

July 20, 1943.

E. E. COLLISON ET AL

2,324,908

CONTROL DEVICE

Filed Nov. 12, 1940

3 Sheets-Sheet 1

Fig. 2.

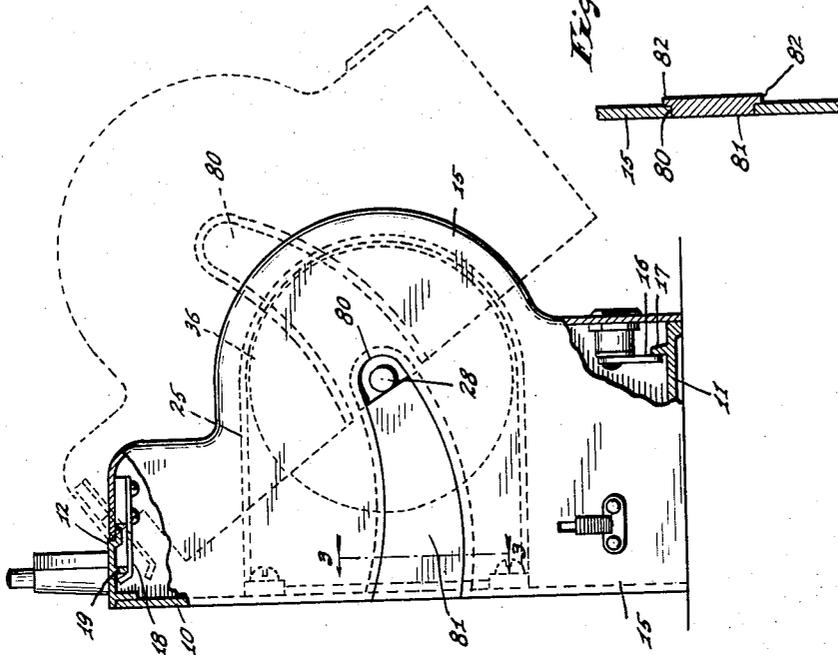


Fig. 3.

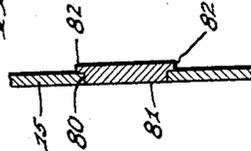
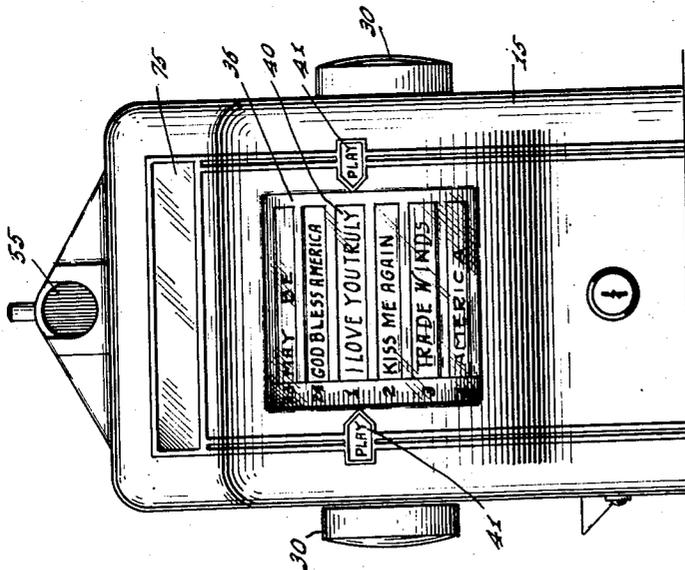


Fig. 1.



