

April 14, 1931.

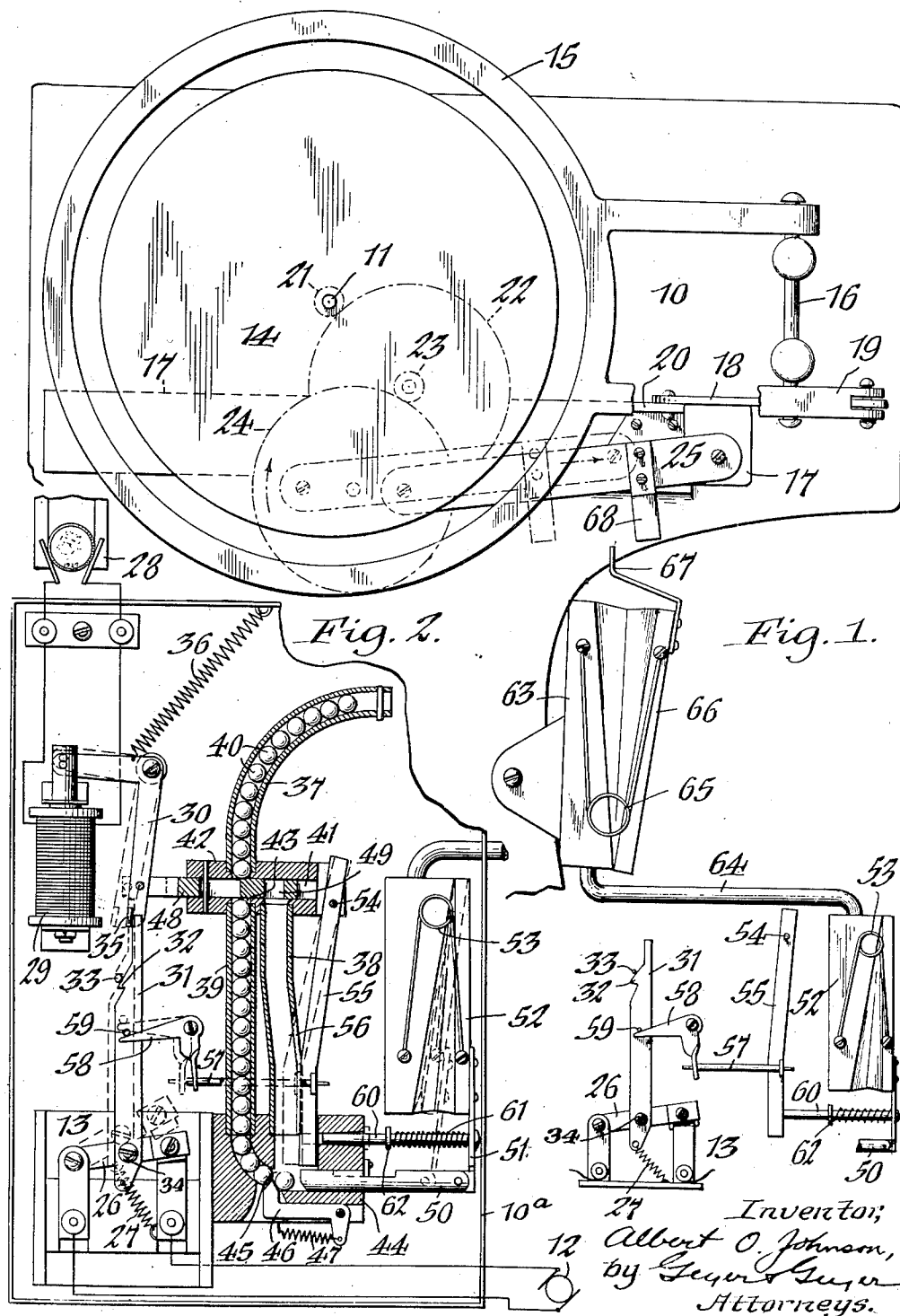
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1,800,537

COIN CONTROLLED ATTACHMENT FOR PHONOGRAPHS

Filed Sept. 17, 1927

2 Sheets-Sheet 1



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Fig. 3.

