

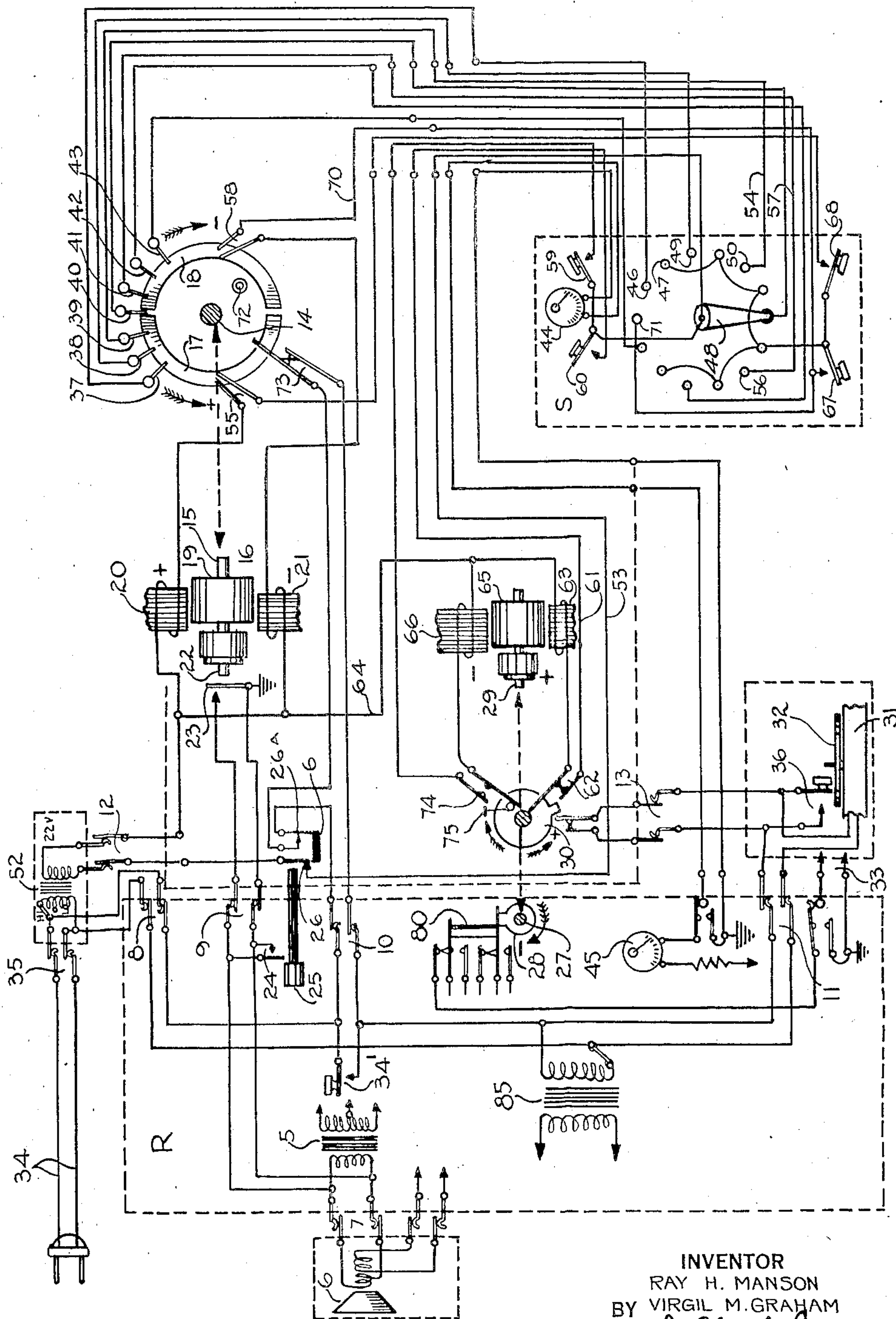
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REMOTE CONTROL RADIO RECEIVING SYSTEM

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REMOTE CONTROL RADIO RECEIVING
SYSTEM

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10 Claims. (Cl. 179—100.11)

This invention relates to radio receiving systems and more particularly to combined radio receiving and phonograph reproducing systems which may be selectively controlled from one or more remote control stations.