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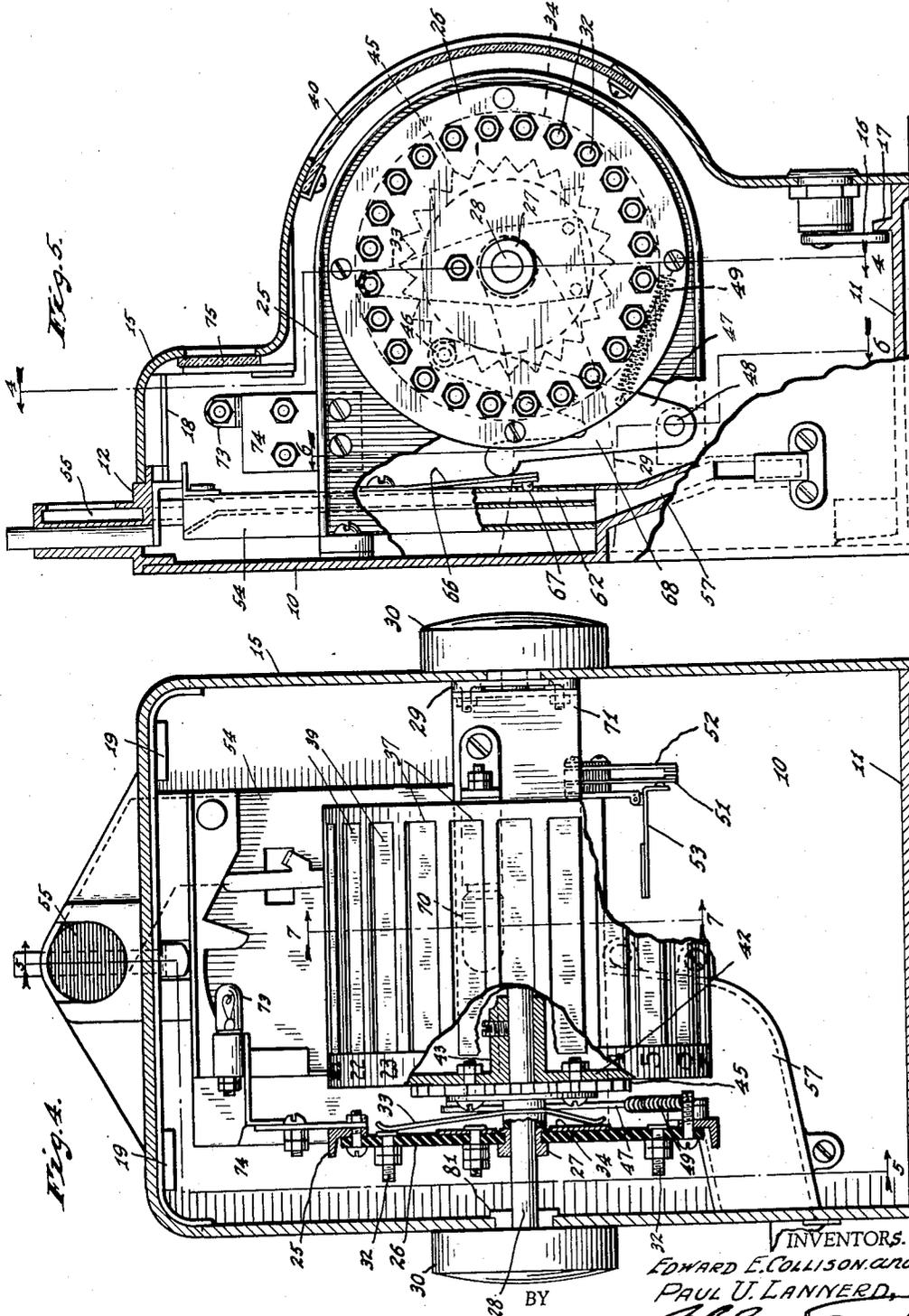
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3 Sheets-Sheet 2



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3 Sheets-Sheet 3

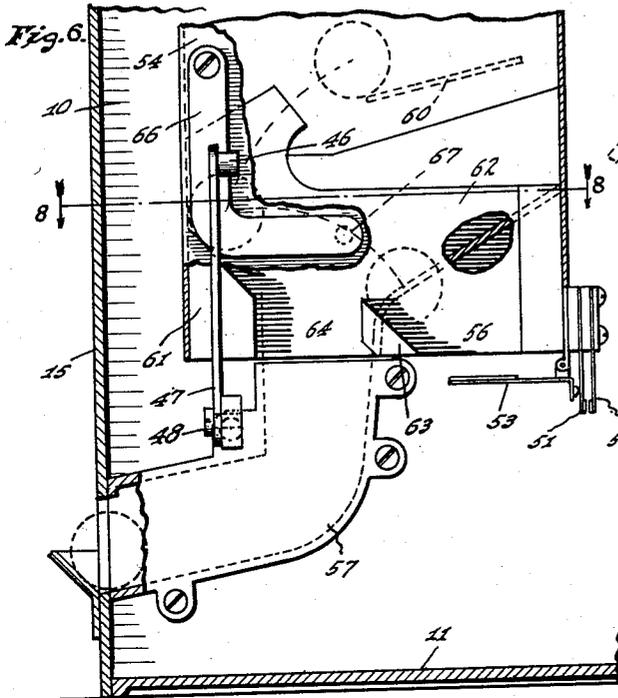


Fig. 7.

