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RADIO RECEIVER CONTROL

Filed Oct. 4, 1927

Fig. 1.

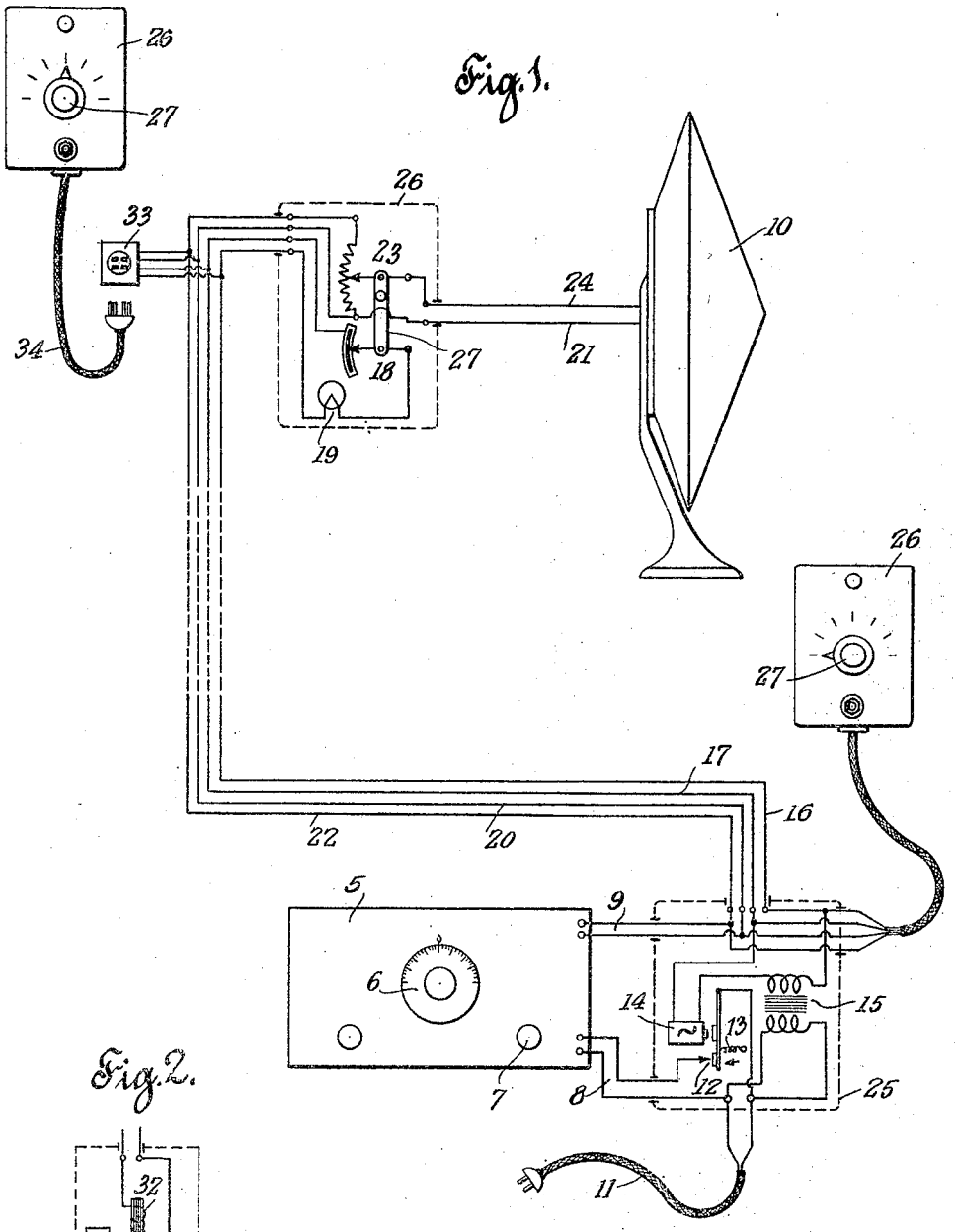
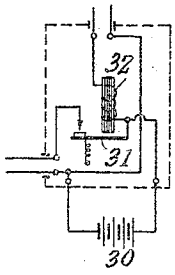


Fig. 2.



