

Feb. 1, 1944.

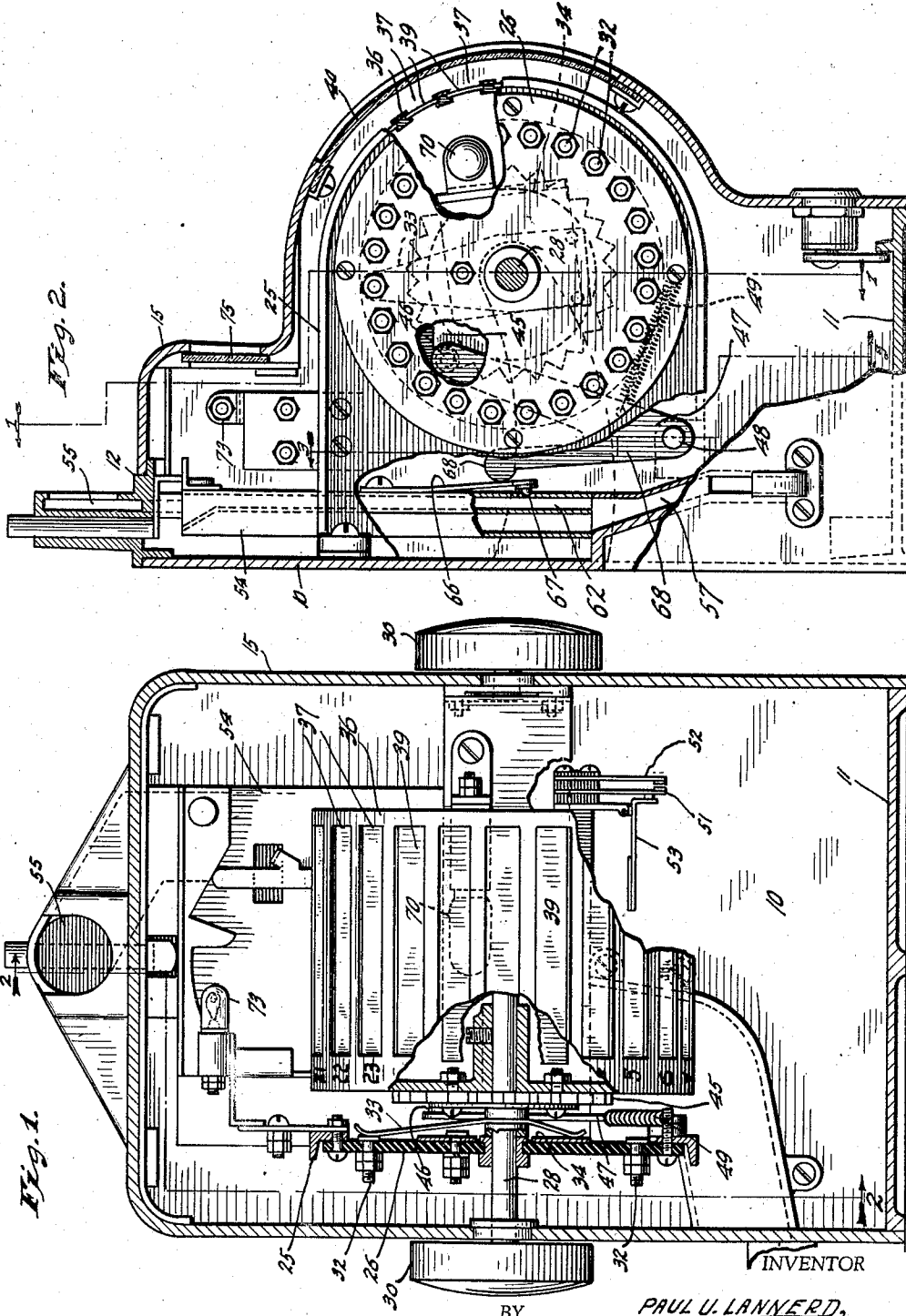
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2,340,478