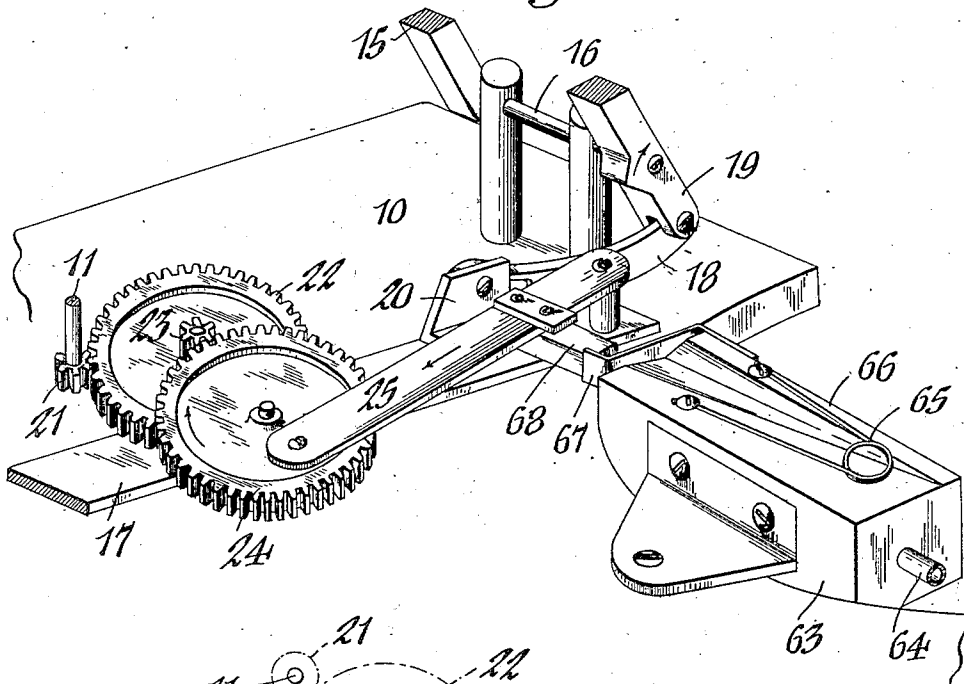
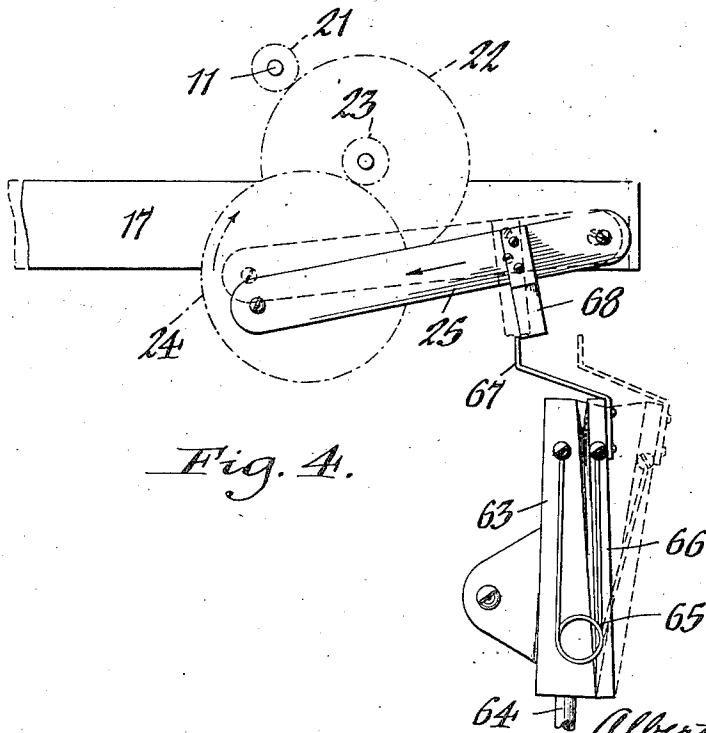


Fig. 4.



