

Dec. 8, 1942.

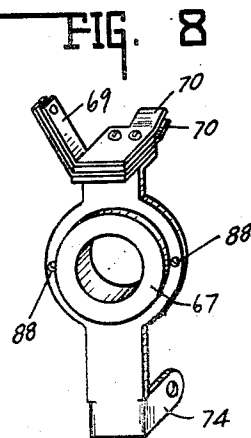
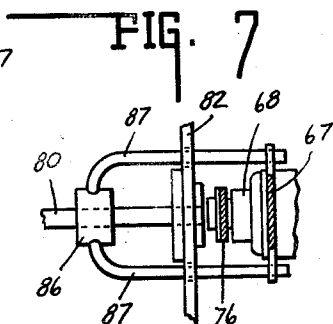
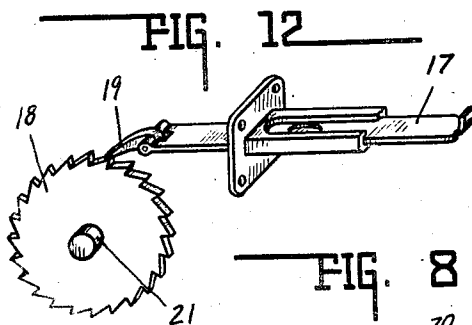
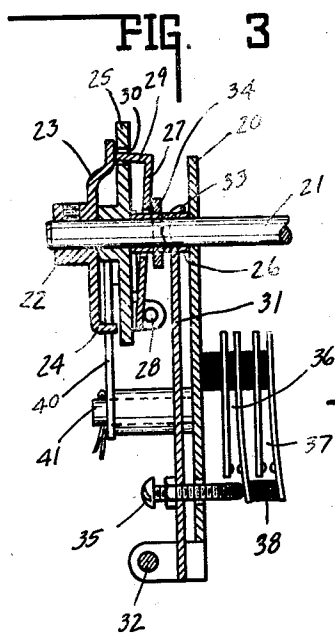
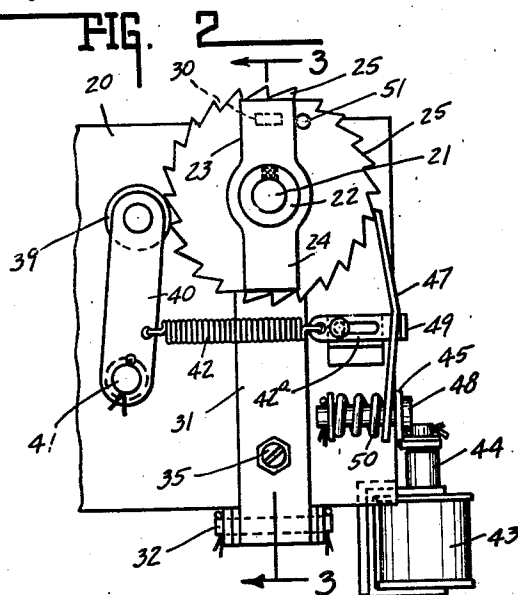
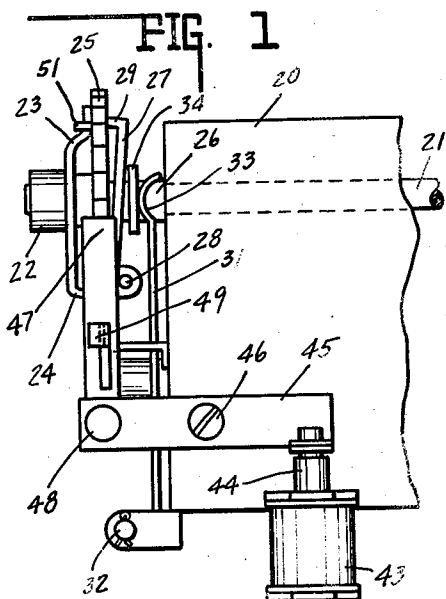
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2,304,590

