

July 31, 1934.

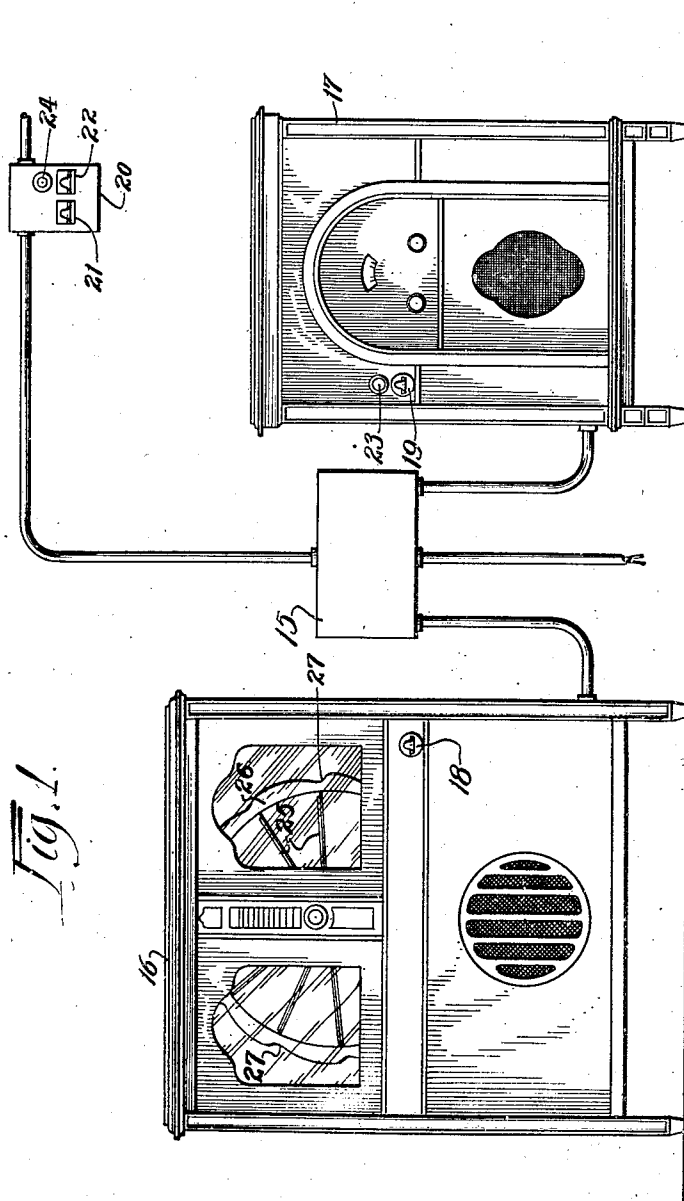
B. E. MILLS

1,968,499

CONTROL MECHANISM FOR COIN OPERATED PHONOGRAPH-RADIO COMBINATION

Filed March 10, 1930

5 Sheets-Sheet 1



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July 31, 1934.

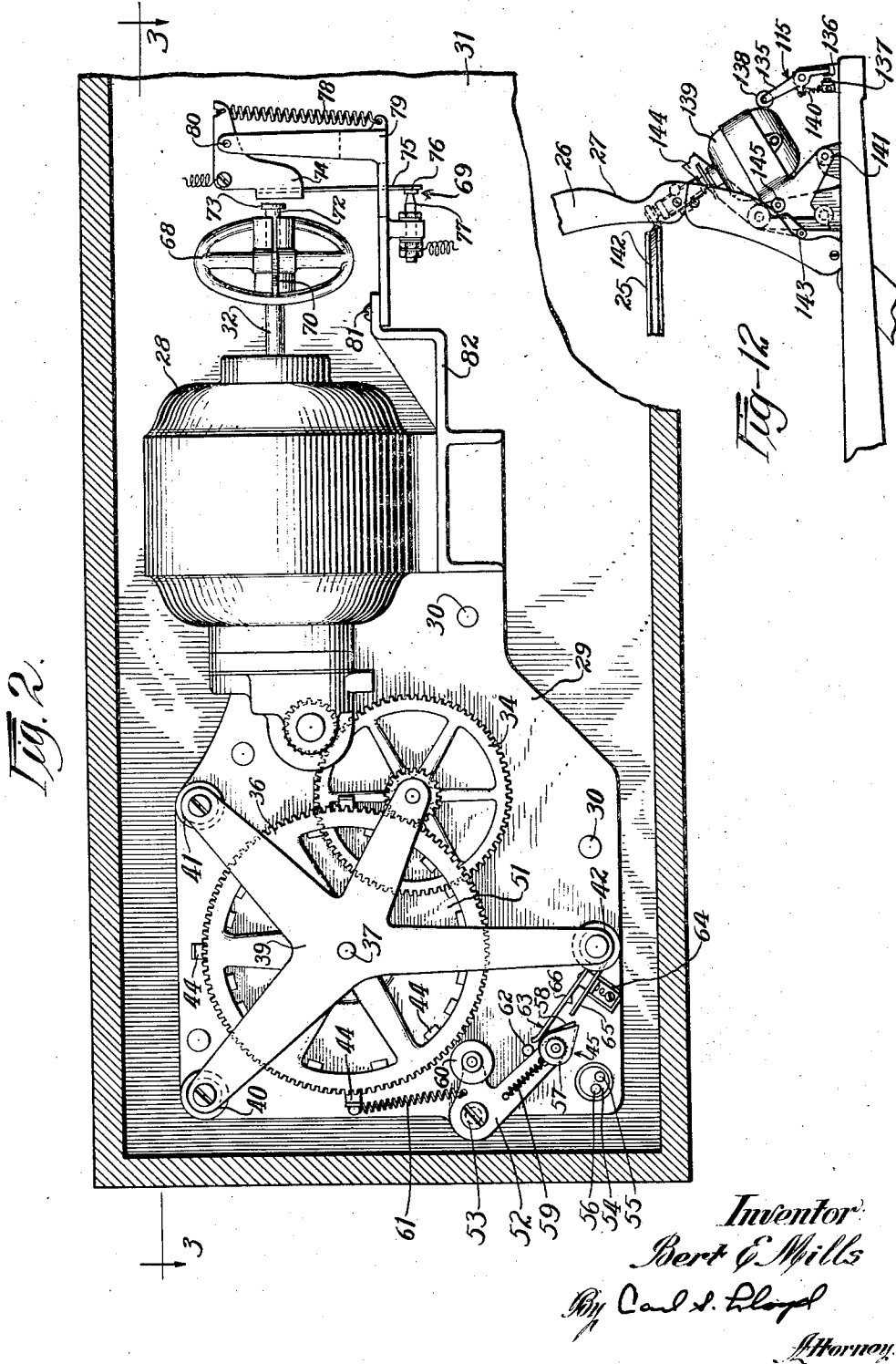
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5 Sheets-Sheet 2



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CONTROL MECHANISM FOR COIN OPERATED PHONOGRAPH-RADIO COMBINATION

Filed March 10, 1930

5 Sheets-Sheet 3

Fig. 3.