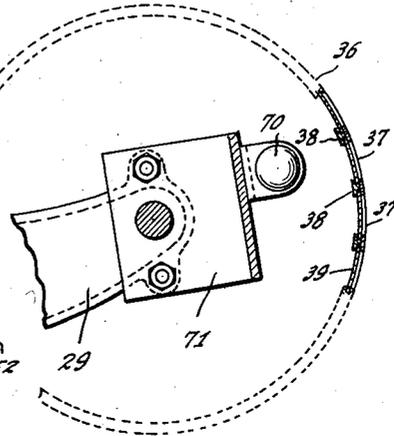
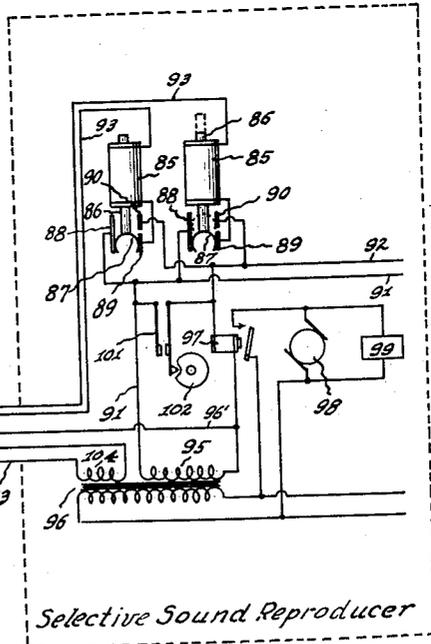
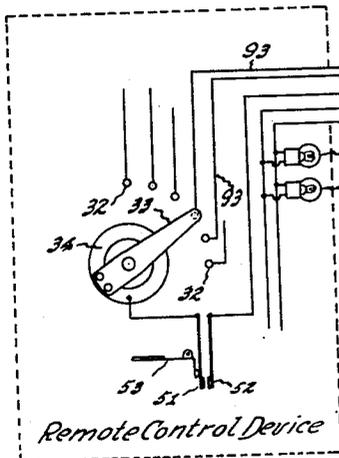
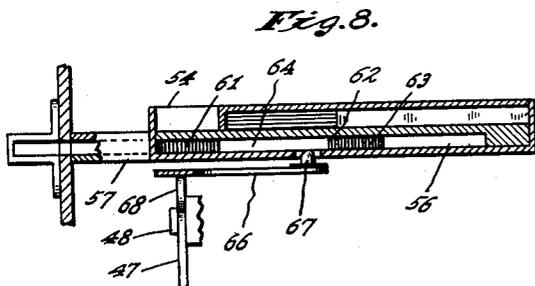


Fig. 9.



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UNITED STATES PATENT OFFICE

2,324,908

CONTROL DEVICE

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3 Claims. (Cl. 179—6)

Our 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 objects of our 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; to provide for the return of any coin deposited when the control device is not properly adjusted to effect the reproduction of recordings; to provide a direct association between the manually operated selector and the list of selections available for reproduction; and to provide a remote control unit which will be attractive in appearance and which will invite operation. A further object of our invention is to provide a remote control unit which will be sturdy in construction and capable of withstanding the abuse and tampering to which such devices are subject.