REMOTE CONTROL APPARATUS FOR SELECTIVELY OPERATED MACHINES

Filed May 6, 1939

3 Sheets-Sheet 1



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REMOTE CONTROL APPARATUS FOR SELECTIVELY OPERATED MACHINES

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3 Sheets-Sheet 2

FIG. 5

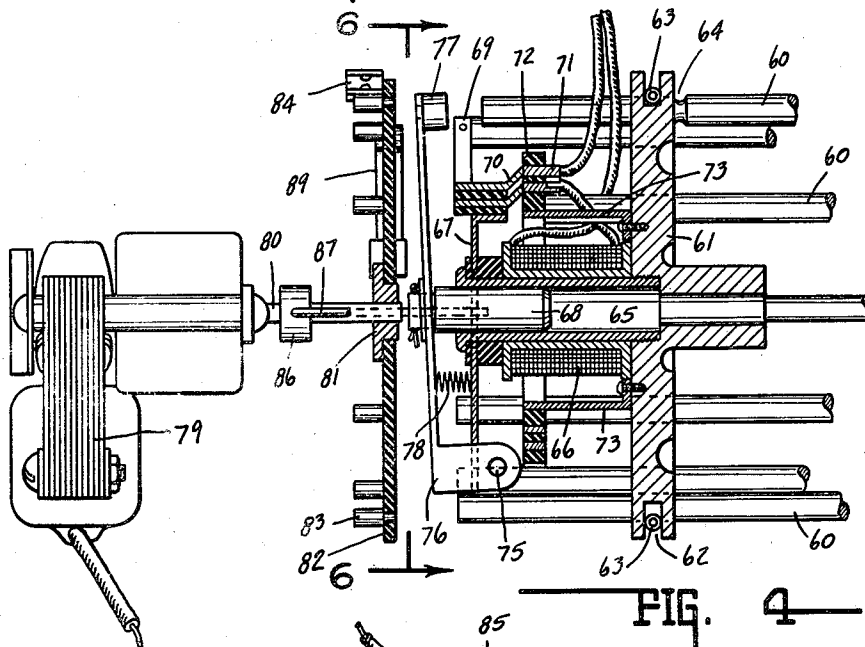


FIG. 4

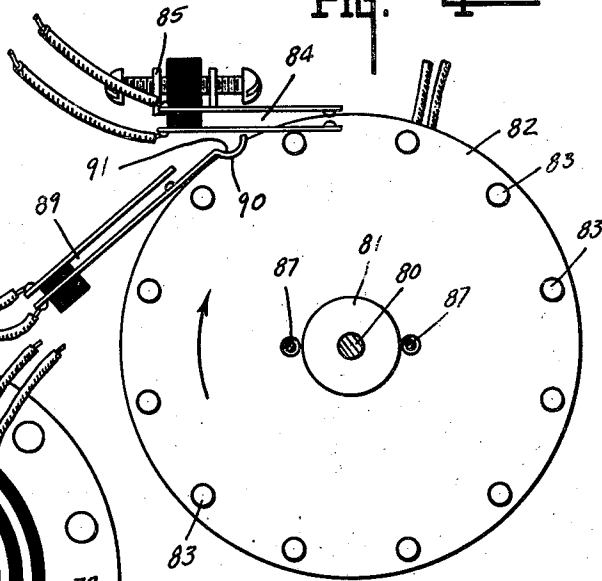
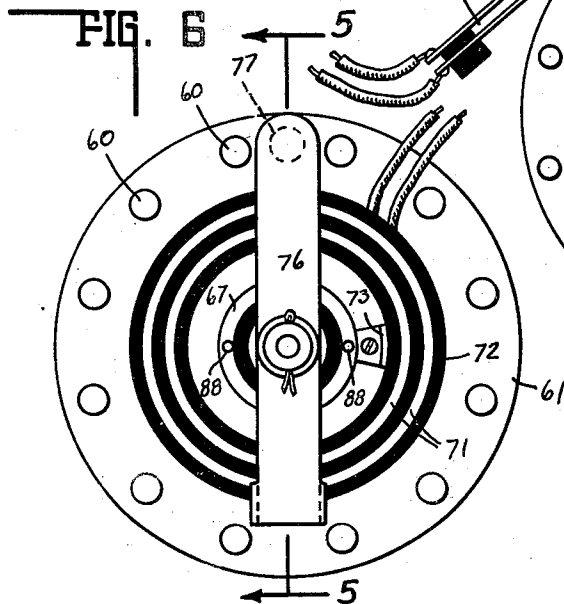