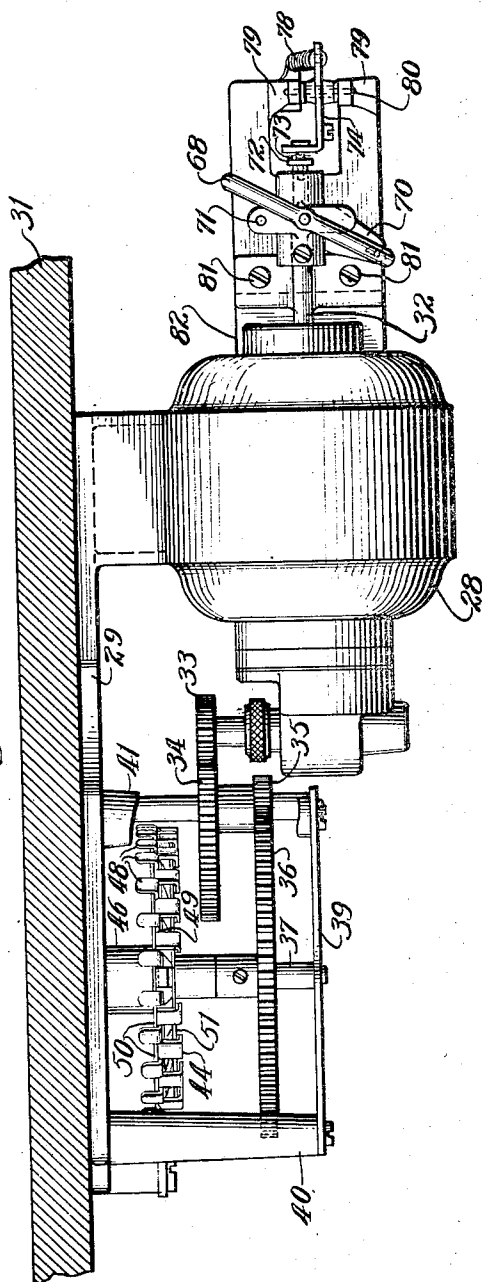


Fig. 5.

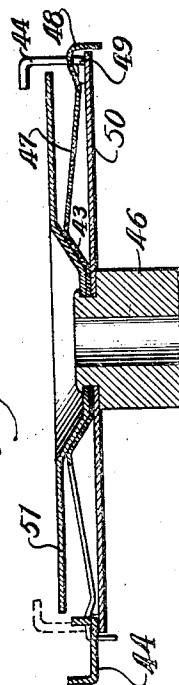
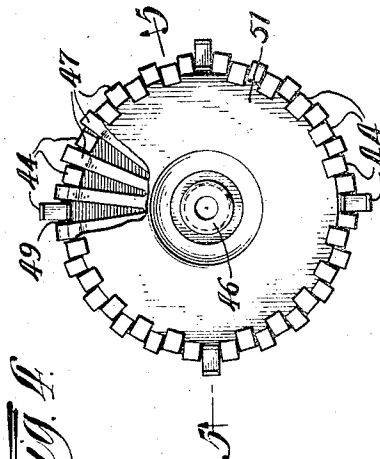


Fig. 4.



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**July 31, 1934.**

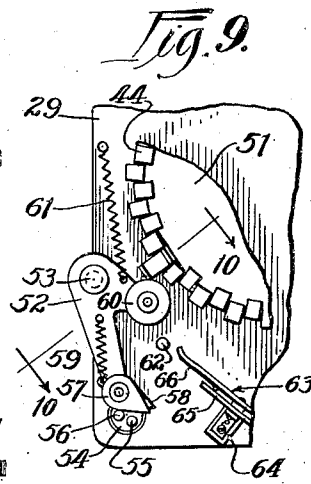
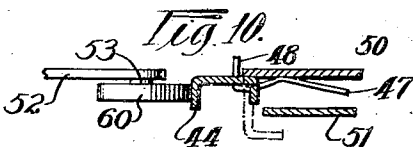
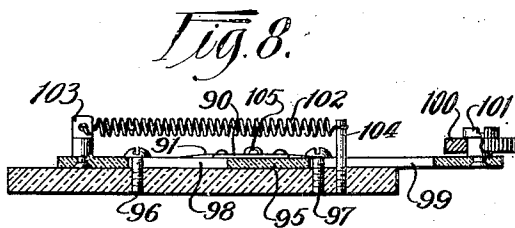
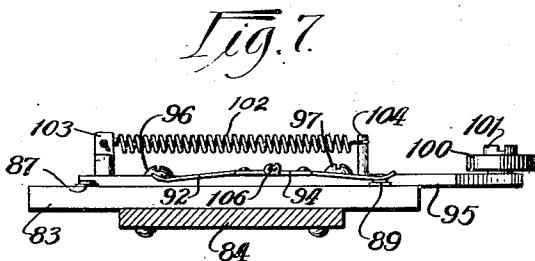
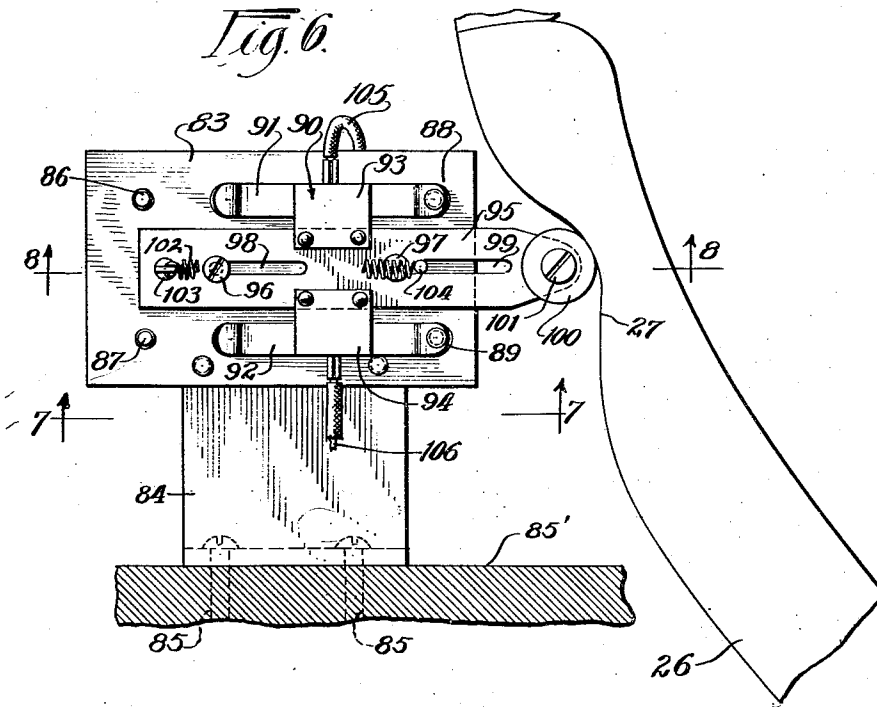
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**1,968,499**