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COIN-CONTROLLED ATTACHMENT FOR PHONOGRAPHS

Application filed September 17, 1927. Serial No. 220,276.

This invention relates generally to coin-actuated devices for controlling the operation of musical instruments, but more particularly to a mechanism for controlling the electric switch of an automatic phonograph to cause the instrument to play a record for every proper coin deposited, regardless of whether additional coins are deposited during the playing of the record.

One of its objects is the provision of simple, durable and reliable means actuated by the record-changing mechanism of the instrument for governing the opening of the motor switch.

Another object of the invention is to provide a controlling mechanism of this character which is compact in construction, which is not liable to get out of order, and which can be readily applied to instruments now in use without altering their construction.

In the accompanying drawings:—

Figure 1 is a fragmentary top plan view of an automatic phonograph showing my invention applied thereto, the switch-actuating mechanism being shown diagrammatically.

Figure 2 is a front elevation, partly in section, of one type of coin-controlled switch with which the invention may be practised.

Figure 3 is a perspective view of the switch controlling device and the phonograph parts governing the same. Figure 4 is a top plan view of the device shown in Figure 3, the parts being in a different position.

Similar characters of reference indicate corresponding parts throughout the several views.

The present invention has been particularly designed for use in connection with an automatic phonograph of the type including a record lift-ring which automatically takes a record from a magazine spindle, deposits it on the turntable, and after the record has been played, lifts it from the turntable and discharges it into a drawer, the instrument continuing to operate until all the records on the magazine spindle have been played, at which time it will stop automatically.

In carrying out my invention, I employ a multiple-coin or magazine switch controlling device governed by the automatic lift ring

mechanism of the instrument which insures the playing of as many records as there have been coins deposited, after which the switch is automatically opened and the instrument stopped.

Referring now to the drawings, 10 indicates the base plate of the instrument upon which the automatic record-changing mechanism is mounted, 11 the usual record spindle driven by the electric motor 12 (shown diagrammatically in Figure 2), 13 the motor switch, and 14 the turntable. Movable in a vertically-swinging direction toward and from the turntable is the record lift ring 15 fulcrumed at 16 and actuated by a reciprocating slide plate 17 through the medium of a link 18, pivotally connected at one end to an arm 19 of the lift ring and at its other end to a bracket 20 carried by the slide plate. At predetermined intervals, the latter is moved in one direction or the other to raise or lower the record lift ring by reduction gearing 21, 22, 23 and 24, driven from the spindle 11, the final drive gear 24 being connected by a crank arm 25 with the slide plate. A suitable clutch mechanism (not shown) automatically controls the transmission of motion from the turntable spindle to the gear train, the clutch being engaged during the period of raising and lowering the lift ring and being released during the playing of the records. In effecting the raising or lowering of the lift ring, the gear 24 travels approximately one half a revolution; when lowering the ring to deposit the record in to playing position on the turntable, said gear turns in the direction indicated by the arrow, the crank arm 25 being moved to the right, as indicated by the arrow in Figure 1; when elevating the ring to discharge the record, the gear continues in the same direction and moves the crank arm to the left, as indicated by the arrows in Figures 3 and 4.

At a predetermined point in its movement, the record-changing mechanism, and preferably the crank arm 25 thereof, functions to automatically govern the opening of the motor switch 13. The latter constitutes a part of a multiple-coin control device of any suitable and well known construction, that

shown in the drawings by way of example, consisting of a case 10^a applied to the cabinet of the instrument and containing the switch 13. The lever 26 of this switch has a spring 27 which tends constantly to close it and establish the motor circuit. This lever is released whenever a proper coin is deposited in the chute 28 of the device and to this end a solenoid 29 is employed whose core controls the switch lever through an elbow lever 30 and a catch bar 31 having a nose 32 normally locking with a pin 33 projecting from the rear wall of the case 10^a. This bar is pivoted at 34 to the switch lever and holds it open against the tension of the spring 27 when said nose engages the pin 33, as shown by dotted lines in Figure 2. The spring is attached to the catch bar so that it will tend to swing the latter in the proper direction to cause its nose to snap into engagement with the pin 33 when the bar is raised to open the switch lever. The lower arm of the elbow lever 30 has a lug 35 which trips the catch bar off the pin 33 every time said lever is rocked by the descent of the solenoid core. A spring 36 returns this lever to its normal position, shown by dotted lines in Figure 2.