FIG. 6



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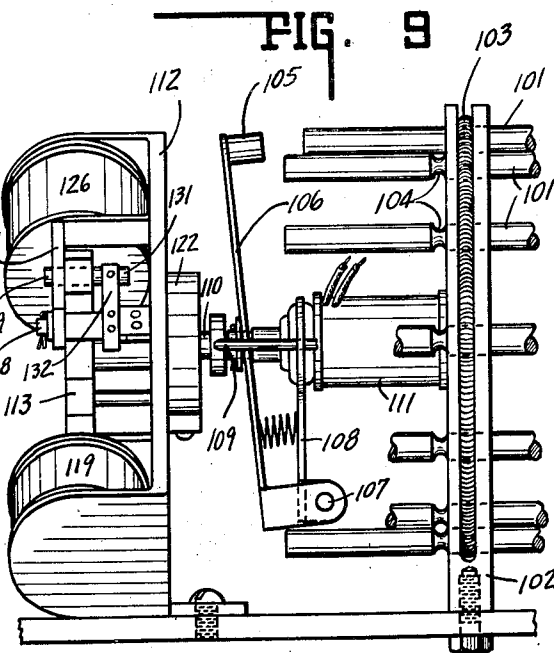
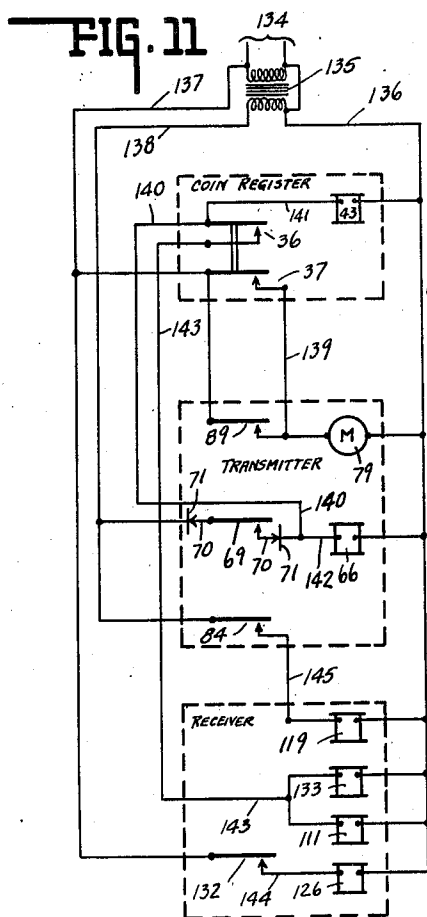
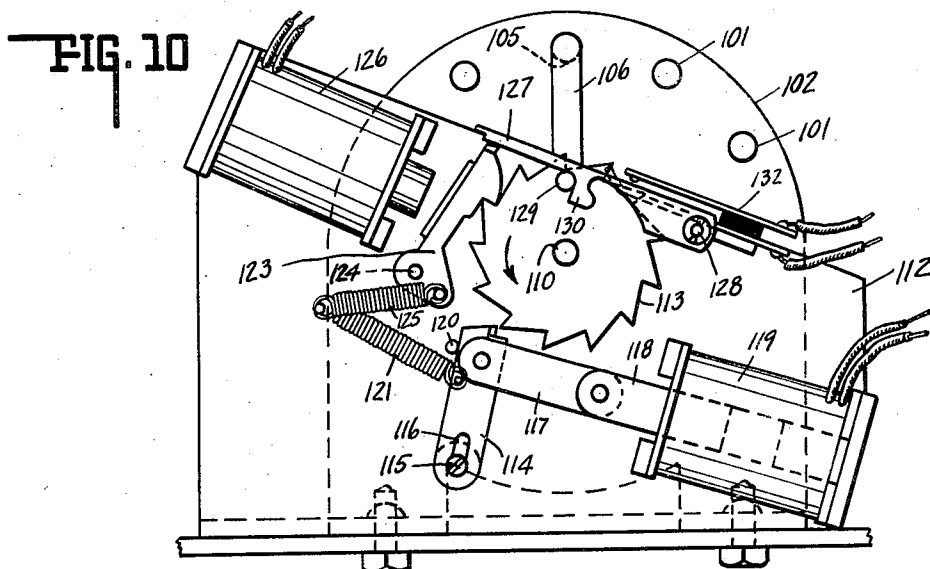
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REMOTE CONTROL APPARATUS FOR SELECTIVELY OPERATED MACHINES

Filed May 6, 1939

3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

2,304,590

REMOTE CONTROL APPARATUS FOR
SELECTIVELY OPERATED MACHINESFred H. Osborne, Snyder, N. Y., assignor to The
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a corporation

Application May 6, 1939, Serial No. 272,162

5 Claims. (Cl. 177-353)

This invention relates to a remote control for selectively operated machines such as automatic phonographs and the like.

One object of the invention is to provide a remote control by means of which a large number of different operations such as the selection of phonograph records to be played may be made from a distance with a minimum amount of wiring connecting the remote control station with the machine to be controlled.

The invention is described herein as adapted for use with a selectively operated automatic phonograph of the kind shown in Wilcox Patent No. 2,002,236 but it is equally applicable to other types of controlled machines having a plurality of local control members, such as push buttons or the like, each of which controls an operation of the machine. The apparatus comprising the invention in its preferred form may be divided into three distinct mechanisms electrically interconnected. The first is the coin register located at the remote station and adapted to evaluate coins received in terms of selections to be played. For household use where coin control is not desired, the register is omitted. The second mechanism is the selection transmitter also located at the remote station and provided with a number of selector members such as push buttons, each corresponding to a record to be played. This mechanism is such that any number of records limited only by the value of the coins received and the number of records available may be preselected. The third mechanism is the receiver located at the instrument to be controlled and electrically operated by signals received from the transmitter. The operation of the transmitter and receiver is such that once a group of selections has been made at the transmitter, a single cycle of operations of the transmitter transfers the entire group of selections to the receiver. The receiver operates the local control members of the controlled machine.