# CONTROL MECHANISM FOR COIN OPERATED PHONOGRAPH-RADIO COMBINATION.

Filed March 10, 1930

5 Sheets-Sheet 4



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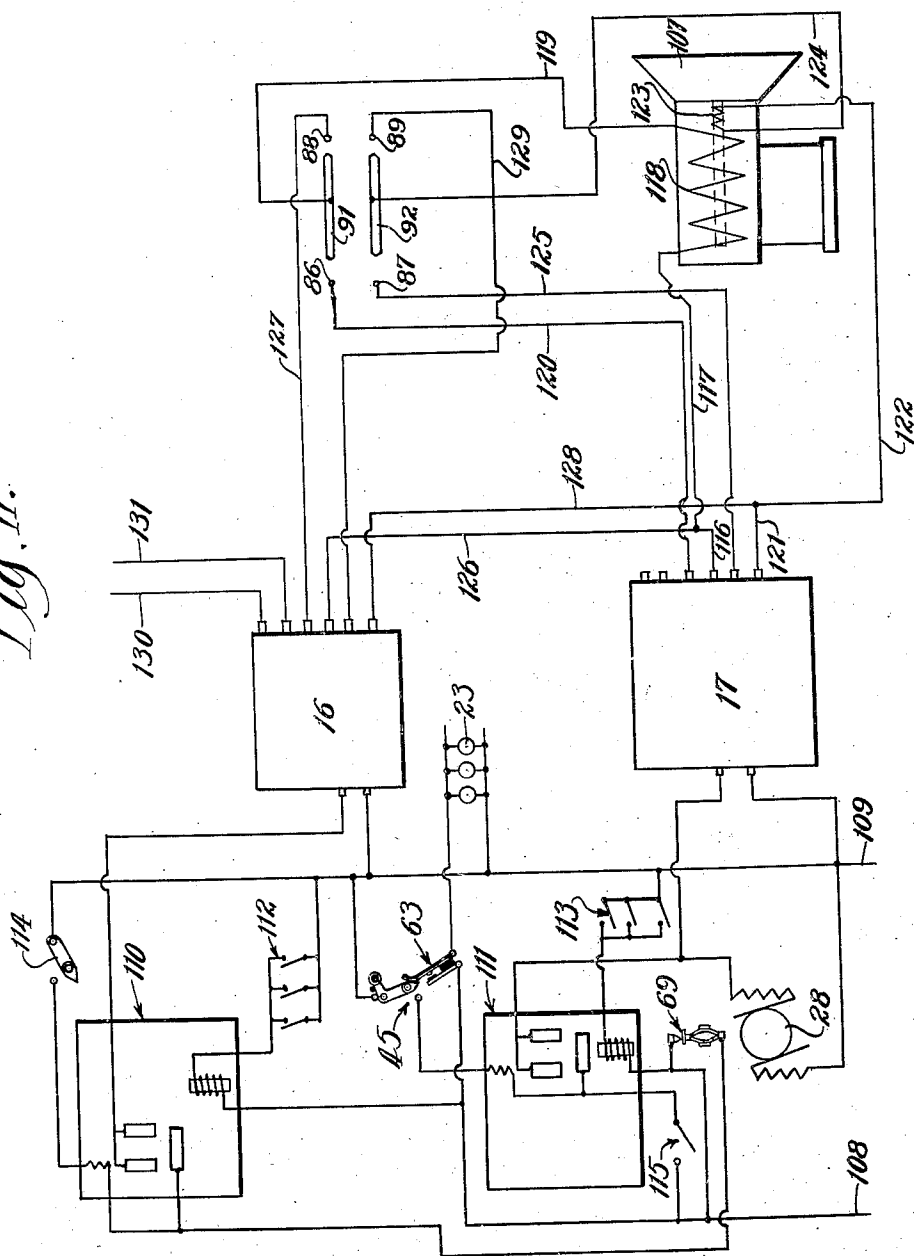
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CONTROL MECHANISM FOR COIN OPERATED PHONOGRAPH-RADIO COMBINATION

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Fig. 11.



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## UNITED STATES PATENT OFFICE

1,968,499

## CONTROL MECHANISM FOR COIN-OPERATED PHONOGRAPH-RADIO COMBINATION

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

Application March 10, 1930, Serial No. 434,792

27 Claims. (Cl. 194—15)

This invention relates to control mechanism for regulating the operation of a combined automatic phonograph and radio unit or system. The mechanism is particularly designed for the control of an automatic phonograph and radio unit which is equipped for coin operation.

An object of the invention is to provide mechanism of this character which will time the operation of the radio and permit only a predetermined period of reception.

Another object is to provide in a phonograph-radio combination means for automatically preventing the operation of either the phonograph or the radio while the other is in operation.

A further object of the invention is to provide in an apparatus of this type, a device which will give a suitable signal a sufficient time before the end of a period of radio reception so that the radio program may be continued, if desired, upon the insertion of an additional coin.

A still further object of the invention is to provide in a combined phonograph and radio system a speaker and a control switch for the speaker which is operable, in conjunction with other portions of the control mechanism, to connect the speaker either to the radio or to the phonograph depending upon which instrument is to be operated.

