switch 66, 67 is located may be broken by means of the manual switch 83, or the device may be moved to inactive position by the adjustment illustrated in dotted lines in Fig. 5, but, so long as the device remains in its active position, the machine will be operated periodically in the absence of an intervening play which will rewind the clock mechanism.

It will be evident that the switch 64, 65 is operated only at the end of the period for which the clock mechanism is set, since it is only at the end of such period that the pin 72 on the bell crank 68 can enter the notches 52 and 74' on the discs 51 and 74, respectively. This period will be normally much longer than the period required for the playing of a record, and, as previously indicated, when the record carrier is operated to change records either upon insertion of a new coin or as a result of the previous insertion of a plurality of coins, the clock mechanism will be rewound to the full extent permitted by the ad-

justment of the parts 41 and 36, which determines the relationship between the winding member 56 and the roller 55 on the arm 53. As a result, the switch 64, 65 will be permitted to close only at the end of a predetermined period of time after completion of the playing of a record or a series of records for which a coin or coins have been inserted in the machine.

The foregoing detailed description has been given for clearness of understanding only, and no unnecessary limitations should be understood therefrom, but the appended claims should be construed as broadly as permissible in view of the prior art.

What I regard as new and desire to secure by Letters Patent is:

1. In a coin-controlled automatic record changing phonograph including record changing and playing mechanisms and a coin-operated control for normally causing operation of said mechanisms: means for periodically causing actuation of said control to operate said mechanisms when the control has not been actuated by a coin for an extended interval, said means comprising a timing device, means actuated by a part of one of said mechanisms during each cycle of operation thereof responsive to the deposit of a coin for initiating action of said timing device in a timing period enduring beyond the completion of said cycle of operation and into an interval thereafter when said mechanisms may be at rest, and means arranged to be actuated through the action of said timing device at the end of said period and operatively connected to said control for causing actuation of the latter to start a new cycle of operation of said mechanisms notwithstanding that said control is not operated by means of a coin.

2. In a coin-controlled automatic record changing phonograph comprising record changing and playing mechanisms and electrical means including a power circuit and a coin-operated circuit controller for normally causing operation of said mechanisms: means for periodically causing operation of said playing mechanism when the circuit controller has not been actuated by a coin, said means including a timing device, means operated by a part of one of said mechanisms for causing said device to start running during a cycle of operation of said mechanisms responsive to the deposit of a coin, and means controlled by said timing device and operatively connected to said control, said means being operable after an extended interval subsequent to the termination of operation of the playing mechanism and without actuation of said circuit controller by a coin for causing the closing of said circuit to start a new operation of the playing mechanism.

3. In a coin-controlled automatic record changing phonograph comprising record changing and playing mechanisms and electrical means including a power circuit and a coin-operated circuit controller for normally causing operation of said mechanisms: means for periodically causing operation of said playing mechanism when the circuit controller has not been actuated by a coin, said means including a timing device, means operated by a part of one of said mechanisms for causing said device to start running during a cycle of operation of said mechanisms responsive to the deposit of a coin, means controlled by said timing device and operatively connected to said control, said means being operable after an extended interval subsequent to the termination of operation of the playing mechanism and without actuation of said circuit controller by a coin for causing the closing of said circuit to start a new operation of the playing mechanism, and means whereby said timing device may be adjusted to vary the timing period.

4. In a coin-controlled automatic record changing phonograph comprising record changing and playing mechanisms and electrical means including a power circuit and a coin-operated circuit controller for normally actuating said mechanisms: auxiliary means operable without actuation of said circuit controller by a coin for causing operation of said controller to close said circuit and thereby start a new cycle of operation of said mechanisms after they have been at rest for an extended interval following the completing of a cycle of operation initiated by the deposit of a coin, said means including a spring-motored timer arranged to be wound by action of one of said mechanisms during each cycle of operation thereof and to thereupon commence unwinding, said timer coacting with said auxiliary circuit-closing means to cause actuation of the latter after said timer has unwound to a predetermined point, thereby determining the extent of the interval of rest aforesaid.

5. In a coin-controlled automatic record changing phonograph comprising a record carrier, a playing mechanism and electrical means including a power circuit and a coin-operated circuit controller for normally actuating said carrier and playing mechanism: auxiliary means operative without actuation of said circuit controller by a coin for causing operation of said controller to close said circuit and thereby start a new cycle of operation of said carrier and playing mechanism after they have been at rest for an extended interval of time following the completion of a cycle of operation initiated by the deposit of a coin, said means including a timing device and means actuated by said carrier during each cycle of operation for initiating action of said device, said timing device coacting with said auxiliary circuit-closing means to cause actuation of the latter after such device has been operating for a predetermined time, thereby determining the extent of the interval of rest aforesaid.

6. In a coin-controlled automatic record changing phonograph comprising a record carrier, playing mechanism and electrical means including a power circuit and a coin-operated circuit controller for normally causing operation of said carrier and playing mechanism: auxiliary means for periodically operating said controller to close said circuit and thereby cause actuation of said playing mechanism without actuation of said circuit controller by a coin, said means comprising a timing device, means actuated by the record carrier during each cycle of operation for initiating action of said timing device in a timing period enduring beyond the completion of a period of operation of said playing mechanism following the completion of a cycle of operation initiated by the deposit of a coin and into an interval thereafter when said mechanism may be at rest, and means coacting with said timing device and said auxiliary circuit-closing means for causing the closing of said circuit to actuate the playing mechanism at the end of said timing period, thereby determining the extent of the interval of rest aforesaid.

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