Circulated through a guide or ball race consisting of the tube-sections 37, 38 and 39 are balls 40, the section 37 being a feed tube or magazine for the balls, the section 38 a controlling tube for the parts which in turn control the motor-switch through the initial action of the record-changing mechanism, and the other section 39 acting as a return tube for the balls and forming a part of the magazine section. The tubes 38, 39 are connected at their upper ends by a horizontal passage 41 formed in a block 42. This block also contains a vertical passage 43 which registers with the opposing ends of the tubes 37, 39. The lower ends of the tubes 38, 39 are connected to a similar block 44 containing a V-shaped passage 45, the vertical branch forming a continuation of the tube 38 and the curved branch leading to the return tube 39. Extending into the path of the balls in the curved branch of the passage 45 is the nose of a vertically-swinging detent 46 which is held in its normal position by a spring 47 and acts to prevent the balls rolling back into the vertical branch of said passage. An ejector or plunger 48 having an opening 49 to receive one of the balls serves to transfer the balls from the magazine-tube 37 to the controlling tube 38 of the ball race. This plunger is connected to the elbow lever 30, so that every time the solenoid 29 is energized by the deposit of a coin, a ball is transferred to the controlling tube on the right hand side of the detent 46. The balls are transferred from the lower end of the controlling tube 38 into the corresponding end of the return tube 39 by a plunger 50 guided in the block 44. In its rearward position, this plunger clears the

vertical branch of the passage 45 and allows a ball to occupy it. On its forward stroke, the plunger pushes the ball past the detent 46 into the curved branch of said passage and raises the column of balls in the return tube a distance equal to the diameter of the balls. Upon the return stroke of the plunger, the nose of the detent returns to its former position and checks the return of the balls into the bottom of the controlling-tube.

The plunger 50 is actuated by an arm 51 carried by the movable board of a pneumatic 52 normally held inflated by a spring 53. When this pneumatic is exhausted or deflated, the plunger is actuated to shift the balls one at a time into the return tube. Pivoted at 54 to the upper plunger-block 42 is a depending lever 55 which is adapted to be swung into the controlling-tube 38 through a slot 56 formed therein. The lower end of this lever terminates just short of the plunger 50 so as to clear the lowermost ball in the controlling tube, but be blocked by any balls which happen to be above that bottom one. This lever is connected by a link 57 with one arm of a bell crank 58, the other arm thereof engaging a pin 59 on the catch bar 31, so that when the lever 55 is swung to the dotted line position shown in Figure 2, it acts to rock the bell crank and raise the catch bar to open the switch 13, as seen by dotted lines in said figure. The movement of the lever 55 is effected by a push rod 60 loosely attached to the arm of the pneumatic 52. A spring 61 applied to this push rod between the arm of the pneumatic and a collar 62 on the rod permits a certain amount of lost motion between said arm and said rod. By this arrangement, the plunger 50 and push rod 60 are simultaneously operated by the pneumatic 52, the push rod only acting on the lever 55 to effect the opening of the switch 13 when there is but one ball in the vertical branch of the V-shaped passage 45, while when there are two or more balls therein, the movement of this lever is temporarily blocked and the switch is unaffected. The spring 61 on the push rod is stiff enough to compel the latter to travel forward with the arm of the pneumatic when there is only one ball in the controlling-tube 38, and yet light enough to yield and allow the arm to slide forward on the rod when the lever is blocked by a plurality of balls.