Further objects and advantages of the invention will be apparent as I proceed with my specification, which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

Referring to the drawings:

Fig. 1 is an elevational view of a phonograph-radio unit provided with the control mechanism of my invention;

Fig. 2 is a broken sectional view, showing the radio timing motor and the switches controlled thereby;

Fig. 3 is a top plan view of the same parts, the view being substantially on the line 3—3 of Fig. 2;

Fig. 4 is a perspective view of the timing disc employed in the timing mechanism;

Fig. 5 is a section taken on the line 5—5 of Fig. 4;

Fig. 6 is an elevational view of a double throw switch adapted to connect either the radio or the phonograph with the speaker;

Fig. 7 is a sectional view of the double throw switch taken on the line 7—7 of Fig. 6;

Fig. 8 is a section through the double throw switch taken on the line 8—8 of Fig. 6;

Fig. 9 is a broken elevational view showing

the operation of the timing disc in opening the radio cut-off switch;

Fig. 10 is a broken detail section taken on the line 10—10 of Fig. 9;

Fig. 11 is a wiring diagram showing the electrical circuits employed in the combined phonograph-radio unit; and

Fig. 12 is a view of the radio cut-out switch and the parts of the phonograph mechanism for actuating the switch.

Referring to Fig. 1, the numeral 15 designates a control box in which are mounted the radio-timing mechanism, and a phonograph cut-out switch, which together are arranged to control an automatic phonograph 16 and a radio 17, both of which are equipped for coin operation, the phonograph being provided with a coin slot 18 and the radio being provided with a coin slot 19 through which coins may be inserted locally to start the operation of the machine. Provision is also made for controlling both the phonograph and the radio from remote paying stations. In the unit shown the remote control consists of a series of wall boxes 20, which are provided with coin slots 21 and 22 for starting the phonograph and radio respectively. The radio cabinet is provided with a light 23, and the wall boxes are provided with lights 24 which, as will subsequently appear, are designed to be turned on slightly before the completion of a period of radio reception to indicate the time for inserting additional coins if continuation of the radio program is desired.

The automatic phonograph 16 is equipped with a record carrier adapted to support a series of records 25 which are radially mounted on a carrier within the cabinet as shown in Fig. 1. An annular cam member 26 is peripherally disposed about the record carrier and is provided with a series of cam grooves 27 which are adapted to control the movements of the reproducer and record-drive mechanism. An automatic phonograph embodying these features is shown in my co-pending application, Serial No. 427,361, filed February 10, 1930.

While in Fig. 1, I have shown the radio and phonograph as distinct units provided with separate speakers, it will be apparent that both of these instruments may be combined in a single cabinet in which a single speaker is employed for both instruments. As will subsequently appear, means is provided for connecting this common speaker either to the phonograph or the radio depending upon which instrument is being played.

Referring to Figs. 2 and 3, a radio timing motor 28 is secured to a mounting plate 29 which in

turn is fastened by the rivets 30 to the wall 31 of the control box 15. The left-hand end of the armature shaft 32, viewing Fig. 2, is connected by reduction gears 33, 34, 35 and 36 to a shaft 37, said shaft being journaled at one end in the mounting plate 29, the other end of the shaft being journaled in a yoke 39 which is supported from the mounting plate 29 by laterally extending posts 40, 41 and 42.

A timing mechanism is provided, which in conjunction with the timing motor, controls the period of radio reception. This mechanism comprises a timing disc 43, provided peripherally with a series of adjustable tabs 44; and a cutout switch 45 (Fig. 2) which is periodically actuated by the tabs 44 to stop the radio after a predetermined period of radio reception.

Referring to Figs. 4 and 5, the timing disc 43 is secured to a hub portion 46 carried by the shaft 37, and is cut away to provide radially extending fingers 47, between which are disposed the adjustable tabs 44. The outer extremities of the fingers 47 are bent inwardly as indicated at 48 to engage laterally extending lugs 49 projecting from the tabs 44. The timing disc 43, including the spaced fingers 47, is made of thin sheet metal and resiliently holds the tabs 44 against a back plate 50 which is carried on the hub 46 and which turns with said timing disc 43. In Fig. 5 the tab 44 which is shown in elevation is in the non-circuit-breaking position and the tab 44 which is shown in section is in the circuit-breaking position, in which position it extends into the path of an arm of the cut-out switch 45. A guard plate 51 is mounted on the hub 46 and protects the spaced fingers 47. In Fig. 4 four of the tabs 44, spaced 90 degrees apart, have been turned to circuit-breaking position. The gear ratio between the timing motor 28 and the shaft 37 is such that the timing disc 43 will make one revolution every twenty minutes so that with the adjustment shown in Fig. 4 the radio will be timed for reception periods of five minutes each. It will be apparent that other timed intervals of radio reception may be obtained by employing other adjustment combinations of the tabs 44.

The radio cut-off switch 45 (see Figs. 2 and 9) comprises a switch arm 52 pivotally mounted at 53 on the mounting plate 29; and a stud 54 carried by said mounting plate 29 and provided with a contact pin 55 and an insulation pin 56. A contact element 57 provided along one edge with an insulation element 58 is pivotally secured to the end of the switch arm 52, its pivotal movement on the arm being restrained by a spring 59 secured at one end to the contact element 57 and at the other end to a fixed point on said arm. A roller 60 is secured to the switch arm 52 and is positioned to engage the tabs 44 when the latter are in the projected or circuit-breaking position. A coil spring 61 secured at one end to the switch arm 52 and at the other end to a fixed point on the mounting plate 29 urges the switch arm 52 in a counter-clockwise direction, viewing Fig. 2, and a stop pin 62 limits said movement of the switch arm under the action of said spring 61.

The action of the timing mechanism in opening the radio circuit is shown in Fig. 9, in which the parts are shown in the circuit-breaking position. The tab 44 by engagement with the roller 60 has turned the switch arm 52 in a clockwise direction until the contact element 57 has momentarily engaged the contact pin 55 and has then been moved into engagement with the insulation pin 56. As the tab 44 moves past the

roller 60, the switch arm 52 will be moved further in a clockwise direction until the tip portion of the switch element 57 has passed the insulation pin 56. When the tab 44 releases the roller 60, the switch arm 52, under the action of the spring 61, is returned to the position shown in Fig. 2. On the return movement of the switch arm a circuit is not completed between the switch element 57 and the contact pin 55 because only the insulation element 58 engages the pins 55 and 56, the switch element 57 being thus held away from said pins. As will subsequently appear in the description of Fig. 11, when the switch 45 is thus temporarily closed, a suitable coin-controlled circuit-breaking device is actuated and either breaks the circuit which energizes the radio, or returns the circuit-breaking switch one step towards circuit-breaking position in the event that further service corresponding to additional coins is still to be rendered.

