July 5, 1938. S. J. LEVY 2,122,912

AUTOMATIC REMOTE CONTROL RADIO RECEIVING SET

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Fig. 1

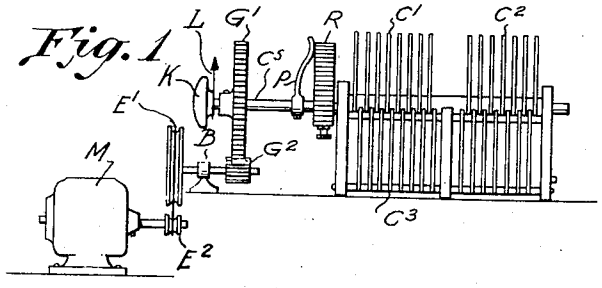

Fig. 3

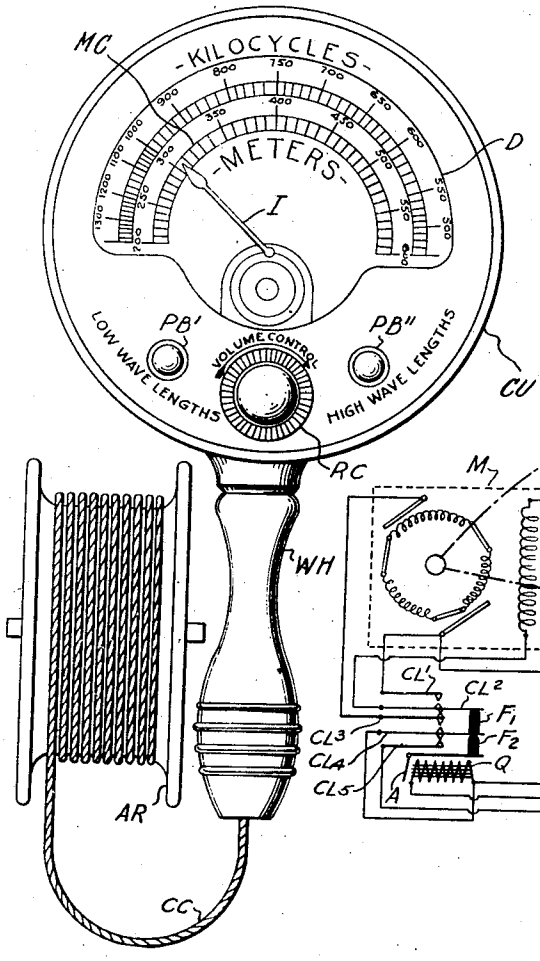

Fig. 2

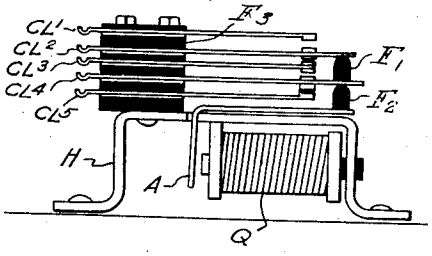

Fig. 4.

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Fig. 5.

