Oct. 4, 1932. B. WASHINGTON ET AL 1,881,392

RADIORECEIVER CONTROL

Filed Sept. 14, 1927 2 Sheets-Sheet 1

Fig. 1.

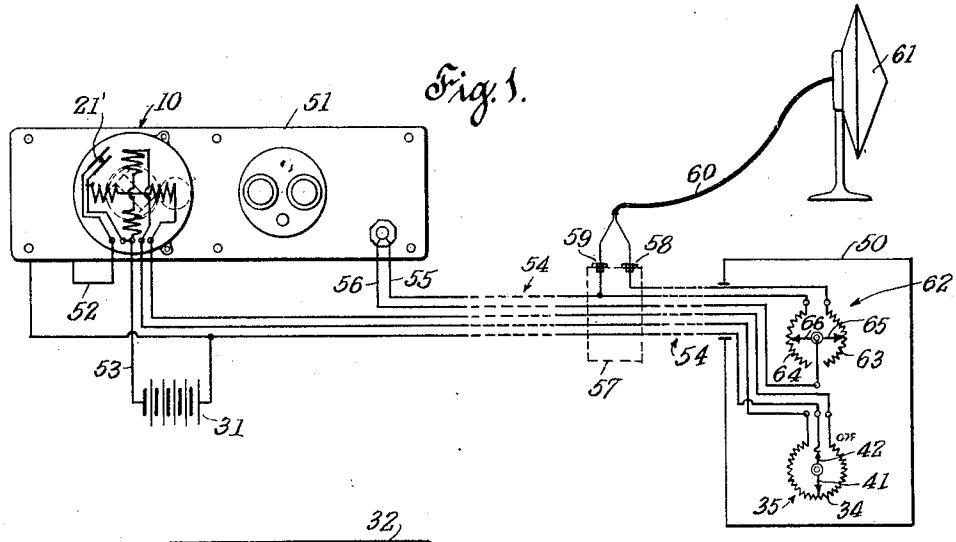


Fig. 2.

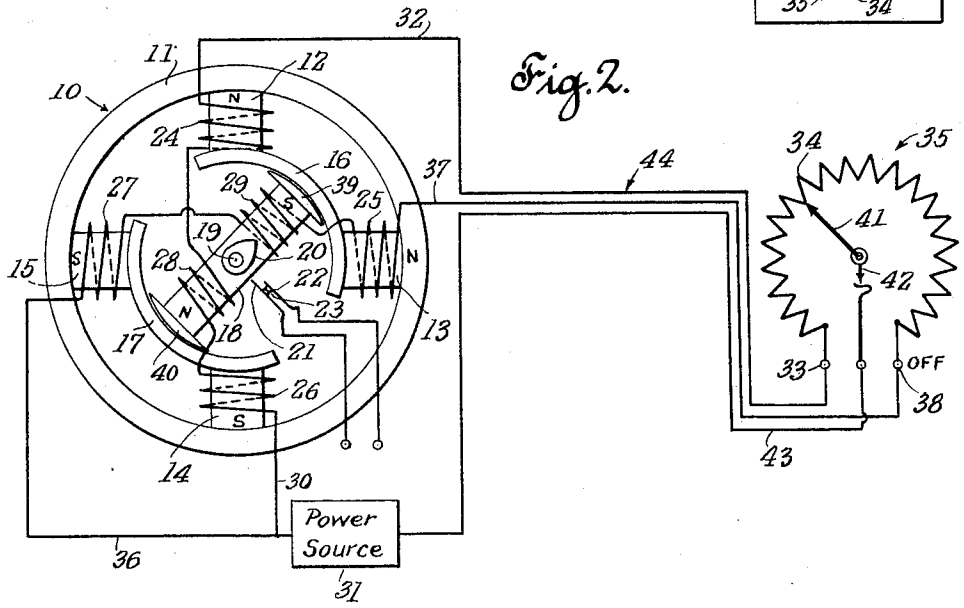
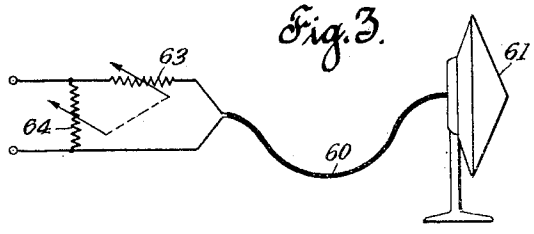


Fig. 3.