INVENTORS
Bowden Washington
Wilson Aull, Jr.
BY
ATTORNEY

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UNITED STATES PATENT OFFICE

BOWDEN WASHINGTON, OF NEW YORK, AND WILSON AULL, JR., OF ASTORIA, NEW YORK, ASSIGNORS TO REMOTROLE CORPORATION, A CORPORATION OF NEW YORK

RADIO RECEIVER CONTROL

Application filed October 4, 1927. Serial No. 223,913.

One object of our invention is to provide a simple and easy manner of turning on and off the filaments or power supply of a radio receiver from a point at or near the loud speaker no matter where the latter may be located, and without causing any substantial drop of filament voltage at the vacuum tubes which would be the case if the filament current was caused to flow through long extension wires of any reasonable cross section.

Another object is to be able to control from a point at or near the loud speaker the volume of the sound produced without spoiling the quality.

Another object is to turn on or off a receiver and control the volume of sound from a point remote from the receiver.

It is becoming more and more usual to use extension cords to the loud speaker sometimes of considerable length in which case the listener has to go to the receiver to turn the set on or off. A particular instance of this may be given to show its usefulness in the broadcasting of "morning exercises." In this case the radio receiver would normally be placed in the living room, while the user might desire to take exercises in his own room or on a porch immediately upon arising. By means of our invention he could before retiring tune to the station which normally transmits the material for the morning exercises and bring the loud speaker to the exercising place. Upon arising at the predetermined hour he would light the filaments of or turn on his receiver from or at the loud speaker and adjust the volume to his pleasure, thus putting the set into operation, and upon finishing the exercises turn off the receiver without the necessity of going downstairs to another room where the receiver is located.

Another object is to provide apparatus for the foregoing purpose which can be readily installed with any receiving set and loud speaker.

Another object is to provide apparatus which can be readily adapted to use with sets which are designed to operate from an alternating current power source.

Another object is to simplify the construction for remote control of a radio set.

Another object is to provide simple and effective means for using any number of loud speakers or installing a loud speaker in any one of a number of places.

Fig. 1 shows diagrammatically a system embodying our invention for alternating current supply.

Fig. 2 shows a modified form of relay for direct current supply.

The receiver 5 may be of any suitable type and provided with the usual tuning and volume controls 6 and 7, respectively, and means for connection of any suitable power supply cable 8 for the tubes and output terminals for the usual cable 9 for a loud speaker 10.

The cable 11 is for alternating current supply. The switch 12 is normally held open by spring 13 and is closed when the relay magnet 14 is energized. A step-down transformer 15 has its primary in the alternating current power line and its secondary in a circuit with the winding of relay 14 and the wires 16 and 17 leading to the remote switch 18 and pilot light 19.

The house current of say 110 volts at 60 cycles may be stepped down to say 10 volts for local transmission and control so as to avoid the necessity of the precautions required by the fire underwriters where 110 volt circuits are used.

The loud speaker is connected to the outlet cable 9 of the set by wires 20 and 21 and by wire 22, potential divider 23 and wire 24.

The filament power is cut in or out by the relay 14 which is controlled by the switch 18. The volume of sound is controlled by the potential divided or potentiometer 23. The pilot light 19 is preferably provided to show when the set is "on." The relay 14 and its switch 12 and transformer 15 are preferably in a box 25. The switch 18 and volume control 23 may be in another box 26. The switch 18 and potential divider 23 may be connected by a link or handle 27 so that both may be operated at once.

When the switch 18 is opened the relay 14 is deenergized so as to open the switch 12 and thus turn off the power supply.