For every coin deposited in the coin chute 28, a corresponding ball 40 is dropped into the controlling-tube 38 and for every coin so deposited a single record will be played by the instrument, and the latter will continue to play records automatically until but a single ball is left in the controlling-tube, when, at a predetermined time in the actuation of the record-changing mechanism, the switch 13 will be automatically opened and the instrument stopped. The preferred device for effecting the automatic opening

of the switch by the record-changing mechanism is as follows:—

Supported on the base plate 10 adjacent to the crank arm 25 is a vacuum pump or exhaust device consisting of a pneumatic 63 which is connected by a conduit 64 with the switch-opening pneumatic 52. A spring 65 normally holds said pneumatic 63 inflated. At a predetermined point in the travel of the crank arm 25, say for example, during its movement in a direction to raise the record lift ring 15 from its horizontal position to its elevated position, this arm is adapted to act on the pneumatic 63 to cause its temporary collapse and release, and when so released the latter creates a vacuum and causes the collapse of the companion pneumatic 52 to actuate the plunger 50 and associated parts in the manner heretofore described, the switch 13 remaining closed as long as there are balls in the controlling-tube 38 to obstruct the movement of the switch-actuating lever 55. To accomplish this action, the movable board 66 of the pneumatic 63 has a trip arm 67 projecting therefrom which is adapted to be engaged momentarily by a tappet 68 applied to the crank arm and collapse the pneumatic. The path of movement of the crank arm 25 is an oscillating one and on its movement to the right to lower the lift ring 15 and bring the record into playing position, the tappet clears the trip arm, while on its movement to the left to elevate the lift ring to discharge the record the crank arm first moves laterally toward the end of the pneumatic 63 and its tappet catches behind the trip arm, as seen in Figure 3. The continued movement of the crank arm results in this pneumatic being collapsed, as shown by full lines in Figure 4, after which the crank arm recedes from the end of said pneumatic and the tappet is released from the trip arm, allowing the pneumatic to be inflated by its spring 65, as shown by dotted lines in said figure. Upon being so inflated, the resulting vacuum acts to collapse the switch-controlling pneumatic 52, as shown by dotted lines in Figure 2, and if the lever 55 is not blocked by the balls 40, the bell crank 58 will be rocked to raise the catch bar 31 and open the switch 13, thus stopping the motor and the mechanism governed thereby, the lift ring being arrested in its elevated position.

The operation of the device is as follows:—

When the instrument is idle, the motor switch 13 is open, the record lift ring 15 is elevated and the pneumatics 52 and 63 are inflated. Assuming now a single coin of the proper denomination to be deposited in the chute 28 of the device or in a wall box connected with it, the solenoid 29 is energized, actuating the upper ball-plunger 48 which pushes one of the balls in the magazine into the controlling-tube 38, the ball dropping in

front of the lower plunger 50, as seen in Figure 1. Simultaneously with the forward stroke of the upper plunger 48, the elbow lever 30 trips the catch bar 31 out of engagement with the fixed pin 33, letting it and the switch lever descend under the tension of its spring 27, closing the switch and starting the motor of the instrument. In the instant case, the starting of the motor rotates the turntable 14, transmitting motion to the train of gearing 21, 22, 23 and 24 to actuate the crank arm 25 and lower the lift ring 15 to bring a record into playing position, as shown by full lines in Figure 1, after which this gearing is arrested by the release of a clutch (not shown) forming a part of the automatic mechanism of the instrument. When the playing of the record is completed, the clutch is automatically engaged, causing the gear train to again operate and shift the crank arm in the reverse direction to elevate the lift ring and discharge the record, after which it picks up another record from the usual magazine provided on the instrument ready to convey it to playing position. Simultaneously with this movement, the tappet 68 of the crank arm engages the trip arm 67 of the pneumatic 63, temporarily collapsing it, after which it is immediately inflated to momentarily collapse the pneumatic 52 which acts to open the switch 13 in the manner heretofore described.