COIN CONTROLLED SWITCH

Original Filed Nov. 12, 1940

2 Sheets-Sheet 1



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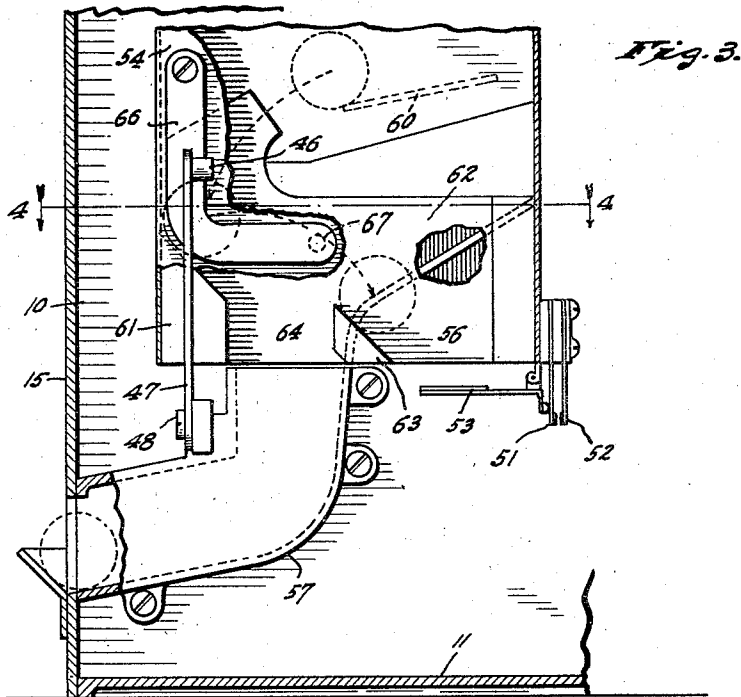


Fig. 3.

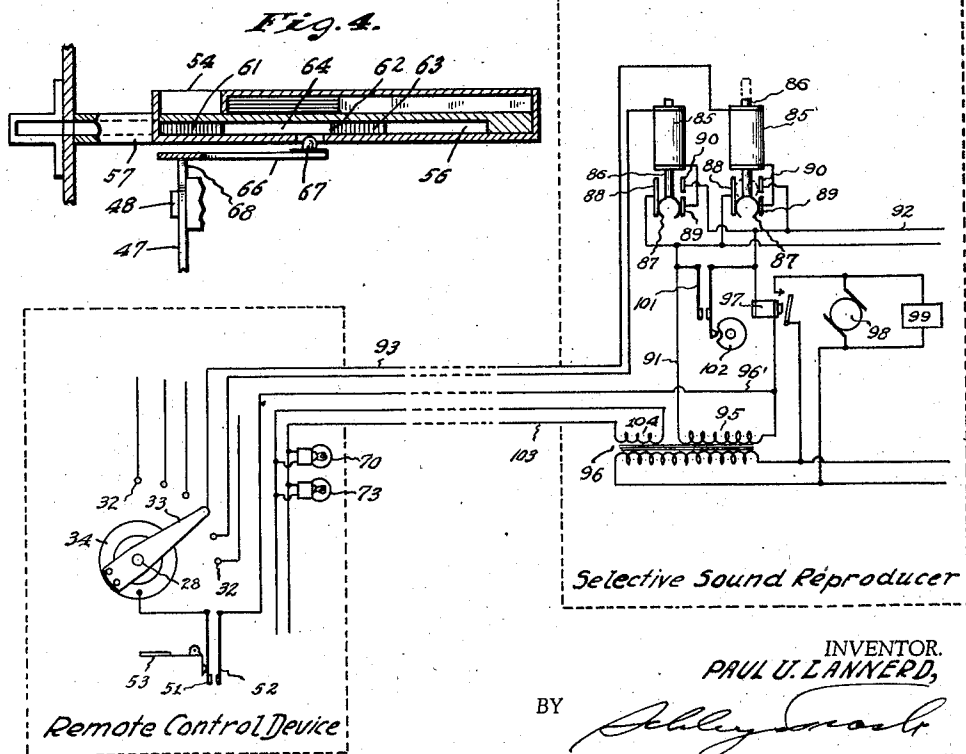


Fig. 4.

Fig. 5.

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UNITED STATES PATENT OFFICE

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COIN CONTROLLED SWITCH

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Original application November 12, 1940, Serial No.
365,174. Divided and this application January
7, 1942, Serial No. 425,811

11 Claims. (Cl. 194—15)

My invention relates to sound-reproducing systems of the type in which a sound reproducing mechanism selectively operable to reproduce any of a number of available sound recordings is controlled by one or more coin-operated remote control devices. In such systems as commonly arranged, the sound-reproducing mechanism is electrically operated and controlled, and the remote control unit includes a manually operated selector switch, the setting of which determines the recording to be reproduced, and a coin-operated actuating switch which initiates operation of the sound reproducing mechanism to cause it to reproduce the recording selected. This invention is directed to remote control devices suitable for use in sound reproducing systems of the type referred to.