It has been previously proposed to selectively control radio receivers and phonographs from a remote point. The present invention, however, has for its purpose a remote control unit which can be readily incorporated in or detached from combined radio receivers and phonographs. Another feature of the invention resides in the provision of a visual indicator in each of the remote control stations whereby the operator is visually informed when the radio receiver is tuned into exact resonance with the signal or carrier wave of the broadcasting station from which the desired program is to be received. A further feature includes the provision of a silent key to be actuated by the operator at the radio receiver in the absence of remote control equipment and in the provision of means operated through the remote control system whereby the loud speaker or loud speakers are disabled during the tuning operation so that disturbing noises or mutilated programs from unwanted stations are not reproduced. A further feature of the invention includes the use of a combined volume control and switching device manually operated at the radio receiver or operated through the remote control system which in addition to controlling the volume of received radio programs, in accordance with certain adjustment disables the radio receiver and renders its audio portion operative in connection with an electrical phonograph device.

The drawing diagrammatically represents the tuning means of a radio receiver, the volume control device therefor and a portion of an electrical reproducing phonograph with the circuit arrangement for controlling the various devices from a remote station.

Within the dotted rectangle designated R there is represented certain mechanical equipment and a portion only of the circuits controlled thereby, of a radio receiver which may be of the type disclosed in the patent to Virgil M. Graham relating to Radio receiving systems, No. 1,851,387, granted March 29, 1932. It is believed unnecessary to reproduce the complete circuits of the radio receiver disclosed in the mentioned application but it is sufficient to state that the output of the radio receiver therein shown as linked to the loud speaker LS by the transformer 23, will be linked by the transformer 5 of the pres-

ent disclosure to a loud speaker 6 which may be of the moving coil type. As herein represented, the loud speaker may be connected to the chassis of the radio receiver and the power supply equipment mounted thereon, through a plug and jack terminal including four sets of contacts.

It will be noted that there are other units indicated within the boundaries of the broken lines associated with the receiver chassis, and that the circuits of these various units are completed among themselves and to the receiver chassis through plug and jack contacts such as 8, 9, 10, 11, 12, and 35. By this arrangement any unit of the system may readily be replaced without disturbing the remaining equipment. Also by this arrangement it is possible to equip a radio receiver with remote control equipment with a minimum amount of labor even after it has left the manufacturing plant.

As is well-known a radio receiver such as disclosed in the mentioned application is provided with a plurality of tuning condenser units (not shown) mounted on a common shaft which is selectively adjusted at the radio receiver. When the radio receiver is equipped for remote control operation, this shaft indicated at 14, is connected by a gear reduction (not shown) to the shaft 15 of a shaded-pole, reversible, induction motor 16 of the type disclosed by Barrett. On the shaft 15 there are mounted two conducting segments 17 and 18 on the surface of which there engage a series of brushes 37, 38, etc. which will further be referred to in the description of the operation of the system. It will be noted that the armature 19 of the motor is slightly out of the field including windings 20 and 21 of the motor. However when the motor field is energized, the armature 19 is drawn into the field and the extension 22 of the shaft closes the springs 23 which disable or shunt the loud speaker during the tuning operation so that disturbing noises are not heard at this time. The contacts 23 are in multiple with similar contacts 24 in the receiver circuits which may be closed by a silent key 25 mounted in the chassis of the receiver for a similar purpose. Also the key 25 when depressed, opens the contacts 26—26A in the operating circuits of the several motors so that the remote control system is rendered inoperative during the time that an operator at the radio receiver chassis is manually adjusting the tuning thereof.

The radio receiver chassis is also provided with a volume control device, the adjusting shaft of which is indicated at 27. This volume control

device is more fully described in the patent to Paul Haas, relating to combined radio and phonograph reproducing systems, No. 1,766,381, granted June 24, 1930. As shown in that patent the shaft such as 27 of the volume control device is provided with a cam 28 which in a certain position actuates a phonograph switch 80 which disables the radio receiver and connects an electrical pickup of a phonograph to the audio portion of a radio receiver. The shaft 27 is connected by a suitable gear reduction to the shaft 29 of a second shaded-pole motor having mounted on its shaft a cam 30 similar to cam 28, which likewise closes the power circuit to the electrical phonograph device when that device is selected for use. This electrical phonograph includes a turntable motor 31 by which the turntable 32 may be rotated and further includes an electrical pickup leads 33 connected to an electrical pickup (not shown) which may be connected through the phonograph switch 80 to the audio portion of the radio receiver.