The radio timing mechanism includes a signal device which gives a suitable warning a sufficient interval of time before the end of the period of radio reception, so that if desired, the radio program may be continued by the insertion of an additional coin. For this purpose there is provided a signal switch 63 which is controlled by the radio cut-out switch 45, the switch 63 being connected in a circuit with the lights 23 and 24 (see Fig. 1). The signal switch comprises a supporting bracket 64 secured to the mounting plate 29; and a pair of spaced contact elements 65 and 66 which are suitably insulated from each other by a block 67. The switch element 66 extends into the path of movement of the switch arm 52. In the normal position of the switch arm 52, which is maintained during the playing period of the radio, the signal control switch 63, as indicated in Fig. 2, is in the open position and the signal lights are inoperative. During the interval of actuation of the switch arm 52 by the tabs 44, as shown in Fig. 9, the signal control switch 63 is closed, so that the signal lights are turned on to indicate the approach to the end of the radio program. It will be apparent that the switch 63 is closed shortly after tab 44 engages the roller 60, so that sufficient time is allowed for the insertion of an additional coin before the radio energizing circuit is broken by the coin-controlled circuit-breaking mechanism.

The radio timing mechanism also includes means for suspending the operation of the phonograph during the period of radio reception. Referring to Figs. 2 and 3, this mechanism comprises a balanced wheel or governor 68 carried by the timing motor armature shaft 32; and a phonograph cut-out switch 69 which is placed in the main line circuit controlling the phonograph mechanism. The balanced wheel 68 carries a lever 70 which is pivoted at 71 to the hub portion of the wheel and which is adapted to engage a pin 72 which is slidably mounted in said hub portion. Said pin 72 carries an insulation tip 73 which engages a lever 74 to which is secured a switch arm 75, said switch arm being provided with a contact 76 adapted to engage an opposing contact 77 of the phonograph cut-out switch 69. During the interval of phonograph operation, the contacts 76 and 77 are held together under the action of a coil spring 78 which extends between the lever 74 and a fixed point on a bracket 79, the lever 74 being pivotally supported on said upright by a pin 80. Said bracket 79 is secured by bolts 81 to an apron 82 carried by the shell of the timing motor 28. Dur-

ing the period of radio reception the balanced wheel 68 straightens out on the shaft 32 which motion, through the action of the lever 70, moves the pin 72 against the lever 74 and opens the switch 69 to prevent operation of the phonograph.

In Figs. 6-8 I have shown one form of a double throw switch which may be used to shift a speaker from a radio to the phonograph and vice versa depending upon which instrument is being played. This switch comprises a switch plate 83 which is carried by a bracket 84 secured by bolts 85 to a fixed support 85<sup>1</sup> in the phonograph cabinet; a pair of radio contact terminals 86 and 87 carried by the switch plate 83; a pair of phonograph contact terminals 88 and 89 carried by the switch plate 83; and a double throw switch member 90 carried by the switch plate 83 and controlled by the movement of the phonograph mechanism to automatically connect either the radio or the phonograph to the speaker. The switch member 90 includes a pair of spaced contact fingers 91 and 92 which are carried by plates 93 and 94 respectively, said plates being secured to a reciprocating cam arm 95. The arm 95 is slidably mounted on the switch plate 83 by means of a pair of large-headed screws 96 and 97 carried by the switch plate 83 and extending through longitudinal slots 98 and 99 formed in the reciprocating arm 95. A roller 100 is secured by a pin 101 to the outer free end of the arm 95, said roller being adapted to follow the peripheral grooved surface of the cam ring 26, which forms a part of the record carrier assembly of the phonograph. A coil spring 102, secured at one end to a stud 103 carried by the arm 95 and at the other end to a pin 104 carried by the switch plate 83, urges the roller 100 into the cam groove 27 formed in the peripheral surface of the cam ring 26. The double throw switch and cam ring are so related that the roller 100 will be in the cam groove 27 when the parts of the phonograph are in playing position. Conductors 105 and 106, carried by the contact fingers 91 and 92 respectively, connect the opposite sides of the line to the speaker. The switch plate 83 and the reciprocating arm 95 are formed of a material which affords suitable insulation between the several parts of the circuit. In the position of the switch as shown in Fig. 6, the contact fingers 91 and 92 are in engagement with the corresponding terminals 88 and 89 in the phonograph circuit. As the cam ring 26 is turned the reciprocating arm 95 will be shifted on the switch plate 83 until the contact fingers 91 and 92 engage the corresponding contacts 86 and 87 leading to the radio. It will be apparent, therefore, that in the playing position for the phonograph the speaker will be connected with the phonograph mechanism and in the playing position for the radio the speaker will be connected to the radio. A single speaker therefore, accommodates both the radio and the phonograph. In Fig. 1 the phonograph and radio are shown mounted in separate cabinets and provided with separate speakers and of course it will be understood that a switch of the type described is ordinarily used only when both instruments are in a single cabinet which is provided with but one speaker.

In Fig. 11 I have shown a wiring diagram for a combined automatic phonograph-radio system in which a single speaker 107 is employed in conjunction with the double throw switch just described to accommodate both the phonograph and radio instruments. The phonograph 16 and

the radio 17 are both fed from the main line wires 108 and 109 through automatic coin-controlled circuit-breaking devices 110 and 111 respectively, said circuit-breaking devices including remote control coin switches 112 and 113, respectively, which are carried in the wall boxes 20 (see Fig. 1). Circuit controlling devices of this general type are shown in detail in Patent No. 1,198,861, issued September 19, 1916, to John H. Lesley and Otto T. Schoen. The automatic phonograph 16 is provided with a cut-off switch 114, which is momentarily closed after the playing of each record of the phonograph to actuate the circuit-breaking device 110. The circuit-breaking device is so designed that a circuit energizing the phonograph can only be broken after the number of records corresponding to the number of coins inserted have been played. A coin operated circuit-breaking device affording this type of action is shown in my co-pending application Serial No. 427,670, filed February 12, 1930. The automatic phonograph 16 also is provided with a radio cut-out switch 115 which is controlled by the movement of the phonograph mechanism to automatically connect the radio in the energizing circuit upon the completion of the playing of each phonograph record. When the next record is played the switch 115 is automatically opened by movement of the phonograph mechanism to cut out the radio.