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Fig. 4.

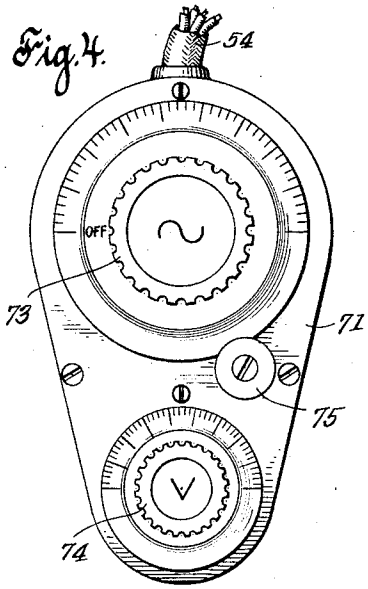


Fig. 5.

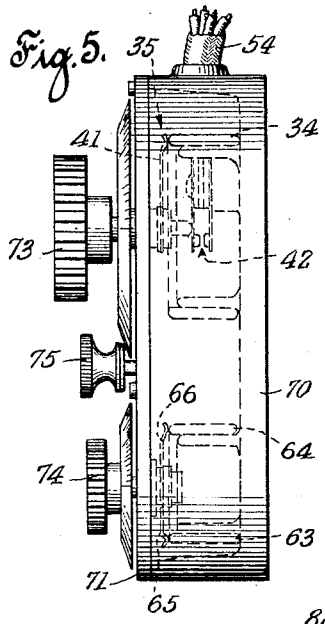


Fig. 6.

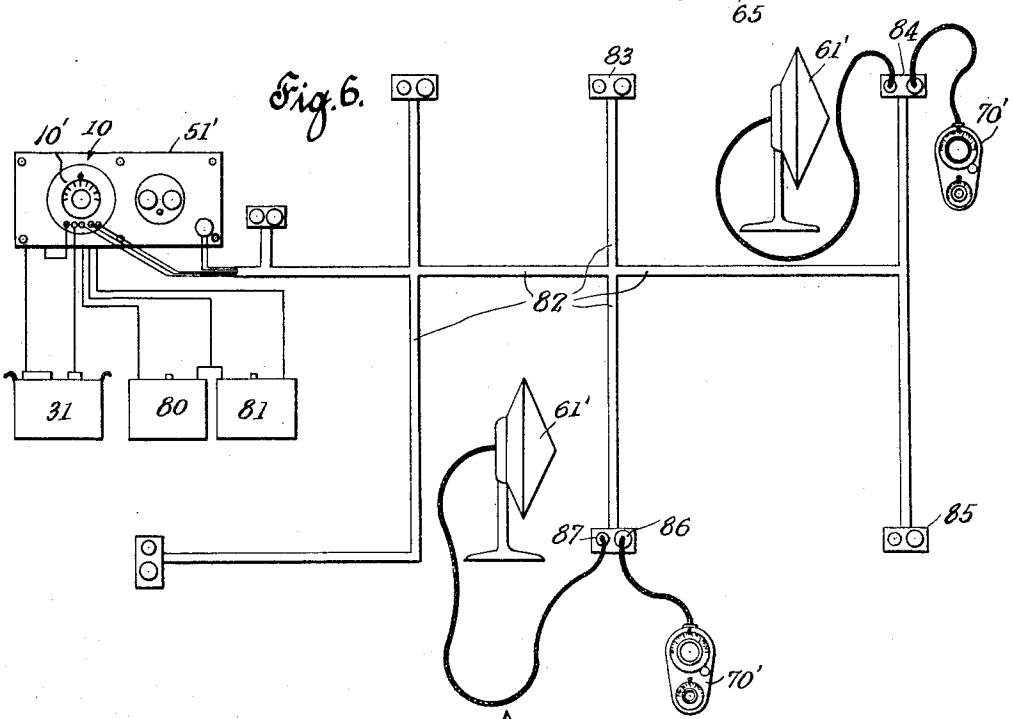
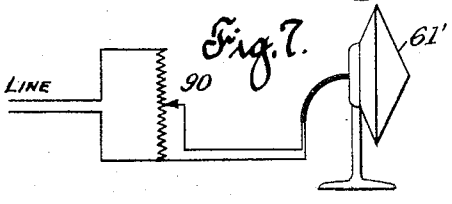


Fig. 7.