In carrying out our invention in its preferred form, we employ a casing through opposite sides of which there project the ends of an operating shaft which, within the casing, carries a cylindrical drum upon which are displayed the titles of recordings available for reproduction. The front of the casing is provided with a window through which a portion of the drum is visible; and by rotating the shaft, through the medium of knobs provided on its ends, any of the titles displayed on the drum may be brought into alignment with a stationary index associated with the window. The selector mechanism within the casing includes a selector switch operated by rotation of the shaft and operating to predispose the sound reproducing mechanism for reproduction of the recording whose title is displayed opposite the index. The remote control device includes a coin receiver operating to reject defective coins and slugs and to pass good coins to a coin-operated control switch which serves to initiate the reproduction of the recording selected as above indicated. The coin receiver 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 de-

flected to a rejection passage leading to a point outside the casing. Adjacent the intermediate outlet in the coin channel, we provide a deflector jointly operable with the selector switch to deflect into the intermediate outlet any coin passing through the channel when the selector switch is not properly set.

The accompanying drawings illustrate our invention: Fig. 1 is a front elevation of the remote control unit; Fig. 2 is a side elevation of the unit with portions broken away to illustrate details of the casing; Fig. 3 is a fragmental section on the line 3—3 of Fig. 2; Fig. 4 is a vertical section on the line 4—4 of Fig. 5; Fig. 5 is a vertical section on the line 5—5 of Fig. 4; Fig. 6 is a fragmental vertical section on the line 6—6 of Fig. 5; Fig. 7 is a fragmental vertical section on the line 7—7 of Fig. 4; Fig. 8 is a fragmental horizontal section on the line 8—8 of Fig. 6; and Fig. 9 is a diagrammatic view illustrating the electrical circuits employed.

The form of our invention illustrated in the drawings is intended primarily for mounting on a wall and comprises a frame having a back wall 10, a bottom wall 11, and a top wall 12. Associated with the frame we provide a cover 15 removably pivoted to the front edge of the top wall 12 and provided with a lock-controlled latch 16 engageable with an ear 17 on the bottom wall 11 of the frame to hold the cover in place. As will be clear from Fig. 2, the front edge of the top wall 12 of the frame is provided with a rabbet groove adapted to receive the rear edge of the top wall of the cover, and the cover is provided with one or more rearwardly projecting fingers 18 having up-turned rear ends adapted to engage behind a flange 19 on the top wall 12 to hold the rear edge of the top wall of the cover seated in association with the top wall 12 when the cover is closed. By releasing the latch 17, the cover may be swung about the rear edge of its top wall as an axis until the fingers 18 clear the flange 19, as indicated by the dotted-line position in Fig. 2, whereupon the cover may be completely removed from the frame 10—11—12 to expose the mechanism mounted thereon.

Within the casing formed by the frame and cover there is mounted on the back wall 10 near one side thereof a forwardly projecting bracket 25 having a large circular opening covered by a disk 26 of insulating material. A sleeve 27 secured at the center of the disk 26 provides a bearing for supporting one end of a shaft 28, the opposite end of such shaft being rotatably supported in a bracket 29 projecting forwardly from the rear wall 10 near the opposite side thereof. The shaft 28 is long enough so that its ends project beyond the side walls of the cover 15, where they are provided with operating knobs 30 by means of which the shaft may be rotated.

The disk 26 of insulating material surrounds

an annular series of fixed switch-contacts 32 the inner ends of which are adapted to be successively engaged by the outer end of a movable contact 33 mounted on the shaft 28 for rotation therewith, but insulated from such shaft. Within the annular ring of contacts 32, we mount on the inner face of the disk 26 a continuous annular contact 34 engaged by the inner end of the movable contact 33. The contacts 32, 33, and 34 constitute the selector switch. By rotation of the shaft 28, the outer end of the movable contact 33 may be brought into engagement with any of the fixed contacts 32 to predispose 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 predisposed to reproduce, the shaft 28 carries a cylindrical drum 36 provided with an annular series of axially extending slots 37 and with guides 38 which hold in respective association with the slots 37 cards 39 bearing the titles of available recordings. The cover 15 is provided in its front wall with a window 40 exposing to view a limited number of the titles on the drum 36; and associated with such window there is an index 41 (Fig. 1) indicating the title of the recording which the sound reproducing mechanism is predisposed to reproduce. As will be clear from Fig. 4, the drum 36 has a closed end 42 provided with a hub 43 which receives the shaft 28 and is rigidly secured thereto as by means of a set screw. The opposite end of the drum 36 is open to permit insertion and withdrawal of the cards 39.

For the purpose of insuring proper engagement between the outer end of the movable contact 33 and each of the fixed contacts 32, we secure to the end wall 42 of 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 41 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. 4). 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 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. 6.