Referring to Fig. 12, the radio cut-out switch 115, comprises a pivoted switch arm 135, provided with a contact 136, and a fixed contact 137 for engaging the contact 136 to complete the circuit through the radio. The upper end of the switch arm 135 carries a roller 138 which is held against the shell of a record drive motor 139 by a spring 140. The motor 139 is pivotally secured at 141 to a supporting frame, and is tilted into driving engagement with record supporting plates 142 by the movement of the cam ring 26, the cam grooves 27 of said ring engaging a cam roller 143 on a lever 144, said lever in turn engaging a cam stud 145 on the motor shell. In the position shown, the motor 139 is in driving engagement with a record support, and the switch 115 is open to cut out the radio. After the playing of the record is completed the motor 139 is tilted into semi-vertical position, which movement closes switch 115 and connects the radio in circuit for playing.

Referring again to Fig. 11, the time-controlled radio cut-off switch 45, being momentarily closed upon the completion of each period of radio reception, actuates the coin-controlled circuit breaker 111, which in turn cuts off the radio provided the number of periods of reception corresponding to the number of coins inserted have elapsed. The signal switch 63, which is closed during the interval of operation of the switch 45, is placed directly across the main line circuit and turns on the lamps 23-24 slightly before the end of a period of radio reception. The radio timing motor 28 is interposed in series with the radio circuit breaker 111 across the main line circuit and controls both the radio cut-off switch 45 and the phonograph cut-out switch 69. It will be noted that the phonograph cut-out switch 69 which prevents the operation of the phonograph while the radio is playing, is placed in the main line circuit in series with the phonograph circuit breaker 110 and the phonograph 16.

The circuit from the radio 17 through the speaker 107 includes a field circuit which comprises, wires 116 and 117 leading from the radio 150



chassis to a field coil 118 in the speaker, a wire 119 leading from said field coil 118 to the switch finger 91, a wire 120 leading from the contact 86 back to the radio chassis; and a voice coil circuit which comprises, wires 121 and 122 leading from the radio chassis to a voice coil 123, a wire 124 leading from the voice coil 123 to the switch finger 92, and a return wire 125 leading from the contact 87 back to the radio chassis.

The circuit connecting the amplifier of the phonograph 16 with the speaker 107 includes a field circuit which comprises, wires 126 and 117 leading to the field coil 118, wire 119 leading from the field coil 118 to the switch finger 91, and wire 127 leading from the contact 88 back to the phonograph amplifier; and a voice coil circuit comprising, wires 128 and 122 leading to the voice coil 123, wire 124 leading from the voice coil 123 to the switch finger 92, and wire 129 leading from the contact 89 back to the phonograph amplifier.

It will be apparent that when the fingers 91 and 92 of the double throw switch 90 engage the contacts 88 and 89 the speaker will be connected for operation with the phonograph amplifier and that when it is in engagement with the contacts 86 and 87 the speaker will be connected to the radio.

The wires 130 and 131 connect the phonograph amplifier with the magnetic pick-up (not shown) which engages the tone grooves of the phonograph record.

While the operation of the various parts of the control mechanism has been explained in the foregoing description, it is believed that a brief statement of the sequence of operations of the playing instrumentalities will aid to a clearer understanding of the invention. Assuming, that a coin has been inserted in either of the coin slots 19 or 22 which control the radio, thereby closing the main line circuit through the radio circuit breaker 111, the radio will be energized and may be tuned in on the desired station. As soon as the circuit is thus completed through the circuit breaker 111, the timing motor 28 is energized and begins to turn the timing disc 43 which in turn moves the tabs 44 towards the radio cut-off switch 45. The starting of the timing motor 28 also opens the phonograph cut-out switch 69 to render the phonograph inoperative during the period of radio reception. When one of the tabs 44 engages the roller 60 on the switch arm 52 the radio signal switch 63 is closed and the signal lights 23 and 24 are turned on to indicate the approach of the end of the period of radio reception. As the tab 44 passes on it momentarily closes the radio cut-off switch 45, which energizes the circuit breaker 111, which in turn cuts off the radio providing only one coin has been inserted. If, however, several coins have been inserted in the radio coin slots, the circuit breaker 111 will merely return one step towards circuit-breaking position and will not shut off the radio until the periods of reception corresponding to the number of coins inserted have elapsed. If but a single coin has been originally inserted in the radio coin slots, the insertion of an additional coin immediately upon the turning on of the signal lights 23 and 24 will permit the continuation of the radio program through another period of reception.

Assuming that the period of play by the radio is ended and that a coin is thereupon inserted in either of the phonograph coin slots 18 or 21, the phonograph circuit breaker 110 will be closed

and the phonograph will start to play. The movement of the phonograph mechanism into playing position automatically opens the radio cut-out switch 115 to render the radio inoperative during the playing of a phonograph record. When a record has been played the movement of the phonograph mechanism into inoperative position automatically closes the phonograph cut-off switch 114, which in turn, through the circuit breaker 110, breaks the circuit through the phonograph, providing the number of records corresponding to the number of coins inserted have been played. If several coins have been inserted the circuit breaker 110 will not cut off the phonograph until all of the records corresponding to the coins inserted have been played. At the end of each record the phonograph mechanism in moving to inoperative position, closes the radio cut-out switch 115. Accordingly, if a coin has in the meantime been inserted in one of the radio coin slots, the radio will be given the preference and will play, the playing of the phonograph being suspended by the opening of the phonograph cut-out switch 69. After the radio has given service corresponding to the coins inserted, the phonograph will again be connected for operation by the closing of the switch 69 and the remaining records corresponding to the coins inserted in the phonograph coin slots will be played. It will be apparent, therefore, that although the playing of the radio is given preference, full service will be rendered by the phonograph although it will be postponed in the event that the radio service may in the meantime be desired by another customer.

During the period of play by the phonograph the speaker control switch 90 will be in the position shown in Fig. 6 and during the interval between the records the switch will be shifted to connect the speaker with the radio. As previously pointed out, the speaker control switch is not necessary in a set up such as is shown in Fig. 1 where two separate cabinets and speakers are employed.

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

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

1. In a combined automatic-phonograph and radio system, means for energizing the phonograph to thereby cause it to play for a period of time, means for energizing the radio whereby to receive a radio broadcast for a period of time, means operable upon energization of the phonograph to prevent energization of the radio until the playing of a record has been completed, and a control mechanism operable to determine the period of radio reception, said mechanism including means for preventing energization of the phonograph during the period of radio reception.