In this system, there are also provided one or more remote control stations, only one of which indicated is within the broken line rectangle S, but it will be understood that other stations will have their outlet leads connected in multiple with the corresponding leads of the remote control station S.

If it is desired to operate the radio receiver in the absence of the mentioned remote control system, an off-and-on switch 34' of the chassis is closed and the source of current from the commercial power system is connected over conductors 34 through the plug and jack contacts 35 and similar plug and jack contacts 8 in the radio receiver chassis, thence through the contacts 34' of the off-and-on switch to the transformer 85 of the chassis so that the vacuum tubes of the receiver have their electrodes properly energized. The operator then depresses the silent key 25 and adjusts the tuning shaft 14 of the tuning condensers until the desired station is reached whereupon the silent key is released and in the event that the volume is not at its proper level the operator may rotate the shaft 27 of the volume control device until the desired volume level is obtained. If, however, the operator desires to discontinue receiving radio programs and to reproduce phonograph records, the off-and-on switch 36 is closed whereby the source of current over conductors 34 is extended through the plug and jack contact 35, 8, and 11, contacts of the switch 36 to the turntable motor 31 of the phonograph which then begins to rotate the turntable 32. In order to connect the electrical pickup leads 33 to the audio portion of the phonograph, the shaft 27 of the volume control device is rotated until the cam 28 is in the position herein shown.

If the radio receiver chassis is provided with remote control equipment as shown in this diagram, the tuning condenser and the volume control device may be selectively controlled from the remote control station S. It will be understood that the brushes 37, 38, 39, etc., which are fixed brushes arranged to engage the rotating segments 17 and 18, may be set to correspond to these adjustments of the tuning condenser shaft 14 wherein predetermined stations may be received and when thus set, these brushes are locked in position. It will also be noted that at the remote control station there is a visual tuning meter 44 electrically connected in series with a similar visual tuning meter 45, both of which me-

ters operate in the same manner as meter, 49, disclosed in the mentioned application of Graham, to indicate when the receiver is tuned into resonance with a desired carrier wave. In the remote control station there is also provided a series of independent contacts such as 46 which correspond to the dial or indicator setting at the remote station necessary to receive a predetermined program whereas other terminals 47 connected in multiple are provided so that the system may be operated to hunt for a desired station. These contacts such as 46 and 47 are in the path of a rotatably adjustable brush 48 which may be adjusted to permit the selection of a predetermined station when it is in engagement with a contact such as 46 or may permit the hunting operation when in engagement with one of the contacts such as 47.

Let it be assumed that the listener desires a program selectable when the dial or other indicator (not shown) is moved to a position where brush 48 is brought into engagement with the contact 50. As soon as this takes place a circuit is completed for the motor 16 from the secondary winding of the transformer 52, plug and jack contacts 12 the cut-off switch contacts 26, conductor 53, brush 48 now in engagement with contact 50, conductor 54, brush 39 now in engagement with conducting segment 17, brushes 55 also in engagement with the segment 17, the field winding 20 of the motor, through the plug and jack contacts 12, to the other terminal of the secondary winding of the transformer 52. Field winding 20 is energized and draws the armature 19 into the field until the projection 22 on the shaft of the motor closes the contacts 23 which disable the loud speaker during the tuning operation. With the field winding energized in the circuit just described the motor 16 rotates the conductor shaft 14 in a counterclockwise direction until the brush 39 is positioned in the non-conducting space between the conducting segments 17 and 18. At this time the operating circuit of the motor 15 is interrupted and the tuning condenser shaft 14 is positioned so that the radio receiver is tuned to receive a program associated with the contact 50.