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UNITED STATES PATENT OFFICE

BOWDEN WASHINGTON, OF NEW YORK, AND WILSON AULL, JR., OF ASTORIA, NEW YORK; DOROTHY CLINTON WASHINGTON, ADMINISTRATRIX OF BOWDEN WASHINGTON, DECEASED, ASSIGNOR TO REMOTROLE CORPORATION, A CORPORATION OF NEW YORK

RADIORECEIVER CONTROL

Application filed September 14, 1927. Serial No. 219,443.

The main object of our invention is to produce a simple and reliable system for the complete control of a radio receiver from a distance.

Another object is to produce a system by which the resonant frequency of a radio receiver may be controlled from a distance and the manual operating means at the control station may be calibrated in frequency, wave length, scale divisions, or other desired calibrations.

Another object is to produce a system by which a residence or apartment may be readily wired with suitable outlets in the various rooms for plugging in control stations and loud speakers in such a manner that the station received may be controlled in any desired room, the receiver turned on or off, and the volume of the various loud speakers individually regulated.

The modern high grade radio broadcast receiver of good faithfulness is becoming bulkier and heavier owing to the use of higher voltages, a larger number of tubes, larger and heavier audio frequency coupling units, and particularly if an antenna and ground are used, it is extremely difficult if not impossible to move the receiver from room to room. Yet it may be desirable to enjoy its output in any room in the house. It is true that it is comparatively simple to run an extension cord to the loud speaker but in this case the listener has no control over the receiver and whenever a change of program or of volume is desired the listener has the inconvenience of going to the receiver proper to make the desired adjustments. Our invention discloses a simple electrical method which by means of a small and compact control box and a cable of comparatively few conductors enables one to make any desired adjustment and to turn the receiver on or off from any distance liable to be encountered in a dwelling house or apartment. We are familiar with systems for tuning a unicontrol receiver by means of a motor equipped with a reversing switch at a distance but this differs in no important particular from the remote-control motors for many other purposes. Apart from the great gain of simplicity we believe that a large improvement over this type of tuning has been effected by us as in our system the frequency control at the distant point may be calibrated which has not heretofore been accomplished in so far as we know.

Referring to the drawings, Fig. 1 is a schematic drawing of one embodiment of our invention with a typical receiver showing frequency control, volume control, and means for turning the receiver proper on and off.

Fig. 2 is a diagrammatic view of one form of frequency control.

Fig. 3 shows diagrammatically one form of volume control.

Figs. 4 and 5 show respectively a front view and side elevation of one form of control station.

Fig. 6 is a diagrammatic view of a house wiring system for the remote control of a radio receiver.

Fig. 7 shows diagrammatically another method of volume control.

In the preferred arrangement the electromagnetic device or motor 10 which drives suitable tuning elements (not shown) of any single control receiver, consists of a field ring 11 having poles such as 12, 13, 14 and 15. Attached to poles 12 and 13 is the shoe or pole tip 16 and to the poles 14 and 15 the shoe or pole tip 17 or separate pole tips or other arrangements of poles may be employed. The armature 18 is rotatably mounted on a shaft 19 which carries a cam 20. The purpose of the cam 20 is to engage the spring 21 when the armature is in an extreme position thus separating the contacts 22 and 23 which constitute a switch used to break the cathode heating circuit of a battery operated receiver or the house line connection of a so-called "power operated" receiver.