2. In a combined automatic-phonograph and radio system, means for energizing the phonograph to thereby cause it to play for a period of time, means for energizing the radio whereby to receive a radio broadcast for a period of time, a control mechanism comprising, in combination, means operable to determine the period of radio reception, and means operated by the phonograph mechanism for preventing energization

zation of the radio during the interval of play of a phonograph record.

3. In a combined automatic-phonograph and radio system, including coin-controlled circuit-breaking devices for interrupting the operation of the phonograph and the radio after the rendition of service corresponding to the number of coins inserted, a control mechanism comprising, in combination, means operable to determine the period of radio reception, and means operated by the phonograph mechanism for preventing operation of the radio during the interval of play of a phonograph record:

4. In a combined automatic-phonograph and radio system, including coin-controlled circuit-breaking devices for interrupting the operation of the phonograph and the radio after the rendition of service corresponding to the number of coins inserted, a control mechanism operable to determine the period of radio reception, said mechanism including means for preventing operation of the phonograph during the period of radio reception.

5. In a combined automatic-phonograph and radio system, including coin-controlled circuit-breaking devices for interrupting the operation of the phonograph and the radio after the rendition of service corresponding to the number of coins inserted, a control mechanism comprising, in combination; means operable to determine the period of radio reception, said means including means for preventing operation of the phonograph during the period of radio reception; and signal means for indicating the approach to the end of a period of radio reception.

6. In a combined automatic-phonograph and radio system, including coin-controlled circuit-breaking devices for interrupting the operation of the phonograph and the radio after the rendition of service corresponding to the number of coins inserted, a control mechanism comprising, in combination; means operable to determine the period of radio reception, said means including means for preventing operation of the phonograph during the period of radio reception; signal means for indicating the approach to the end of a period of radio reception; and means for preventing operation of the radio during the interval of play of a phonograph record.

7. In a combined automatic-phonograph and radio system, the combination which comprises; means for energizing the phonograph to thereby cause it to play for a period of time; means for energizing the radio whereby to receive a radio broadcast for a period of time; a speaker; a control mechanism operable to prevent energization of the phonograph during the period of radio reception, said control mechanism including means for preventing energization of the radio during the interval of play of a phonograph record; and a switch operable to connect said speaker to the radio during the period of radio reception and to the phonograph during the interval of play of a phonograph record.

8. In combination, a radio, means for energizing the radio whereby to receive a radio broadcast for a period of time and a timing mechanism operable to determine the period of radio reception, said mechanism comprising, a motor, a timing disc driven by said motor and provided with a series of adjustable tab members and a radio cut-out switch comprising a fixed contact, and a lever pivoted adjacent said

disc, one arm of said lever being provided with a contact for engaging said fixed contact and the other arm of said lever being positioned to be engaged by those tab members on the disc which have been adjusted to circuit-breaking position.

9. In combination, a radio; means for energizing the radio whereby to receive a radio broadcast for a period of time, a timing mechanism operable to determine the period of radio reception, said mechanism comprising, a motor, a timing disc driven by said motor and provided with a series of adjustable tab members, and a radio cut-out switch comprising a fixed contact, and a lever pivoted adjacent said disc, one arm of said lever being provided with a contact for engaging said fixed contact and the other arm of said lever being positioned to be engaged by those tab members on the disc which have been adjusted to circuit-breaking position; and a signal device for indicating the approach to the end of a period of radio reception.

10. The combination with a radio and a coin-controlled circuit-breaking device for interrupting the radio circuit after the rendition of service corresponding to the number of coins inserted, of a timing mechanism operable to determine the period of radio reception, said mechanism comprising a motor, a timing disc driven by said motor and provided with a series of adjustable tabs, and a switch adapted to be actuated after a predetermined interval by said tabs, said switch being operable to close a circuit through said circuit-breaking device.

11. In a combined automatic-phonograph and radio system, the combination which comprises; a speaker; a control mechanism operable to suspend the operation of the phonograph during the period of radio reception, said control mechanism including means for suspending the operation of the radio during the interval of play of a phonograph record; and a double throw switch actuated by movement of the phonograph mechanism and operable to connect said speaker to the radio during the period of radio reception and to the phonograph during the interval of play of a phonograph record.

12. In a combined automatic-phonograph and radio system, including a speaker and coin-controlled circuit-breaking devices for interrupting the operation of the phonograph and the radio after the rendition of service corresponding to the number of coins inserted, a control mechanism comprising, in combination; means operable to determine the period of radio reception, said means including means for suspending the operation of the phonograph during the period of radio reception; means for suspending the operation of the radio during the interval of play of a phonograph record; and a double throw switch operable to connect said speaker to the radio during the period of radio reception and to the phonograph during the interval of play of a phonograph record.

13. In a combined automatic-phonograph and radio system, including a speaker and coin-controlled circuit-breaking devices for interrupting the operation of the phonograph and the radio after the rendition of service corresponding to the number of coins inserted, a control mechanism comprising, in combination; means operable to determine the period of radio reception, said means including means for suspending the operation of the phonograph during the period of radio reception; signal means for indicating the ap-

proach to the end of a period of radio reception; means for suspending the operation of the radio during the interval of play of a phonograph record; and a double throw switch operable to connect said speaker to the radio during the period of radio reception and to the phonograph during the interval of play of a phonograph record.

14. In a combined automatic-phonograph and radio system, including coin-controlled circuit-breaking devices for interrupting the operation of the phonograph and the radio after the rendition of service corresponding to the number of coins inserted, a control mechanism comprising, in combination; time-controlled means operable to determine the period of radio reception, said means including a motor, a timing disc driven by said motor and provided with a series of adjustable tab members, and a radio cut-off switch adapted to be momentarily closed by said tab members upon the completion of a period of radio reception; and means for suspending the operation of the phonograph during the period of radio reception, said means including a phonograph cut-out switch and a governor member actuated by said motor and operable to hold said cut-out switch open during the period of operation of said motor.

15. In a combined automatic phonograph and radio system, including coin-controlled circuit-breaking devices for interrupting the operation of the phonograph and the radio after the rendition of service corresponding to the number of coins inserted, a control mechanism comprising, in combination; time-controlled means operable to determine the period of radio reception, said means including a motor, a timing disc driven by said motor and provided with a series of adjustable tab members, and a radio cut-off switch adapted to be momentarily closed by said tab members upon the completion of a period of radio reception; means for suspending the operation of the phonograph during the period of radio reception, said means including a phonograph cut-out switch and a governor member actuated by said motor and operable to hold said cut-out switch open during the period of operation of said motor; and means for suspending the operation of the radio during the interval of play of a phonograph record.