Among the more important objects of my invention are to provide a remote control device which will make substantially impossible the obtaining of a number of reproductions greater than that for which coins have been deposited, and to provide for the return of any coin deposited when the control device is not properly adjusted to effect the reproduction of recordings.

In the ordinary sound-reproducing system of the type to which my invention is directed, the sound reproducing mechanism is conditioned to reproduce any given selection by a manually controlled selector switch incorporated in the remote control unit, and reproduction of the desired recording is initiated by the momentary closing of a coin-operated switch to which coins are delivered from a coin receiver. The coin receiver operates to reject defective coins and slugs and possesses a coin channel through which good coins are delivered to the coin-operated switch, such coin channel being provided with an intermediate opening through which coins or slugs may be deflected to a rejection passage leading to a point outside the casing. In embodying my invention in a remote control device including a selector switch and a coin receiver of the type described, I associate with the coin channel of the receiver and adjacent the intermediate opening thereof a movable deflector which is jointly operable with the selector switch and which serves to deflect into the intermediate outlet any coins or slugs passing through the channel when the selector switch is not properly set.

The accompanying drawings illustrate my invention: Fig. 1 is a vertical section through a remote control unit on the line 1—1 of Fig. 2; Fig. 2 is a vertical section through a remote control unit on the line 2—2 of Fig. 1; Fig. 3 is a frag-

mental vertical section on the line 3—3 of Fig. 2; Fig. 4 is a fragmental horizontal section on the line 4—4 of Fig. 3; and Fig. 5 is a diagrammatic view illustrating the electrical circuits employed.

The particular remote control unit illustrated in the drawings is more fully illustrated and described in the co-pending application of Edward E. Collison and myself, Serial No. 365,174, filed November 12, 1940, of which co-pending application the instant one is a division. This unit, which is intended primarily for mounting on a wall, comprises a frame having a back wall 10, a bottom wall 11, and a top wall 12. Associated with this frame is a removable cover 15 which, with the frame, constitutes a casing in which the movable parts of the remote control unit are housed. Supported within this casing upon a bracket 25 is a disk 26 of insulating material through which there extends a switch-operating shaft 28. The ends of this shaft project through the side walls of the casing and are provided exteriorly thereof with operating knobs 30 by means of which the shaft may be rotated. The disk 26 carries an annular series of switch-contacts 32 with which there co-operates one end of a movable contact 33 rotatable with the shaft 28. The opposite end of the movable contact 33 engages an annular fixed contact 34 which, by suitably positioning the shaft 28 and the movable contact 33, may be electrically connected to any one of the fixed contacts 32, thus conditioning the sound-reproducing mechanism, by means hereinafter described, for reproduction of any of the available recordings.

To indicate to the operator the title of the recording which the sound reproducing mechanism is conditioned to reproduce, there is mounted on the shaft 28 a cylindrical drum 36 provided with a circumferential series of axially extending slots or openings in which there are respectively disposed cards 39 bearing the titles of the available recordings. The cover 15 is provided in its front wall with a transparent window 40 through which a number of successive cards 39 are visible; and associated with such window there is an index (not shown) indicating the title of the recording which the sound reproducing mechanism is conditioned to reproduce.

For the purpose of insuring proper engagement between the outer end of the movable contact 33 and each of the fixed contacts 32, there is secured to the drum 36 a toothed wheel 45 having an annular series of teeth corresponding in number to the fixed contacts 32 and slots 37. Receivable in the spaces between the teeth of the wheel

45 is a roller 46 mounted on the outer end of a lever 47 which is pivoted to the bracket 25 at 48 and yieldingly urged toward the wheel 45 as by a tension spring 49 acting between the lever 47 and the bracket 25. The contact 33, the drum 36, and the toothed wheel 45 are so disposed angularly about the axis of the shaft 28 that when any title card 39 is in line with the index the roller 46 will be firmly seated in one of the spaces between the teeth of the wheel 45 and the outer end of the movable contact 33 will be in proper engagement with one of the fixed contacts 32.