The shaft 19 is connected by suitable gearing (not shown) of suitable ratio to the usual tuning shaft of the receiver (not shown), bearing in mind the maximum rotation of the armature in the embodiment shown is approximately 90°. The poles 12 and 14 carry the windings 24 and 26 and poles 13 and 15 carry the windings 25 and

27. The armature carries the windings 28 and 29. The windings 24, 28 and 26 are connected in series, and by the lead 30 to one terminal of the power source 31 which may be of any suitable type such as the "A" battery of the receiver, if such is used, or to the secondary of a small step-down transformer if the receiver proper is operated entirely on the house current. The magnetic structure may be laminated so as to permit operation on alternating current of commercial frequencies. The other end of these windings is connected by the lead 32 to the terminal 33 of the resistance 34 which forms a part of the control unit 35. The windings 25, 29 and 27 are connected in series and by the lead 36 to the same terminal of the power source 31 as are the other group of windings by the lead 30. The other end is connected by the lead 37 to the terminal 38 of the resistance 34. These windings are so directioned that, for instance, at a given instant the poles 12 and 13 and the end of the armature 40 will be "north" while the poles 14 and 15 and the end of the armature 39 will be "south." The resistance 34 is provided with a rotatable arm or contact 41 which through a switch 42 is connected by the lead 43 to the opposite terminal of the power source 31. The switch 42 is so constructed, as will later be explained, that it is closed only during the manual operation of the arm or contact 41. It will be seen that the flow of current through the two sets of windings is proportional to the amount of resistance in their respective circuits on either side of the contact arm 41 and that by moving this arm the center of field density will be moved and that the armature 18 will tend to take up a corresponding position and that by giving the resistor 34 a sufficient number of steps or convolutions any desired degree of fineness of tuning may be obtained. It will also be seen that the position of the armature 18 is dependent on the relative strengths of two fields and therefore not materially affected by voltage fluctuations of the power source 31. Also as the two conductors 32 and 37 of the cable 44 are included one in each magnetic system and will naturally be of equal length, and due to the fact that the conductor 43 is common to both magnetic systems, the over-all length of the cable 44 will not affect the relation of the relative positions of the contact arm 41 and the armature 18 and therefore will not affect the calibration of the tuning control 35.

Fig. 1 shows a complete system in which the receiver may be turned on and off, tuned, and the volume regulated from the control box 50. 51 represents a typical unicontrol broadcast receiver in which the electromagnetic device 10 has been substituted for the usual frequency control dial. This may have any suitable form of indicator 10′ connected to it in any suitable manner. In the particular embodiment shown the power source 31 may be the cathode heating battery ordinarily supplied with the receiver. The resonant frequency is regulated as previously described by means of electromagnetic device 10 and the resistor 35. The receiver is turned on and off by the cam actuated switch 21′ (shown and described in Fig. 2) which as will be seen is inserted between one of the receiver's "A" battery leads 52 and the terminal 53 of the "A" battery 31. This switch is opened when the frequency control 35 and therefore the tuning means of the receiver (not shown) is in either a zero or full scale position as desired. A cable 54 may be provided with suitable terminals 55 and 56 for connection to the usual audio frequency output of the receiver and may carry a junction box 57 provided with suitable terminals such as the pin jacks 58 and 59 for connection to the cord 60 of the loud speaker telephone 61.

62 represents the volume control which is shown schematically in Fig. 3. It consists of two simultaneously variable resistors 63 and 64 provided with the arms 65 and 66 so arranged that as the resistor 63 is introduced in series with the loud speaker to reduce the volume, the value of the shunt resistor 64 is decreased so as to keep the load on the output of the receiver substantially constant.

The cable 54 may be of any desired length for instance 30 feet and the amount of cable included between the junction box 57 and the control station 50 may be of any desired length. If a so-called "power operated" receiver is used operating from the house lines, the switch 21′ may be inserted between the receiver and the house wiring and a small transformer substituted for the power source 31 shown.

Figs. 4 and 5 show a typical control station or instrument. The case 70 and the cover 71 may be molded of insulating compound. A frequency control rheostat 35 is shown having the resistance unit 34 and the rotatable arm 41. The switch 42 is operated by pressing upon the frequency control knob 73 so that the tuner actuating device 10 only takes current during the actual operation of tuning. Volume control resistors 63 and 64 are shown with their contact arms 65 and 66 actuated by the volume control knob 74. A friction drive 75 for fine adjustment may be used, and a cable 54 is indicated.