Other objects and features of the invention will be understood from the accompanying drawings and the following description and claims:

Fig. 1 is a side view of a preferred form of coin register. Fig. 2 is an end view thereof and Fig. 3 is a central sectional view taken substantially on the line 3-3 of Fig. 2. Fig. 4 is an end view of a preferred form of the transmitter. Fig. 5 is a central sectional view of the same taken substantially on the line 5-5 of Fig. 6. Fig. 6 is a sectional view taken on the line 6-6 of Fig. 5. Fig. 7 is a detail view in plan of a portion of the apparatus of Fig. 5. Fig. 8 is a perspective view of one

of the members appearing in Fig. 5. Fig. 9 is a side view of a preferred form of the receiver and Fig. 10 is an end view thereof. Fig. 11 is a diagram of electrical connections for the interoperation of the three separate units. Fig. 12 is an elevational view of a form of coin operated mechanism used with the coin register.

Coin register

The coin register disclosed in Figs. 1, 2, 3 and 12 is similar in most respects to one disclosed in co-pending application of Fred H. Osborne and Theodore M. Wright, Serial No. 180,728, filed December 20, 1937. In this mechanism any well known form of coin receiver, such as the coin slide 17, Fig. 12, may be used. The coin receiver may be arranged to operate a ratchet 18 by means of a pawl 19 each time a coin is inserted and the slide 17 is pressed home. The ratchet wheel 18 is mounted on a shaft 21 and said shaft is rotated through a predetermined angle each time a coin is received. Preferably several slides 17 are provided each adapted to receive a coin of a different denomination and each arranged to turn shaft 21 through an angle proportional to the value of the coin normally received thereby.

The shaft 21 is mounted on a stationary frame 20 and has secured thereto a hub 22 carrying radial arms 23 and 24 preferably formed in a single piece. A ratchet wheel 25 is freely mounted on the shaft 21 and is held in position by a bushing 26 abutting against the ratchet wheel and against a portion of the stationary frame 20.

A trigger 27 is pivotally mounted on the back of the ratchet wheel 25 by means of a pivot pin 28 engaging suitable lugs formed on the trigger and on the ratchet wheel. The end of the trigger remote from the pivot pin is bent at right angles as shown at 29 and enters a rectangular opening 30 in the ratchet wheel. The end of the arm 23 is bent as best seen in Fig. 3 to rest against the face of the ratchet wheel 25 to retain the trigger 27 in registry with the opening 30. When said arm is moved relative to the ratchet wheel so as to uncover the opening 30, the trigger 27 is free to move on its pivot pin 28 and to protrude through the opening.

A lever 31 is pivotally mounted on the frame 20 by means of a pivot pin 32 and has a forked upper end 33 engaging a washer 34 in turn engaging the trigger 27. A screw 35 is adjustably mounted on the lever 31 and passes through a suitable opening in the frame 20 to engage one of the leaves of an electric switch 36. One of the leaves of a second switch 37 is mechanically con-

nected by an insulation block 38 with the switch 36 so that both switches are opened by pressure of the screw 35 and both are closed by a release of said pressure. The switches 36 and 37 are mounted on and insulated from the frame 20 and the end of the screw 35 carries suitable insulation material.

A roller 39 mounted on the free end of a lever 40 engages the teeth of the ratchet wheel 25. The lever 40 is mounted on a pivot pin 41 in turn mounted on the frame 20. The roller 39 is maintained in contact with the ratchet wheel by a tension spring 42 secured to a member 42a which is slidably mounted on the frame 20.

An electromagnet 43 is mounted on the frame 20 and is provided with a plunger 44 attached to a lever 45 pivotally mounted at 46 on the frame 20. An arm 47 is mounted on a pivot pin 48 attached to the outer end of the lever 45 and extends upwardly into engagement with the teeth of the ratchet wheel 25. The arm 47 is resiliently held against a stop 49 formed on the member 42a by means of a compression spring 50 mounted on the pivot pin 48. The spring 42 thus resiliently holds both the roller 39 and arm 47 against the teeth of the ratchet wheel 25.

In the operation of the coin register, the shaft 21 is rotated by the operation of the slide 17 after receipt of a coin or coins. The movement of the shaft is through an angular distance equivalent to one tooth of the ratchet wheel 25 when a coin is received of proper value for one selection to be played and is through corresponding greater angles upon the receipt of coins of greater value. In the rotation of the shaft 21 the ratchet wheel is held in place by the pressure of the roller 39 thereon. The arm 23 moves with the shaft 21 and thus uncovers the opening 30 and permits the lever 27 to be pressed through the opening 30 by the resilient action of the leaves of the switches 36 and 37. These switches are thus closed whenever the opening 30 is uncovered.

The solenoid 43 is momentarily actuated as hereinafter described each time a selection is checked off and the actuation thereof lifts the arm 47 into engagement with one of the ratchet wheel teeth and moves the ratchet wheel in the direction of rotation of the shaft 21. Thus, when the solenoid 43 has been actuated a number of times equivalent to the number of selections which have been paid for, the opening 30 in the ratchet wheel overtakes the arm 23. The edge of the arm 23 is properly chamfered and the end of the lever 27 is properly shaped so that the engagement between the same presses the lever 27 back to the position shown in Fig. 3 and opens the switches 36 and 37. When this condition has been reached, a stop pin 51 mounted on the ratchet wheel 25 engages the arm 23 and subsequent actuations of the solenoid 43 move the ratchet wheel and arm together without affecting the operation of switches 36 and 37.