If the operator selects a station or program corresponding to the contact 56 at the remote station, the brush 48 is moved into engagement with this contact whereupon an operating circuit for the motor 16 is now completed from the secondary winding of the transformer 52, plug and jack contacts 12, cutout switch contacts 26, conductor 53, brush 48, contact 56, conductor 57, brush 41, conducting segment 18, through one of the pair of brushes 58, field winding 21 of the motor 16, plug and jack contacts 12 to the other terminal of the transformer. With the field winding 21 energized, the armature 19 is drawn into the field, disabling the loud speakers as previously described and also causing the motor 16 to rotate the shaft 14 of the tuning condenser. In this instance the condenser shaft 14 is rotated in a clockwise direction until the brush 41 is positioned in the insulating space between the conducting segments 17 and 18. When this takes place, the motor ceases to operate and the receiver is tuned to the program associated with the contact 56.

If, when the desired progress is received, it is not at the proper volume level, the volume may be increased by depressing the volume key 59 or diminished by depressing the volume key 60. Let it be assumed that the operator desires to

diminish the volume he therefore depresses the key 60. This closes a circuit from the transformer 52, plug and jack contacts 12, cut-off switch 6, conductor 53, contacts of the volume key 60, conductor 61, limit switch contacts 62, field winding 63 of the shaded-pole, reversible, induction motor, conductor 64, plug and jack contacts 12 to the other terminal of the secondary winding of the transformer. Under the control of this circuit, the motor 65 rotates the volume control until the desired volume is obtained. Similarly if it is desired to increase the volume, key 59 is depressed and the field winding 66 of the motor 65 is energized to rotate the volume control in a direction to increase the volume. It will be noted that contacts 62 and 74 cooperating with stop 75 act as limit switches to open the operating circuit of motor 65 when the volume control device has been rotated to its extreme position in either direction.

Provision is made in the present arrangement so that the operator may hunt for stations or programs other than those obtainable by placing the brush 48 in engagement with contacts such as 49, 50, and 56. When it is desired to hunt for stations, a hunting operation, commonly known in the art as DX, is used, the brush 48 is moved into engagement with some one of the contacts such as 47 and then either the hunting key 67 or the hunting key 68 is depressed. Let it be assumed that the hunting key 68 is depressed whereupon an operating circuit for the motor 16 is completed from the transformer 52, plug and jack contacts 12, cut-out switch 26, conductor 53, brush 48, now in engagement with contact 47, contacts of the key 68, brushes 55 in engagement with conducting segment 17, field winding 20 of the motor 16, plug and jack contacts 12 to the transformer 52. Under the control of this circuit the motor rotates the condenser shaft 14 and conducting segments 17 and 18 until the operator releases the key 68 or until connection is broken between the brushes 55 by reason of the fact that the insulating break between the actuating segments 17 and 18 has been positioned between the two brushes indicating that the tuning condenser shaft has been moved to its extreme position in one direction of rotation. The operator may then depress the key 67 to rotate the tuning condenser shaft in the opposite direction. The operating circuit of the motor is similar to that previously described except that the circuit is now completed over conductor 70, brushes 58 in engagement with conducting segment 18, field winding 21 of the motor 16 and thence over the remainder of the circuit previously described. Under the control of this circuit the tuning condenser shaft is rotated in counterclockwise direction until a desired program is selected.

It will be noted that a visual tuning meter 44 is connected in series with the visual tuning meter 45 mounted in the receiver chassis and by noting the maximum swing of the needle of the meter 44 the operator receives an indication that the receiver is tuned to resonance with a desired program. The tuning motor 16 responds very quickly and accurately to the depression of the hunting keys 67 and 68 so that if the tuning condenser shaft is rotated slightly past the best setting for receiving a certain station, the condenser shaft may be rotated through very small increments of motion in either direction by momentarily touching one or the other of these hunting keys. To turn off the radio receiver from

a remote point the brush 48 is moved to the off position 71 which causes the tuning motor to rotate the tuning condenser shaft until the stop 72 opens the spring 73 which are connected in multiple with the on-and-off switch 34 mounted in the radio receiver chassis.