Fig. 6 indicates a house wiring system which is a further amplification or development of Fig. 1, in which case the receiver 51′ is provided with the "A" battery 31 and other necessary batteries such as 80 and 81. The control and output wiring is run in the conduit system 82 provided with suitable outlet

boxes such as 83, 84 and 85 having outlets such as 86 and 87 for plugging in respectively the control boxes as 70′ and the loud speakers as 61′. The outlets may be located at various points in the same or different rooms.

It may be preferable that when an extensive system of this sort is installed, a receiving set be employed having either an output transformer or an output filter in conjunction with the voltage divider type of volume control shown at 90 in Fig. 7 so that the volumes of several loud speakers may be adjusted with comparatively little effect upon each other.

It should be understood that we do not wish to limit ourselves to the details of structures shown and described except in so far as we are limited in the following claims.

We claim:

1. Radio receiving apparatus comprising electro-magnetic motor means for turning the tuning elements, a manually variable resistance in circuit therewith having an adjusting element, indicators connected respectively with the resistance and the motor and movable in synchronism and a switch operated by the motor for opening the power circuit of the receiver and connected to the resistance.

2. Radio receiving apparatus comprising electro-magnetic motor means for turning the tuning element of the receiver, a variable resistance in circuit with a winding of the motor means and having an adjusting element located at a remote point from the tuning element, indicators mechanically connected respectively with the adjusting element and with the tuning element and movable in synchronism with each other, balanced means for regulating the volume of output of the receiver, a single cable including conductors connecting the means for regulating the output of the receiver and the resistance at the remote point and the receiver, and a switch controlled from the remote point for opening and closing the power circuit of the receiver.

3. Radio receiving apparatus including a power circuit and comprising electro-magnetic motor means for moving the tuning elements, a variable resistance in circuit therewith having an adjusting element, an indicator connected with the resistance and movable proportionally to the tuning element and a switch operated by the motor for opening and closing the power circuit of the receiver.

4. Radio receiving apparatus having an adjusting element and comprising electro-magnetic motor means for moving the adjusting element, a control station including a variable resistance in circuit with the motor means and having an adjusting element, an indicator connected with one of the adjusting elements, a switch operated by the motor for opening the power circuit of the receiver, and remote means at the control station and including a rheostat connected for regulating the volume of output from the receiver.

5. In a remote-control radio receiver an electro-magnetic tuning device, a multi-conductor cable, a junction box, and a control station, said tuning device having an armature, a plurality of variable fields and a switch which may be operated by said armature for turning on and off said receiver, said junction box being provided with output connections, said control station being provided with variable resistors for the control of said tuning device and for the control of the output of said receiver and said cable being provided with conductors for connection between said receiver, said tuning device, said junction box and said control station.

6. A radio receiving system comprising a receiving instrument having collecting and tuning means, a remote control station connected with the receiving instrument by a cable containing the necessary conductors, motive means at the receiving instrument for tuning the same, a regulating device at the control station connected in circuit with a winding of said motive means, indicating means at the control station directly connected to said regulating device, a loud speaker connected to the output of the receiving instrument, and a regulating device at the control station connected in circuit with the loud speaker for controlling the volume of sound and a switch at the receiver for turning on and off the power circuit of the receiver, said switch being actuated by the first mentioned regulating device at the control station.

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WILSON AULL, Jr.

CERTIFICATE OF CORRECTION.

Patent No. 1,881,392. October 4, 1932.

BOWDEN WASHINGTON, AND WILSON AULL, JR.,
DOROTHY CLINTON WASHINGTON, ADMINISTRATRIX
OF BOWDEN WASHINGTON, DECEASED.

It is hereby certified that error appears in the above numbered patent requiring correction as follows: In the heading to the printed specification line 4, and in the grant, line 3, for "assignor" read "assignors". In the grant strike out lines 14 and 15, and insert "Remotrole Corporation", its successors, or assigns as shown by the records of assignments in this office; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 13th day of December A. D. 1932.

M. J. Moore,
Acting Commissioner of Patents.

(Seal)

CERTIFICATE OF CORRECTION.

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