The selector switch comprising the contacts 32, 33, and 34 merely predisposes the sound reproducing mechanism for reproduction of the desired recording, the actual reproduction being initiated by the momentary closing of a coin-operated switch comprising a pair of normally separated, spring-mounted contacts 51 and 52 (Fig. 1). Associated with the contacts 51 and 52 is a pivotally mounted bell-crank 53 one arm of which projects horizontally in position to be engaged and depressed by a coin discharged from the coin receiver 54. The other arm of the bell-crank 53 projects downwardly in association with the contact 51 in position to force it into engagement with the contact 52 when the horizontal arm of the bell-crank is momentarily depressed by the impact of a coin upon it. The coin receiver 54, which includes slug-rejector mechanism, may take any desired form and is disposed to receive a coin deposited in a slot 55 provided in the top wall 12 of the casing-frame. The coin receiver, whatever its form, has a discharge opening 56 (Fig. 3) for good coins, such opening being located above the bell-crank 53 so that coins falling from it will impinge upon the bell-crank and momentarily close the switch 51-52. The coin-receiver also includes one or more discharge openings for rejected coins or slugs, such openings being positioned so that a coin or slug falling through them will not strike the bell-crank 53. Preferably, the opening or openings for rejected coins or slugs are arranged to discharge into a channel 57 leading to a recovery opening in the side wall of the casing 15, as will be clear from Fig. 3.

In the device as so far described, it might be possible by rotation or rapid oscillation of the shaft 28 to produce engagement of the movable contacts 33 with more than one of the stationary contacts 32 during the brief interval in which the coin-operated switch 51-52 is closed. Owing to the manner in which selective sound-reproducers subject to remote control are ordinarily constructed, engagement of the movable contact 33 with a plurality of fixed contacts 32 during the interval in which the switch 51-52 is closed would result in the successive reproduction of a corresponding number of recordings. To prevent this, I incorporate in association with the coin-receiver 54 a means which prevents a coin from reaching the discharge opening 56 when the shaft 28 is being rotated or oscillated. Such a means conveniently takes the form of a deflector movable under the control of the shaft 28 into the coin channel of the coin receiver 54 and operative when in such channel to prevent a coin from reaching the discharge opening 56.

In the particular form of coin receiver indicated in the drawings, the coin or slug deposited first passes through means effective to reject ferrous metal slugs and slugs or coins of improper size. Any coin or slug which passes this

initial rejecting mechanism rolls down an inclined ledge 60 and impinges upon the inclined face of an anvil 61 from which it rebounds laterally through a coin channel 62. Most non-ferrous metal slugs rebound from the anvil 61 with less velocity than do sound coins, and advantage is taken of this characteristic to reject certain slugs capable of passing the initial slug-rejecting means of the coin receiver. To this end, there is provided in the channel 62 a divider 63 positioned to be cleared by sound coins rebounding from the anvil 61 but to be struck by slugs or defective coins. Such coins which clear the divider 63 are directed to the discharge opening 56 above the bell-crank 53, while slugs or unsound coins strike the divider 63 and fall through an intermediate outlet 64 in the channel 62 into the channel 57, through which they are returned.

The means which I prefer to employ for preventing the discharge of the coin through the opening 56 on to the bell-crank 53 when the shaft 28 is being rotated or oscillated in an attempt to obtain the reproduction of a plurality of recordings for the price of one desirably takes the form of a leaf spring 66 secured at one end on the front face of the coin receiver 54 and carrying at its other end a pin 67 adapted to be advanced into the coin channel 62 in such a position that it will be struck by a coin rebounding from the anvil 61 and will deflect such coin into the opening 64. The spring 66 is so shaped that normally the pin 67 lies outside the channel 62 in the position illustrated in Figs. 2 and 4; but the lever 47 is provided with an integral arm 68 which engages the spring 66 to distort it and force the pin 67 into the channel 62 whenever the roller 46 is passing over one of the teeth of the toothed wheel 45.

As a result of the construction just described, any attempt to secure the reproduction of more than one recording by rapid rotation or oscillation of the shaft 28 will cause the pin 67 to be repeatedly interposed into the channel 62, where it will prevent the passage of a coin to the discharge opening 56 and will cause the coin to drop through the opening 54 into the channel 57 for return to the operator.

For the purpose of illuminating the titles of available recordings on the circumference of the drum 36, the cards 39 bearing such titles may be of translucent material and a lamp 70 may be mounted within the drum in line with the window 40. A second lamp 73 may be employed to illuminate a translucent window 75 mounted over an opening in the upper portion of the cover 15 and bearing directions for operation of the remote control device.