16. In a combined automatic phonograph and radio system, means for energizing the phonograph to thereby cause it to play for a period of time, means for energizing the radio whereby to receive a radio broadcast for a period of time, means operable upon energization of the phonograph to prevent energization of the radio until the playing of a record has been completed, and means for preventing energization of the phonograph during the period of radio reception, said last mentioned means comprising a radio timing motor, a cut-out switch for opening and closing the circuit of said phonograph-energizing means, and means operated by said timing motor for maintaining said switch in open circuit position.

17. In a combined automatic phonograph and radio system, means for energizing the phonograph to thereby cause it to play for a period of time, means for energizing the radio whereby to receive a radio broadcast for a period of time, means operable upon energization of the phonograph to prevent energization of the radio until the playing of a record has been completed, and means for preventing energization of the phonograph during the period of radio reception, said last-mentioned means comprising a radio timing

motor, a cut-out switch for opening and closing the circuit of said phonograph-energizing means, and a governor member operated by said timing motor for maintaining said switch in open circuit position.

18. In a combined automatic-phonograph and radio system, including coin-controlled circuit-breaking devices for interrupting the operation of the phonograph and the radio after the rendition of service corresponding to the number of coins inserted, a control mechanism comprising, in combination; means operable to determine the period of radio reception, said means including means for suspending the operation of the phonograph during the period of radio reception; and a signal device for indicating the approach to the end of a period of radio reception, said device including a switch actuated by said time-controlled means and operable to close a circuit through the signal device at about the end of a period of radio reception.

19. In a combined automatic-phonograph and radio system, including coin-controlled circuit-breaking devices for interrupting the operation of the phonograph and the radio after the rendition of service corresponding to the number of coins inserted, a control mechanism comprising, in combination; means operable to determine the period of radio reception, said means including means for suspending the operation of the phonograph during the period of radio reception; and a radio cut-out switch controlled by movement of the phonograph mechanism and operable to suspend the operation of the radio during the interval of play of the phonograph record.

20. In a combined automatic-phonograph and radio system, including coin-controlled circuit-breaking devices for interrupting the operation of the phonograph and the radio after the rendition of service corresponding to the number of coins inserted, a control mechanism comprising, in combination; time-controlled means operable to determine the period of radio reception, said means including a motor, a timing disc driven by said motor and provided with a series of adjustable tab members, and a radio cut-off switch adapted to be momentarily closed by said tab members upon the completion of a period of radio reception; means for suspending the operation of the phonograph during the period of radio reception, said means including a phonograph cut-out switch and a governor member actuated by said motor and operable to hold said cut-out switch open during the period of operation of said motor; a signal device for indicating the approach to the end of a period of radio reception; and means for suspending the operation of the radio during the interval of play of a phonograph record.

21. In a combined automatic phonograph and radio system, means for energizing the phonograph to thereby cause it to play for a period of time, means for energizing the radio whereby to receive a radio broadcast for a period of time, a speaker, control devices associated with the radio and automatically operable by energization of the latter to prevent energization of the phonograph until the termination of the period for which the radio is energized, and control devices associated with the phonograph and automatically operable by energization of the latter to prevent energization of the radio until the termination of the period for which the phonograph is energized, and a switch operable to connect said speaker to the radio during the period of radio

reception and to the phonograph during the period of play of the phonograph record.

22. In a combined automatic-phonograph and radio system, means for energizing the phonograph to thereby cause it to play for a period of time, means for energizing the radio whereby to receive a radio broadcast for a period of time, a speaker, and a double-throw switch actuated by movement of the phonograph mechanism and operable to connect said speaker to the radio during the period of radio reception and to the phonograph during the interval of play of a phonograph record.

23. In a combination phonograph and radio receiving apparatus, means for energizing the phonograph to thereby cause it to play for a period of time, means for energizing the radio receiving apparatus whereby to receive a radio broadcast for a period of time, control devices associated with the radio and automatically operable by energization of the latter to prevent energization of the phonograph until the termination of the period for which the radio is energized, and control devices associated with the phonograph and automatically operable by energization of the latter to prevent energization of the radio until the termination of the period for which the phonograph is energized.

24. In a combination phonograph and radio receiving apparatus, means for energizing the phonograph to thereby cause it to play for a period of time, means for energizing the radio receiving apparatus whereby to receive a radio broadcast for a period of time, control devices associated with the radio and automatically operable by energization of the phonograph to prevent de-energization of the radio and energization of the phonograph until the termination of the period for which the radio is energized, and control devices associated with the phonograph and automatically operable upon energization of the latter to prevent de-energization of the phonograph and energization of the radio until the termination of the period for which the phonograph is energized.

25. In a combined automatic-phonograph and radio system, including coin-controlled circuit-breaking devices for interrupting the operation of the phonograph and the radio after the rendition of service corresponding to the number of coins inserted, a control mechanism comprising,

in combination; time-controlled means operable to determine the period of radio reception, said means including a motor, a timing disc driven by said motor and provided with a series of adjustable tab members, and a radio cut-off switch adapted to be momentarily closed by said tab members upon the completion of a period of radio reception; means for suspending the operation of the phonograph during the period of radio reception, said means including a phonograph cut-out switch and a governor member actuated by said motor and operable to hold said cut-out switch open during the period of operation of said motor; a signal device for indicating the approach to the end of a period of radio reception, said device including a switch actuated by said time-controlled means and operable to close a circuit through the signal device at about the end of a period of radio reception; and means for suspending the operation of the radio during the interval of play of a phonograph record.

26. In a combination phonograph and radio receiving apparatus, an electric circuit for operating the phonograph, an electric circuit for operating the radio, means for closing the phonograph circuit to operate the phonograph, means including a switch operable by the phonograph apparatus for automatically opening the radio circuit upon the closing of the phonograph circuit and for preventing the closing thereof until the playing of a record on the phonograph has been completed, means for closing the radio circuit, and means for maintaining the phonograph circuit in open condition and preventing the closing thereof during a predetermined period of radio reception.

27. In a combination phonograph and radio receiving apparatus, an electric circuit for operating the phonograph, an electric circuit for operating the radio, coin-controlled means for closing the phonograph circuit to operate the phonograph, means for automatically opening the radio circuit upon the closing of the phonograph circuit and for preventing the closing thereof until the playing of a record on the phonograph has been completed, coin-controlled means for closing the radio circuit, and means for maintaining the phonograph circuit in open condition and preventing the closing thereof during a predetermined period of radio reception.

BERT E. MILLS.