By means of the coin register, the switches 36 and 37 are closed only when coins have been received and have not been checked off by a corresponding number of actuations of the solenoid 43.

Transmitter

Referring now to Figs. 4 to 8, inclusive, the transmitter is provided with a plurality of selector pins or push buttons 60 equal in number to the number of selections available in the phonograph. These pins are slidably mounted in a stationary disc 61 having an annular groove 62

in the outer edge thereof. A tension spring 63 lies in the groove 62 and is adapted to engage grooves 64 in the pins 60 for retaining the same in selected position. The pins 60 extend to the right, referring to Fig. 5, to a point accessible to an operator of the machine and, in their idle or unselected position, are located as shown by the uppermost of the pins 60 in Fig. 5. When pressed to operative position to select the corresponding record, the pins assume the position illustrated by the lowermost of the pins 60.

Screwed into a central threaded bore in the frame disc 61, there is a sleeve 65 which serves as a seat for the spool and winding of an electromagnet 66 and which also serves as a journal for the hub of a rotatable member 67 shown in detail in Fig. 8. The interior of the sleeve 65 serves also as a guideway for a plunger 68 adapted to be attracted by the magnet 66. The rotatable member 67 has mounted on its upper end a pair of contact leaves forming an electric switch 69. Said leaves are suitably insulated from the member 67 and from each other and each is provided with a brush 70 engaging an electrical contact ring 71 mounted on an annular insulation member 72 which is in turn supported by brackets 73 from the frame disc 61. The leaves of the switch 69 are in position to be engaged by the ends of the selector pins 60 when said pins have been pressed to the selected position but may pass freely beyond said ends when said pins are in their idle position. The rotatable member 67 has formed on its lower end a pair of bearing lugs 74 on which there is pivotally mounted, by means of a pin 75, a lever 76. Said lever is pivotally attached to the plunger 68 and carries at its upper end a hammer 77 positioned to register with the end of each of the pins 60 when said pin is engaged by the switch 69. A compression spring 78 is interposed between the lever 76 and the rotatable member 67 and normally retains the hammer 77 in the position shown in Fig. 5.

An electric motor 79 is suitably mounted on any fixed support with its shaft 80 arranged coaxially with the sleeve 65. Said shaft has mounted thereon a hub 81 carrying a disc 82 provided with a number of pins 83. Said pins are equal in number to the selector pins 60 and the angular spacing about the center of shaft 80 is the same as that of pins 60. The pins 83 successively engage one of the leaves of an electric switch 84 which is adjustably mounted as shown at 85 on any suitable fixed support. The leaves of the switch 84 are insulated from each other and from their support and the disc 82 or pins 83 are formed of insulating material. The shaft 80 also carries a collar 86 in turn carrying a pair of yoke arms 87 which pass freely through suitable openings in the disc 82 and engage openings 88 in the rotatable member 67 for rotating the same.

A switch 89 has one of its leaves engaging the periphery of the disc 82 which is provided with a notch 90 in which the arcuate end 91 of said leaf may engage. In the rotation of the disc 82, the switch 89 is opened when the end 91 thereof engages the notch 90 but is closed at other times.

In the operation of the transmitter as so far described, the member 67 is rotated by the motor 79. The switch 69 scans the operative positions of the selector pins 60 and each time it reaches one of the pins which has been placed in the operative position, said switch is closed. By means of electric circuits to be hereinafter described the solenoid 66 is actuated by the closure of switch 69 and the hammer 77 is caused to

strike the pin 60 which has just been engaged by said switch and to return the pin to its normal position. At the same time, the disc 82 is rotated and the switch 84 is closed each time one of the pins 83 strikes the same. The operation of switch 84 is so timed by adjustment of its position with respect to the pins 83 that the closure takes place slightly ahead of and continues during the operation of switch 69. It is to be noted, however, that switch 84 is actuated once by each of the pins 83, whereas switch 69 is actuated only by the pins 60 which have been placed in selected position. The switch 89 is closed when the disc 82 leaves an initial idle position and is not reopened until said disc has made a complete revolution.

Receiver

In Figs. 9 and 10 of the drawings the local control members of the controlled machine appear as a group of pins 101 corresponding to pins 32 of Fig. 1 of the Wilcox patent before mentioned. Each of said pins is adapted when pressed to the right in Fig. 9 to control the selection of a certain record to be played. The mechanism by which this is accomplished is shown in the Wilcox patent and forms no part of the present invention. Said pins are slidably mounted in a stationary member 102 which is provided with a peripheral tension spring 103. Each of the pins is furnished with a notch 104 adapted to engage the spring 103 to retain the pins in the selected position. For moving the pins from the idle to the selected position, there is provided a hammer 105 mounted on a lever 106 which is pivotally mounted on a pin 107. The pin 107 is carried by a rotatable member 108 which is similar in construction to the rotatable member 67 except that the upper portion thereof carrying the switch 69 is omitted. The member 108 is mounted in a similar manner to the member 67 and is rotated in a similar manner by means of a yoke 109 mounted on a shaft 110. The hammer 105 is operated by an electromagnet 111 in the same manner as the hammer 77 is operated by the electromagnet 66.