The recording-selecting mechanism as well as other elements of the selective sound-reproducer may take any desired form, as my invention is not concerned with the construction of this portion of the system. Practicable record-selecting means of several different forms are on the market and well known, and it will therefore be unnecessary for us to describe them in detail herein. In general, such mechanisms embody a plurality of electro-magnetic devices such as relays or solenoids selectively operable to determine the recording which is to be reproduced. In Fig. 5, I have illustrated two of a series of such electro-magnetic devices, the same being solenoids 85 selectively operable under the control of the selector switch 32-33-34. It will be understood that the number of solenoids 85

or other electro-magnetic devices in the recording-selecting mechanism will correspond to the number of fixed contacts 32 in the selector switch.

As will be clear from Fig. 5, each of the solenoids 85 has associated with it a normally retracted core 86 which is advanced when the solenoid is energized to control the record-selecting mechanism in well known manner to cause it, when its operation is later initiated, to select and present for reproduction a particular one of the plurality of recordings available. Each core 86 carries an electrical bridge contact 87 movable with the core and adapted to connect a fixed contact 88 either to an outer fixed contact 89 or an inner fixed contact 90. The fixed contacts 88 of the several solenoids 85 are connected to a common conductor 91, while the inner fixed contacts 90 of the several solenoids are connected to a second common conductor 92. Each of the outer fixed contacts 89 is connected to one end of the winding of its associated solenoid; and the other ends of the solenoid windings are respectively connected by wires 93 to the fixed contacts 32 of the selector switch.

A source of current, such as the secondary 95 of a transformer 96, has one terminal connected to the conductor 91 and the other terminal connected through a conductor 95' and the coin-operated switch 51-52 to the common contact 34 of the selector switch. A relay 97, having its winding connected between the conductors 92 and 96', controls the supply of current to the driving motor 98 of the selective sound reproducer and to the actual reproducing mechanism indicated diagrammatically at 99 and ordinarily comprising a pick-up, an amplifier, and a speaker.

When the system is not operating, all cores 86 of the several solenoids 85 are retracted, or in the full-line positions illustrated in the case of the two solenoids 85 shown in Fig. 5, and each of the bridge contacts 87 establishes a connection between the contact 88 and the outer contact 89. To operate the device, the operator first rotates the shaft 28 by one or the other of the knobs 30 until the title of the desired recording comes into line with the index on the face of the cover 15 to prepare for completion a circuit including that solenoid 85 whose core 86, when advanced, will control the selecting mechanism of the selective sound reproducer to cause it to present the desired recording to the sound-reproducing mechanism for reproduction. In Fig. 5, the movable contact 33 of the selector switch is shown in engagement with that one of the fixed contacts 32 which is connected to the second of the two illustrated solenoids 85, and it will be this solenoid which will be actuated upon the deposit of a coin.

When a coin is deposited it impinges upon the bell-crank 53, closes the switch 51-52 and completes a circuit extending from one terminal of the transformer-secondary 95 through the conductor 91, the contacts 88, 87, and 89 of the second solenoid 85, the winding of such solenoid, the associated conductor 93, the selector switch, the coin-operated switch, and the conductor 95' to the opposite terminal of the transformer-secondary. The resultant energization of the solenoid 85 advances the associated core 86, interrupts the circuit just described by breaking the connection between the contacts 88 and 89, and completes a second circuit extending from one terminal of the transformer-secondary 95 through the conductor 91, the contacts 88, 87, and 90 of the second solenoid, the conductor 92 and the

relay 97 to the opposite terminal of the transformer-secondary. The resultant energization of the relay 97 effects the supply of current to the motor 98 and sound reproducing mechanism 99, and the selecting mechanism of the sound reproducer thereupon operates to bring into association with the sound reproducing mechanism that recording which corresponds to the solenoid 85 whose core 86 has been advanced.

In many of the record-selecting mechanisms now in use the core 86 of the solenoid corresponding to the recording being reproduced is mechanically restored to its retracted position before the playing of a recording is completed. To prevent such retraction of the solenoid core from opening the relay 97 and thereby interrupting the supply of current to the motor 98 and sound-reproducing mechanism 99, it is customary to employ a holding switch 101 which is connected across the conductors 91 and 92 and which is controlled by a cam 102, such cam being driven by the motor 98 in well known manner. The cam 102 is so shaped as to close the switch 101 after the reproduction of a recording has begun and before the solenoid-core 86 has been mechanically retracted in the manner above indicated, and to maintain the switch 101 closed until the playing of the recording has been completed. After the solenoid-core 86 has been retracted to break the connection between the contacts 88 and 90, the circuit through the winding of the relay 97 is maintained closed by the switch 101; but when the playing of the recording is completed, the cam 102 opens the switch 101, causes de-energization of the relay 97, and interrupts the supply of current to the driving motor 98 and sound-reproducing mechanism 99.