If five coins are dropped into the controlling device during the playing of the first record, five balls will correspondingly be pushed into the controlling-tube 38. At the end of the playing of each record, except the last of the five paid for, one ball is pushed from that tube into the return tube 39. The balls (other than the lowest) remaining in the controlling-tube act to block the movement of the switch-opening lever 55. The column of balls in the controlling-tube descends a step every time a record is finished playing, but the switch-opening lever continues to be blocked as long as there are two or more balls in said tube. During the playing of the last record of the five paid for, only one ball is left in this tube, that ball being clear of the lower end of the lever 55; and when said last record is finished playing, this lever, being now unlocked, is free to move far enough under the impulse of the push rod 60 to open the switch 13 and stop the instrument.

I claim as my invention:—

1. In a phonograph, the combination of a record-changing mechanism, an electric motor therefor, a coin-controlled switch in the motor circuit, a pneumatic for controlling said switch, and means including a pneumatic controlled by said record-changing mechanism for rendering said first-named pneumatic operative to open said switch.

2. In a phonograph, the combination of a

record-changing mechanism, an electric motor therefor, a coin-controlled switch in the motor circuit, a pneumatic for controlling said switch, and an exhaust device for said pneumatic operated by said record-changing mechanism.

3. In a phonograph, the combination of a record-changing mechanism, an electric motor therefor, a coin-controlled switch in the motor circuit, a pneumatic for controlling said switch, and a second pneumatic connected by a conduit with said switch-controlling pneumatic and operated by said record-changing mechanism to temporarily deflate and expand it, the expansion of the second pneumatic mechanism operating the switch-controlling pneumatic to open the switch.

4. In a phonograph, the combination of a record-changing mechanism, an electric motor therefor, a coin-controlled switch in the motor circuit, a pneumatic for controlling said switch, a second pneumatic connected with said switch-controlling pneumatic and actuating the same upon the collapse of said second pneumatic, and a part on said record-changing mechanism for effecting the collapse of said second pneumatic.

5. An automatic phonograph, comprising a record-changing mechanism, an electric motor therefor, a coin-controlled switch in the motor circuit, a pneumatic for controlling said switch, a second pneumatic connected with said switch-controlling pneumatic and actuating the same upon the collapse of said second pneumatic, a tappet controlled by said record-changing mechanism, and a trip arm on the second pneumatic arranged to be tripped by said tappet at a predetermined point in the movement of the record-changing mechanism to collapse said second pneumatic.

6. In an automatic phonograph, the combination with a record-changing mechanism including a vertically-swinging carrier for moving the records into and out of playing position, a motor and an intermittently movable part actuated by the movement of the carrier, of automatic means rendered operative at a predetermined point in the travel of said movable part for controlling said motor.

7. In an automatic phonograph, the combination of a record-changing mechanism including an intermittently movable part, an electric motor, a switch therefor, and pneumatic means governed by the intermittently movable part of said record-changing mechanism for controlling said switch.

8. In a switch-controlling device for automatic phonographs, the combination with a record lift ring and the crank arm thereof, of a tappet applied to said crank arm, a switch-actuating device, and an exhaust device for operating the latter and controlled by said crank arm, the exhaust device carrying a trip element arranged to be momenta-

rily engaged by said tappet to actuate the exhaust device at a predetermined point in the movement of the crank arm.

9. In a switch-controlling device for automatic phonographs, the combination with a record lift ring and the crank arm thereof, of a tappet applied to said crank arm, a switch-actuating pneumatic, and a second pneumatic connected with and governing said switch-actuating pneumatic, the former carrying a trip element arranged to be engaged by the tappet of the crank arm at a predetermined point in its movement to effect the opening of the switch.

10. In an automatic phonograph having a record-changing mechanism, the combination with a coin-controlled-switch having a pneumatic for controlling its opening movement, of a governing pneumatic operatively connected with and controlling said switch-pneumatic, and means applied to a part of the record-changing mechanism for operating said governing pneumatic at predetermined intervals in the cycle of its operation.

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