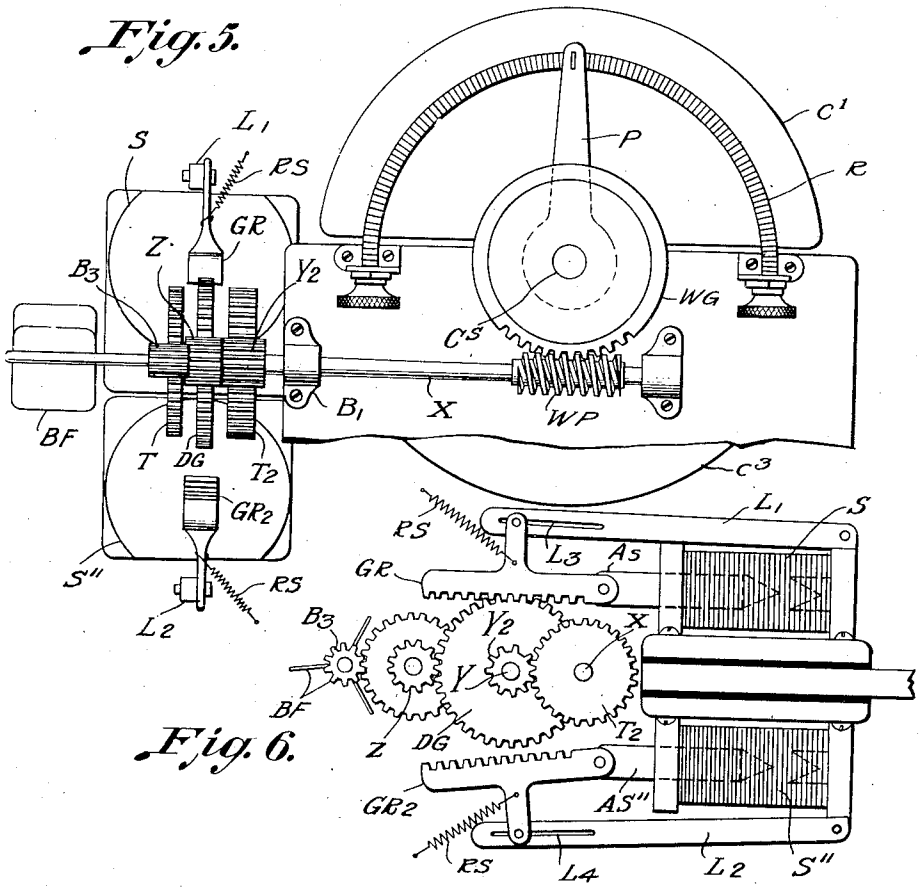
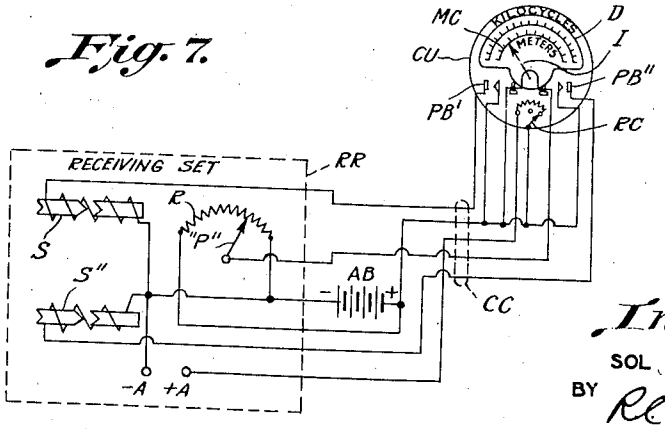


Fig. 6.

Fig. 7.



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UNITED STATES PATENT OFFICE

2,122,912

AUTOMATIC REMOTE CONTROL RADIO RECEIVING SET

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Application September 12, 1925, Serial No. 55,989

19 Claims. (Cl. 250—20)

My invention relates to a means of automatically controlling a radio receiving set at a remote distance from the set.

It is now necessary, in tuning or adjusting a radio receiving set, in order to pick up the various transmitting stations, to operate manually the tuning dials and other controls on the set panel.

It is an object of my invention to enable any person to tune and control the receiving set without manually operating the controls of the set, but at a remote distance, as for example, from some other portion of the house or building in which the set may be located.

It is a further object of my invention to provide means for this automatic remote control, which will be simple and easy to operate, and which will have a low cost factor.

My invention will be more readily understood, by reference to the drawings accompanying this specification, in which like letters refer to like parts in the several figures.

Fig. 1 is a diagrammatic view in elevation, of my motor operated means.

Fig. 2 is a detail view of the motor control relay and switch.

Fig. 3 shows an embodiment of the front of my control meter with the extension cord to same.

Fig. 4 is a wiring diagram of one embodiment of my invention.