If the lamps 70 and 73 on the remote control device operate at a voltage different from the remainder of the control system, as is usually the case, they may be supplied with current through conductors 103 leading from opposite ends of an auxiliary secondary 104 of the transformer 96. The conductors 93, 96, and 103, between the remote control device and the selective sound-reproducer are desirably embodied in a single cable. If a plurality of remote control devices are used in association with a single selective sound-reproducer, the several remote control devices are connected in parallel.

From the above description of the electrical circuits, it will be apparent that engagement of the movable contact 33 of the selector switch with a plurality of contacts 32 during the interval in which the coin-operated switch 51-52 is closed would result in the energization of a corresponding number of solenoids 85. If this should occur, the conductors 91 and 92 would be interconnected through a plurality of switches 88-87-90, and the circuit including the winding of the relay 97 would remain closed when the switch 101 is opened upon the completion of the playing of the first recording. As a result, the selective sound reproducer would continue to operate to reproduce successive recordings until all the solenoid cores 86 had been retracted. By the use of our invention, however, any such operation is prevented; for the selector switch cannot be manipulated in an attempt to energize a plurality of solenoids without interposing the pin 67 into the coin channel and thus preventing the coin from reaching the switch 51-52. In addition the pin insures the return of any coin which passes through the coin channel when the movable switch contact 33 is held between two adja-

cent fixed contacts 32 and when, therefore, closing of the switch 51—52 would not result in energization of any solenoid 85.

I claim as my invention:

1. A coin-operated control device for a sound reproducer having mechanism including a plurality of electro-magnetic elements selectively operable to cause reproduction of any of a plurality of selections, said remote control device comprising a selector switch having a series of fixed contacts respectively connectible to said electro-magnetic elements and a manually movable contact engageable with any of said stationary contacts to select an electromagnetic device for energization, a coin-operated switch operable to cause energization of the selected electromagnetic device, a coin receiver having a coin channel for delivering a coin to said coin-operated switch, said coin channel having an intermediate outlet through which coins or slugs may pass without operating said coin-operated switch, a normally retracted deflector associated with said coin channel and movable thereinto to deflect a coin to said intermediate outlet, and mechanism operable jointly with the movable contact of said selector switch for advancing said deflector into said channel whenever said movable contact is disposed between adjacent ones of said stationary contacts.

2. A coin-operated control device for a sound reproducer having mechanism including a plurality of electro-magnetic elements selectively operable to cause reproduction of any of a plurality of selections, said remote control device comprising a selector switch having a series of fixed contacts respectively connectible to said electro-magnetic elements and a manually movable contact engageable with any of said stationary contacts to select an electromagnetic device for energization, a coin-operated switch operable to cause energization of the selected electromagnetic device, a coin receiver having a coin channel for delivering a coin to said coin-operated switch, said coin channel having an intermediate outlet through which coins or slugs may pass without operating said coin-operated switch, and mechanism operated jointly with said movable contact for deflecting into said intermediate outlet any coin passing through said channel when said movable contact is disposed between adjacent ones of said stationary contacts.

3. A coin-operated control device for a sound reproducer having mechanism including a plurality of electro-magnetic elements selectively operable to cause reproduction of any of a plurality of selections, said remote control device comprising a selector switch having a series of fixed contacts respectively connectible to said electro-magnetic elements and a manually movable contact engageable with any of said stationary contacts to select an electromagnetic device for energization, a coin-operated switch operable to cause energization of the selected electromagnetic device, a coin receiver having a coin channel for delivering a coin to said coin-operated switch, a normally retracted obstruction associated with said channel and movable thereinto to prevent the delivery of a coin to said coin-operated switch, and means for moving said obstruction into said channel whenever said movable contact is disposed between adjacent ones of said fixed contacts.