What we claim is:

1. In combination with a radio receiver having a loud speaker connected thereto and an adjustable tuning unit for tuning said radio receiver to any one of a plurality of programs, a motor for actuating said tuning unit, said motor having field generating means and an armature normally out of a portion of said field, the development of said field serving to draw said armature therein, and means actuated by the movement of said armature into said field for disabling said loud speaker.
2. In combination with a radio receiver having a loud speaker connected thereto and an adjustable tuning unit for tuning said radio receiver to any one of a plurality of programs, a motor for actuating said tuning unit, said motor having a field winding and an armature normally outside of a portion of the field developed thereby, the energizing of said field winding serving to draw said armature therein, and means actuated by the axial movement of said armature into said field for disabling said loud speaker.
3. In combination with a radio receiver having a loud speaker connected thereto, an adjustable tuning unit for tuning said radio receiver to any one of a plurality of programs, a motor for actuating said tuning unit, means within audible range of the loud speaker and responsive to program signals received by said radio receiver for indicating when said radio receiver is tuned into substantial resonance with a desired program, and means actuated during the operation of said motor for preventing the reproduction of programs through said loud speaker.
4. In combination with a radio receiver having a loud speaker connected thereto, and adjustable tuning unit for tuning said radio receiver to any one of a plurality of programs, a motor for actuating said tuning unit, preselecting means at a remote point for directly controlling the operation of said motor to effect a desired adjustment of said tuning unit, means associated with said preselecting means within audible range of the loud speaker and responsive to program signals received by said radio receiver for indicating when said radio receiver is tuned into substantial resonance with a preselected program, and means actuated during the adjustment of said tuning unit for preventing the reproduction of programs through said loud speaker.
5. In combination with a radio receiver having a loud speaker connected thereto, an adjustable tuning unit for tuning said radio receiver to any one of a plurality of programs, a motor for actuating said tuning unit, preselecting means at a remote point for directly controlling the operation of said motor to effect a desired adjustment of said tuning unit, visual means associated with said preselecting means within audible range of the loud speaker and responsive to program signals received by said radio receiver for indicating when said radio receiver is tuned into substantial resonance with a preselected program, and means actuated during the adjustment of said tuning unit for preventing the reproduction of programs through said loud speaker.
6. In combination with a radio receiver having a loud speaker connected thereto, an adjust-

able tuning unit for tuning said radio receiver to any one of a plurality of programs, a motor for actuating said tuning unit, and preselecting means for controlling the operation of said motor, said preselecting means including an indicator giving an approximate indication of the tuning of said radio receiver, and an electrical meter connected in circuit with said radio receiver for indicating when said radio receiver is tuned approximately into resonance with a desired signal.

7. In combination with a radio receiver having a loud speaker connected thereto, an adjustable tuning unit for tuning said radio receiver to any one of a plurality of programs, a motor for actuating said tuning device, means for causing said motor to effect a hunting adjustment of said tuning unit, means actuated during said tuning operation for preventing the reproduction of programs through said loud speaker, and an indicator within audible range of said loud speaker and responsive to signals received by said radio receiver for showing when the tuning unit has tuned said radio receiver into substantial resonance with desired signals.

8. In combination with a radio receiver having a loud speaker connected thereto, an adjustable tuning unit for tuning said radio receiver to any one of a plurality of programs, a motor for actuating said tuning device, means causing said motor to effect a hunting adjustment of said tuning unit, means actuated during said tuning operation for preventing the reproduction of programs through said loud speaker, and an electrical meter within audible range of said loud speaker and responsive to signals received by said radio receiver for visually indicating when

said tuning unit has tuned said radio receiver into resonance with desired signals.

9. In combination with a radio receiver having a loud speaker connected thereto, an adjustable tuning unit for tuning said radio receiver to any one of a plurality of programs, a motor for actuating said tuning unit, means at a remote point for controlling said motor to adjust said tuning unit for tuning said radio receiver to receive a predetermined program, said means also controlling said motor to adjust said tuning unit for effecting a program hunting operation of said radio receiver, an indicator associated with said means responsive to program signals received by said radio receiver for indicating when said radio receiver is tuned into substantial resonance with any of said programs, and means actuated during the adjustment of said tuning unit for preventing the reproduction of programs through said loud speaker.

10. In combination with a radio receiver having a loud speaker connected thereto, an adjustable tuning unit for tuning said radio receiver to any one of a plurality of programs, a motor controlled from a remote point to effect a desired adjustment of said tuning unit, a volume control device for controlling the volume of signal reproduced by said loud speaker, a motor directly controlled from a remote point for adjusting said volume control device, a phonograph provided with a turntable motor, and means actuated in a predetermined position of the volume control device for energizing said turntable motor and for disabling at least a portion of said radio receiver.

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