The shaft 110 is suitably journaled in a stationary plate 112 and has mounted thereon a ratchet wheel 113. A pawl 114 is mounted on a pivot pin 115 secured to plate 112 and operating in a slotted opening 116 in said pawl. Said pawl is connected by a link 117 to the plunger 118 of an electromagnet 119 mounted on plate 112 and is normally held against a stop pin 120 by a tension spring 121. The upper end of the pawl 114 is adapted to engage the teeth of the ratchet wheel 113 and to rotate the ratchet wheel, shaft 110 and hammer 105 through an angle corresponding to one of the teeth of said ratchet wheel each time magnet 119 is energized. Said rotation is opposed by a coiled clock spring 122 having one end secured to the shaft 110 and the other to the plate 112. A second pawl 123, pivoted to plate 112 at 124 is normally held in engagement with the teeth of the ratchet wheel 113 by a tension spring 125 and normally prevents return movement of the ratchet wheel by the spring 122.

The pawl 123 serves as the armature of an electromagnet 126 adapted when energized to withdraw the pawl from engagement with the ratchet teeth. A latch bar 127 is pivotally mounted on a pin 128 secured to the plate 112 and has a latching engagement with the upper end of pawl 123 adapted to retain said pawl out of engagement with the ratchet teeth when electromagnet 126 has been energized and subse-

quently deenergized. A pin 129 mounted on the ratchet wheel 113 engages an abutment 130 formed on the latch lever 127 when the parts are in the initial position shown in Fig. 10. Said pin has an insulated extension 131 on the reverse side of the ratchet wheel adapted to engage one of the leaves of an electric switch 132 which is mounted on and suitably insulated from the plate 112.

In the operation of this part of the invention, the parts are initially in the position shown in Fig. 10. Successive actuations of the magnet 119 advance the ratchet wheel step-by-step in the direction of the arrow until at the last actuation of the magnet 119 extension 131 of the pin 129 closes switch 132. The closing of said switch energizes the electromagnet 126 by a circuit to be hereinafter described. Magnet 126 withdraws pawl 123 from ratchet wheel 113 and latch bar 127 engages said pawl and holds the same out of engagement. Subsequent deenergizing of magnet 119 permits the spring 122 to return said ratchet wheel to the initial position. The return movement is stopped by engagement of pin 129 with abutment 130, at which time said pin also engages the lower surface of lever 127 and lifts the same out of engagement with pawl 123. Since magnet 126 is now deenergized, the pawl returns to its original position.

Wiring diagram

Referring now to the wiring diagram, Fig. 11, there are indicated therein the several switches and electromagnets and the motor 79 already described. There is also shown an electromagnet 133 not shown in the drawings. Said magnet corresponds to the magnet 158 in Fig. 18 of the Wilcox Patent 2,002,236 which places the controlled machine in condition to play one selection each time the magnet is energized. This magnet thus serves the same purpose as the coin register magnet in the usual phonograph mechanism.

Power for operating the apparatus may be supplied from any suitable source, as by a pair of conductors 134. Preferably certain of the apparatus is operated at a low voltage and for this purpose there is provided a transformer 135 which may be located at the remote station or at the controlled machine, as desired. A conductor 136 is connected to both the primary and secondary windings of the transformer 135 and serves as a common return line for both high voltage and low voltage circuits. A conductor 137 connected to the opposite terminal of the primary winding of the transformer serves as a distributary for the high voltage circuits. A conductor 138 connected to the opposite terminal of the secondary winding of the transformer serves as a distributary for the low voltage circuits. Other conductors shown in the diagram will be referred to by reference number only in tracing the circuits of which they form a part. The circuits may best be described in connection with a résumé of the operation of the entire apparatus.

Operation

In the idle condition of the apparatus, all of the switches are open and all of the electromagnets are deenergized. The mechanical parts are in the condition shown in the drawings. The lever 76 carrying the hammer 77 is positioned with said hammer approximately midway between two of the pins 60 (Fig. 6).

Let it now be assumed that it is desired to

play five selections. Five of the pins 60 in the transmitter corresponding to the five desired selections are pressed to the left (Fig. 5) into the path of travel of the scanning switch 69. A coin or coins are then inserted sufficient in value to pay for the five selections. The receipt of the coins causes rotation of the shaft 21 of the coin register a distance proportional to five teeth of the ratchet wheel 25. The arm 23 is moved counterclockwise in Fig. 2 a distance corresponding to said five teeth and switches 36 and 37 are closed as previously described.