4. A coin-operated control device for a sound reproducer having mechanism including a plurality of electromagnetic elements selectively op-

erable to cause reproduction of any of a plurality of selections, said remote control device comprising a selector switch having a series of fixed contacts respectively connectible to said electro-magnetic elements and a manually movable contact engageable with any of said stationary contacts to select an electromagnetic device for energization, a coin-operated switch operable to cause energization of the selected electromagnetic device, a coin receiver having a coin channel for delivering a coin to said coin-operated switch, and means operated jointly with said movable contact for preventing a coin in said channel from reaching said coin-operated switch when said movable contact is disposed between adjacent ones of said fixed contacts.

5. In a coin-operated control device for a selective sound-reproducing mechanism selectively operable to reproduce any of a number of recordings, a manually operated selector having a control member successively movable to any of a plurality of controlling positions to select a recording to be reproduced, a coin-operated device for initiating reproduction of the selected recording, a coin receiver having a coin channel for conducting a coin to said coin-operated device, and means operated jointly with said control member for preventing a coin in said channel from reaching said coin-operated device whenever said control member is disposed between adjacent ones of said controlling positions.

6. In a coin-operated control device for a selective sound-reproducing mechanism selectively operable to reproduce any of a number of recordings, a manually operated selector having a control member successively movable to any of a plurality of controlling positions to select a recording to be reproduced, a coin-operated device for initiating reproduction of the selected recording, a coin receiver having a coin channel for conducting a coin to said coin-operated device, said channel being provided with an intermediate outlet opening through which coins or slugs may pass without operating said coin-operated device, and deflecting means associated with said channel and operable jointly with said control member for deflecting to said intermediate outlet any coin passing through the channel when said control member is disposed between adjacent ones of said controlling positions.

7. In a coin-operated control device for a selective sound-reproducing mechanism selectively operable to reproduce any of a number of recordings, a selector for selecting the recording to be reproduced, said selector being freely operable at all times, a coin-controlled actuator for initiating reproduction of the selected recording, a coin receiver having a coin channel for conducting a coin to said actuator, and mechanism operated jointly with said selector for preventing a coin in said channel from reaching said actuator except when said selector is set to effect the reproduction of a single recording.

8. In a coin-operated control device for a selective sound-reproducing mechanism having a plurality of electro-magnetic devices selectively operable to reproduce any of a number of recordings, a selector switch comprising a series of stationary contacts adapted for connection to said electro-magnetic devices respectively and a movable contact selectively movable into engagement with any of said stationary contacts, means for moving said movable contact, a coin-controlled actuator for initiating reproduction of the se-

lected recording, a coin receiver having a coin channel for conducting a coin to said actuator, and mechanism operative to prevent a coin in said channel from reaching said actuator, said mechanism being controlled by said contact-moving means.

9. In a coin-operated control device for a selective sound-reproducing mechanism having a plurality of electro-magnetic devices selectively operable to reproduce any of a number of recordings, a selector switch comprising a series of stationary contacts adapted for connection to said electro-magnetic devices respectively and a movable contact selectively movable into engagement with any of said stationary contacts, means for moving said movable contact, a coin-controlled actuator for initiating reproduction of the selected recording, a coin receiver having a coin channel for conducting a coin to said actuator, said channel having an intermediate outlet through which coins and slugs can pass without operating said actuator, and mechanism controlled jointly with said movable contact for deflecting a coin in said channel into said intermediate opening.

10. In a coin-operated control device for a selective sound-reproducing mechanism selectively operable to reproduce any of a number of recordings, a selector for selecting the recording to be reproduced, a coin-controlled actuator for initiating reproduction of the selected recording,

a coin receiver having a coin channel for conducting a coin to said actuator, said receiver being provided with a coin receptacle and a coin-return opening, and mechanism operated jointly with said selector for directing to said receptacle any coin passing through said channel when said selector is set in a condition to effect the reproduction of a single recording and to said coin-return opening any coin passing through said channel when said selector is in any other condition.

11. In combination, a selective sound-reproducing mechanism having a plurality of electro-magnetic devices selectively operable to reproduce any of a number of recordings, selector switch mechanism for establishing a connection to any of said devices, a coin controlled actuator for completing a circuit through any electro-magnetic device to which a connection is established by said selector switch, a coin receiver having a channel for conducting a coin to said actuator, said coin-receiver also having a coin receptacle and a coin-return opening, and mechanism controlled jointly with said selector switch for directing to said receptacle any coin passing through said channel when said selector switch is set in a condition to establish a connection to a single one of said electro-magnetic devices and to said coin-return opening any coin passing through said channel when said selector switch is in any other condition.

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