The design of the transformer 15 as to leakage and windings may be such that the primary exciting current is negligible as in a "bell ringing" transformer when the secondary circuit is open.

The conductors 16 and 17 may if found necessary be so transposed or shielded as to prevent induction between the alternating current relay circuit and the loud speaker conductors 20 and 21 in the cable 9.

The value of the resistance of potentiometer 23 should be so proportioned with respect to the impedance of ordinary loud speakers that it shunts but little alternating current energy (music, speech, etc.) away from the loud speaker when the volume is adjusted to the maximum position. At the same time this resistance should be such that if the direct current supplying the anode potential to the last tube passes through the remote control cable, box, etc., the voltage drop between the loud speaker terminals on the receiving set varies but slightly as the volume control handle is changed from maximum to minimum positions. Otherwise a corresponding adjustment of the grid potential of this tube would in some cases be necessary as the volume control was altered, to maintain an undistorted output of sound.

A remote control box containing such a value of resistance for the volume control is, of course, also suitable for sets using output transformers or output filters in which case the direct current component of the plate circuit of the last audio amplifier tube does not pass through the connecting cable and remote control box.

By this arrangement the volume of the loud speaker may be varied without appreciably affecting the operation of the tubes or the efficiency of the receiver.

All the wires 16, 17, 20 and 22 may be embodied in a single cable.

In the form of relay box shown in Fig. 2 intended for direct current the battery 30 is connected to the cathodes of the tubes through switch 31 controlled by relay 32 in turn controlled by a remote switch as above described.

In either the alternating current or direct current system any number of station sockets 33 may be installed and a control unit 26 with cable 34 plugged in, such unit having a switch and volume control as above described. Similarly a control unit 26 may be connected directly into the relay box 25 if desired.

While remote control box 26 and relay box 25, together with the connecting cables may be manufactured and sold as accessories for existing radio receivers, the relays shown may be built into and included in radio receivers designed to be controlled from one or more remote points.

This is a continuation in part of our application Serial No. 198,470 filed June 13, 1927.

We claim:

1. A radio receiver including a relay provided with contacts for closing the filament lighting circuit, an energizing circuit including said relay and the filament power supply, a remote switch in said energizing circuit, and a loud speaker, a circuit including said loud speaker and a volume control device and means for simultaneously operating said control device and said remote switch.

2. A receiving set having input power supply terminals and signal output terminals, a relay and distribution unit having power input and output terminals, a switch for connecting the power supply to the set, a loud speaker having leads connected to the signal output terminals of the set and including a voltage divider having an adjustable element for controlling the volume of output to the loud speaker, a relay for operating said switch and means connected with the voltage divider for actuating said relay.

3. Means for controlling a radio receiver having vacuum tubes and a loud speaker said means consisting of an alternating current relay having contacts for opening and closing the cathode heating circuit of said receiver, said relay being connected for operation from the cathode heating source, control means having a voltage divider connected to control the input to said loud speaker, a switch in the operating circuit of said relay connected for operation by manual control of said voltage divider, and a pilot light in series with said switch so connected as to remain lighted whenever said relay is closed.

4. Apparatus for controlling a vacuum tube radio receiver having a loud speaker from a distance comprising an alternating current relay, and a control unit having a voltage divider and a switch, said relay so connected as to be controlled by said switch and connections for opening and closing an alternating current power circuit of said receiver, said switch being connected to be actuated with the movable element of said voltage divider and suitable independent connections between said receiver, said control unit, and said loud speaker.

5. A vacuum tube radio receiver including a loud speaker and a source of alternating current for the tubes, a switch for controlling the alternating current tube circuit, a starting circuit including a relay for operating said switch and a remote switch for opening and closing said starting circuit and a step-down transformer having its primary and secondary windings connected to the source of alternating current and in the starting circuit respectively.

BOWDEN WASHINGTON.
WILSON AULL, JR.