The closing of switch 36 has no immediate effect. The closing of switch 37 completes a circuit for motor 79 (137, 37, 139, 79, 136). The operation of motor 79 starts the rotation of the transmitter parts as previously described.

The first event to occur in the rotation of these parts is the closing of switch 89 which is in parallel with switch 37 in the motor circuit. Thus the motor will continue to run for at least a complete revolution of the disc 82 even though switch 37 is later opened.

The next event is the engagement of one of the pins 83 with switch 84. Switch 84 is thus closed and completes a circuit for the magnet 119 (138, 84, 145, 119, 136). The operation of this magnet turns the receiver hammer 105 through a distance corresponding to one tooth of ratchet 113 and places the same in registry with one of the pins 101. At this time the motor 79 has turned the transmitter hammer 77 so that it is in registry with one of the pins 60. Successive engagements of the pins 83 with the switch 84 similarly operate the magnet 119 so that the hammer 105 is moved in step with the hammer 77. Thus each time the hammer 77 registers with one of the pins 60 the hammer 105 registers with a corresponding pin 101. Obviously each local control pin 101 may control the selection in the phonograph of the record designated for the corresponding remote selector pin 60.

Assuming that the first of the pins 60 to be reached by the hammer 77 was not selected, the scanning switch 69 passes said pin without engagement and no result is obtained other than the spacing of the hammer 135 to follow the movement of the hammer 77. The scanning switch 69 reaches the first of the pins 60 which have been placed in selected position just after the switch 84 has been closed to place the hammer 105 in registry with the corresponding pin 101. The closing of switch 69 by engagement with said pin completes a circuit for solenoid 43 (138, 71, 70, 69, 70, 71, 140, 41, 43, 136). The operation of solenoid 43 moves the ratchet wheel 25 in the coin register one space and thus checks off one selection value on said coin register.

The closing of switch 69 also completes a circuit for solenoid 66 (128, 71, 70, 69, 70, 71, 142, 66, 136). The operation of solenoid 66 causes the hammer 77 to strike the selected pin 60 to return the same to its idle position.

The closing of switch 69 also completes a circuit for solenoid 111 (138, 71, 70, 69, 70, 71, 140, 36, 143, 111, 136). The operation of solenoid 111 operates the hammer 105 to strike the pin 101 to place the same in the selected position.

The closing of switch 69 also completes a circuit for the magnet 133 (138, 71, 70, 60, 70, 71, 140, 36, 143, 133, 136). The operation of solenoid 133 places the controlled machine in condition to play one selection as taught in the Wilcox patent previously mentioned.

Successive engagements of the switch 69 with the pins 60 similarly result in the checking off of values on the coin register, the placing of the corresponding pins 101 in selected position and the registry of coin values by the magnet 133 until when five such selections have been made the coin register has resumed its initial position and switches 36 and 37 are opened. The opening of switch 36 prevents the subsequent completion of the circuits for magnets 111 and 133 so that no more selections can be transmitted to the receiver, even though more than five of the pins 60 have been selected. The opening of switch 37 has no immediate result since switch 89 is closed and the motor 79 continues to run until one complete revolution of the disc 82 has been made. This is for the purpose of returning all of the pins 60 to idle position in the case that excess selections have been made and to insure that the receiver is returned to initial position.

Assuming that six selections were made but only five were paid for, the first five operations of the switch 69 are effective as previously described, leaving one of the pins 60 in selected position. When this pin is engaged by switch 69, magnet 56 is operated as before to return the pin to idle position. Magnet 43 is also operated but results merely in turning the ratchet wheel 25, arm 23 and shaft 21 together since pin 51 engages the arm 23. Magnets 111 and 133 are not energized since switch 36 has been opened.

One complete revolution of disc 82 returns the notch 90 to the switch 89, permits said switch to be opened and stops the operation of motor 79. The last actuation of switch 84 in this revolution moves the receiver ratchet 113 to engage pin 131 with switch 132. The closing of switch 132 completes a circuit for magnet 126 (137, 132, 144, 126, 136). The operation of said magnet frees the pawl 123 from the ratchet wheel 113 but the ratchet wheel is prevented from immediately returning to the initial position by the fact that magnet 119 remains energized until the hammer 105 has had time to operate, if the selections made call for such operation. The opening of switch 84 just prior to the completion of the revolution of disc 82 de-energizes magnet 119 and permits the receiver parts to return to initial position.

It will be observed that ratchet wheel 113 can not make a complete revolution due to interference of pin 129 with abutment 130. For that reason said ratchet wheel may be provided with one more tooth than the number of possible selections and the pins 101 may be spaced accordingly. The same result may be obtained by using a ratchet with the same number of teeth as the number of selections, placing the first pin 101 in registry with the initial position of the hammer 105 and omitting the first of the pins 83 in the transmitter. Thus with twelve available selections only eleven movements of hammer 105 are required and the pins 101 may be uniformly spaced.