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, we 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 drawing, 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 we 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. 5 and 8; 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 26 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 are desirably of translucent material and a lamp 70 is mounted within the drum in line with the window 40. Conveniently, the lamp 70 is mounted upon an L-shaped support 71 secured to the inner face of the bracket 29. The outer surface of the support 71 behind the lamp 70 may be polished to reflect light through the translucent cards and window 40.

A second lamp 73, carried by a support 74 secured to the bracket 25, 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.

Because it is desirable to be able to remove the cover 15 without disturbing the shaft 28 or knobs 30 by which it is rotated, it is necessary in a casing of the type described herein to slot the side walls of the cover for the reception of the shaft, and it is also necessary to provide means for closing such slots when the cover is in place in order to prevent tampering with the mechanism within the casing. Such slots, one of which is indicated at 80 in Fig. 2, open in the rear edges of the side walls of the cover 15 and are arcuate in form, their center-lines being approximately co-axial with the upper edge of the rear wall of the cover about which the cover swings as it is being applied to or removed from the frame. Desirably, as will be clear from Fig. 2, the side walls of the slots 80 diverge rearwardly so that the rear end of each slot has a width greater than its front end.

For the purpose of closing the slots 80 when the cover is in place, we may employ the bracket 29 at one side of the casing and a finger 81 which projects rearwardly from the back wall 10 of the frame at the opposite side of the casing. The upper and lower edges of the bracket 29 and finger 81 conform to the sides of the slot 80 when the cover 15 is in place and are desirably internally flanged as indicated at 82 in Fig. 3 in order to prevent the insertion of any implement into the casing.

The recording-selecting mechanism as well as other elements of the selective sound-reproducer may take any desired form, as our 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. 9, we have illustrated two of a series of such elec-

tro-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. 9, 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 96' 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. 9, 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 41 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. 9, 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 96 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-selective 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 the 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 at-

tempt to energize a plurality of solenoids without interposing the pin 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 adjacent fixed contacts 32 and when, therefore, closing of the switch 51—52 would not result in energization of any solenoid 85.

The mounting of the list of the available recordings upon the drum and the direct association of that drum with the selector switch and the index has a distinct advantage. Only a portion of the list of available recordings is visible through the window, and any prospective operator is impelled by curiosity to rotate the drum and discover the titles of the remaining recordings. The direct association of the title-bearing drum with the selector-switch facilitates operation; for, when the selector switch is set to reproduce any recording, the title of that recording appears in line with the index.

We claim as our invention:

1. In a remote control device for a selective sound-reproducing mechanism selectively operable to reproduce any of a number of recordings, a frame having a back wall, a horizontal shaft rotatably supported from said back wall and extending parallel and in spaced relation thereto, selecting mechanism supported from said back wall and operated by said shaft for controlling the operation of said selective sound-reproducing mechanism, a cover co-operating with said frame to form a casing for said selecting mechanism, the ends of said shaft projecting outwardly through and beyond opposite side walls of said cover and being there provided with operating knobs, said cover being hinged to said frame near the upper end of said back wall, the opposite side walls of said cover being provided with rearwardly opening, arcuate, shaft-receiving slots concentric with the axis about which said cover is removably hinged to said frame, and arcuate fingers on the back wall of said frame and extending forwardly therefrom to close said slots when the cover is in place.

2. In a remote control device for a selective sound-reproducing mechanism selectively operable to reproduce any of a number of recordings, a frame having a back wall, a horizontal shaft rotatably supported from said back wall and extending parallel and in spaced relation thereto, selecting mechanism supported from said back wall and operated by said shaft for controlling the operation of said selective sound-reproducing mechanism, a cover co-operating with said frame to form a casing for said selecting mechanism, the ends of said shaft projecting outwardly through and beyond opposite side walls of said cover and being there provided with operating knobs, said cover being removable from said frame and being provided in its opposite side walls with rearwardly opening, shaft-receiving slots, and fingers on the back wall of said frame and extending forwardly therefrom, said fingers being shaped and disposed to close said slots when the cover is in place on the frame.

3. The invention set forth in claim 2, with the addition that one of said fingers is provided with a bearing for supporting said shaft with its axis in fixed position when said cover is removed.

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