The parts have all now returned to initial position. The pins 101 at the controlled machine corresponding to the remote selector pins 60 which were pressed have been placed in selected position and the magnet 133 has been operated a number of times equal to the number of selections to be played so that the controlled machine is in condition to play all of the records selected. The pins 101 are returned to

their idle positions by operation of the controlled machine as the corresponding selections are played and the selections as played are checked off on the apparatus controlled by magnet 133. The mechanism by which these operations may be accomplished is shown in the Wilcox patent and forms no part of the present invention.

The foregoing specification describes the invention in its preferred form as applied to the particular type of controlled machine shown in the Wilcox patent mentioned. Obviously the details may be considerably varied and the invention may be adapted to control other types of machines without departing from the scope thereof as defined by the appended claims.

The invention claimed is:

1. Remote control apparatus for operation of a machine having a plurality of local control members each movable to control a variable operation of the machine, said remote control apparatus including a plurality of remotely positioned selector members each selectively movable from an idle to an operative position and each corresponding to one of said local control members, a movable element having a scanning portion adapted to scan the operative positions of said selector members and to engage in said scanning movement such of said selector members as have been placed in operative position, an operating member movable into registry with each of said local control members successively, electrically operated means controlled by movement of said movable element and moving said operating member to register with each of said local control members as said scanning portion scans the position of the corresponding remote control member, and other electrical means operated by engagement of said scanning portion with each of said remote control members to actuate said operating member to move the local control member with which it is then in registry, starting means for said machine, and means operable concurrently with said other electrical means for operating said starting means.

2. Remote control apparatus for operation of a machine having a plurality of local control members each movable to control an operation of the machine, said remote control apparatus including a plurality of remotely positioned selector members each selectively movable from an idle to an operative position and each corresponding to one of said local control members, a movable element having a scanning portion adapted to scan the operative positions of said selector members and to engage in said scanning movement such of said selector members as have been placed in operative position, an operating member movable into registry with each of said local control members successively, electrically operated means controlled by movement of said movable element and moving said operating member to register with each of said local control members as said scanning portion scans the position of the corresponding remote control member, other electrical means operated by engagement of said scanning portion with each of said remote control members to actuate said operating member to move the local control member with which it is then in registry, and means operating substantially simultaneously therewith for returning said last mentioned remote control member to idle position.

3. Remote control apparatus for operation of

a machine having a plurality of local control members each movable to control an operation of the machine, said remote control apparatus including a plurality of remotely positioned selector members each selectively movable from an idle to an operative position and each corresponding to one of said local control members, a movable element having a scanning portion adapted to scan the operative positions of said selector members and to engage in said scanning movement such of said selector members as have been placed in operative position, an electromagnetically operated hammer movable into registry with each of said local control members successively, electrically operated means controlled by movement of said movable element and moving said hammer to register with each of said local control members as said scanning portion scans the position of the corresponding remote selector member, a second electromagnetically operated hammer movable with said scanning portion into registry with each of said remote selector members successively, an electric switch operated by engagement between said scanning portion and each of said remote selector members, electromagnetic elements and associated electric circuits controlled by said switch and adapted to actuate said first mentioned hammer to strike and move the local control member with which it is then in registry and to actuate said second mentioned hammer to strike the corresponding remote selector member to return the same to idle position when said switch is operated.

4. Remote control apparatus for operation of a machine having a plurality of local control members each movable to control an operation of the machine, said remote control apparatus including a plurality of remotely positioned selector members each selectively movable from an idle to an operative position and each corresponding to one of said local control members, a movable element having a scanning portion adapted to scan the operative positions of said selector members and to engage in said scanning movement such of said selector members as have been placed in operative position, an operating member movable into registry with each of said local control members successively, an electromagnetically operated ratchet mechanism for moving said operating member, an electric switch periodically operated by movement of said movable element, an electric circuit controlled by said switch and operating said ratchet mechanism to move said operating member to register with each of said local control members as said scanning member scans the position of the corresponding remote selector member, and electrically operated means operated by engagement of said scanning portion with each of said remote control members to actuate said operating member to move the local control member with which it is then in registry.

5. Remote control apparatus for successive operations of a machine having a plurality of local control members each movable to control an operation of the machine, said remote control apparatus including a local scanning member movable to scan a plurality of positions each corresponding to one of the several local control members, a plurality of remotely positioned selector members each selectively movable from an idle to an operative position, a remote scanning member movable to scan the operative positions of said selector members and to engage in said scan-

ning movement such of said selector members as have been placed in operative position, means electrically synchronized with the movement of said remote scanning member for moving said local scanning member in timed relation with the movement of said remote scanning member, electrically operated means adapted to move said local control members, said electrically operated means being actuated by engagement of the re-

5 mote scanning member with an operatively positioned selector member and controlled by the position of the local scanning member to move a particular local control member corresponding to said position at the moment of actuation, starting means for said machine, and means operable concurrently with said other electrical means for operating said starting means.

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