Fig. 5 is a section of the front elevation of my magnetic solenoid drive.

Fig. 6 is a side elevation of Fig. 5.

Fig. 7 is a wiring diagram in accordance with a modified embodiment of my invention as shown in Figs. 5 and 6.

The essential features of my device consist of a single control means in the set, with some method of automatically operating said control, together with a visible means, remotely situated, and adapted to show the operator with which transmitting station the receiving set may at any time be tuned.

It is a further feature of my device, to construct this visible means in such a way that it will show the operator the wave length at which the set may be then positioned, and specifically to do this by means of coordinating the tuning motion of the condenser shaft with a potentiometer or resistance unit, to which the visible means, or indicator is connected.

Referring to Fig. 1, I have shown two tuning condensers with rotors C′ and C^2 mounted with the stators C^3, and actuated by a common shaft or drive C^s. This method of simultaneous operation of tuning condensers is well known in the art. Upon this common shaft I mount a potentiometer arm P, making contact with the potentiometer resistance R. The shaft may be driven by any method of gear or friction drive or a knob K with a pointer L may be fastened to the shaft C^s for manual control. I have shown the gearing G′ and G^2, the latter mounted on the bearing B, which gearing is operated by the motor M through the pulleys E′ and E^2 as shown. My motor receives its energy either from the storage or "A" batteries of the conventional set, or in a suitable manner from the house lighting circuit, in cases where such energy is used in place of the conventional batteries.

I may also operate my tuning condensers and potentiometer by means of solenoid magnets, one embodiment of which I have indicated in Figs. 5, 6 and 7. In this arrangement the brush P is operated through the worm gear WG and worm WP which is integral with the shaft X, the latter being journalled at the bearings B_1 and B_2. The shaft X carries a gear T_2 which meshes with the pinion Y_2, the latter being mounted on the shaft Y which also carries the gear DG.

A pair of solenoids S and S″ is arranged with core armatures AS and AS″ respectively, also with auxiliary armatures L_1 and L_2 respectively. Pivoted to the ends of each core armature is a toggle rack GR or GR_2, each having a projecting lug with a pin arranged to slide in one of the slots L_3 or L_4 of the auxiliary armatures L_1 and L_2. Each of the toggle racks is also provided with a retracting spring RS. By this arrangement it will be seen that the shaft C^s can be rotated in either direction according as solenoid S or S″ is actuated, the operation being as follows: When either the solenoid S or S″ is energized, the armature AS or AS″ moves into the coil actuating the toggle racks GR or GR_2 respectively, tensioning one of the springs RS and the rack GR or GR_2 comes into engagement with the teeth of the large gear DG as shown. A quick positive motion is imparted to the gear DG which is reflected in a corresponding but slower motion of the tuning elements C′ and C^2, also of the brush P. The gear DG operates the fan fly BF through the gear train including the pinion Z which meshes with gear DG and pinion B_3 which meshes with gear T. This stabilizes the motion by air resistance.

It is of course evident that my motor may be remotely controlled, and by referring to wiring diagram Fig. 4 it will also appear that the tun-

ing motion of the condensers C' and C² simultaneously changes the position of the brush P, with respect to resistance R. The resistance, being connected across the battery AB, or other source of energy, and being shunted across the meter D, in effect a volt meter, will cause the pointer I of such meter to move proportionately and by calibrating one scale of meter D in kilocycle frequency and metric wave length at MC, in place of volts, I have a direct indication of the setting of the set.

Referring to the wiring diagram Fig. 4, if I close the button PB'', mounted on my meter housing, as shown in Fig. 5, I will establish a circuit from the positive side of my battery AB or other source of energy, through the relay coil Q, which will cause the arm A to be attracted to the coil, lifting the fingers F2 and F1 of my switch, which will, in turn, close the contact CL1, CL2 and the contact CL3 and CL4, and open the contact CL4 to CL5, and the contact CL2 and CL3, which situation will operate my motor in one direction, whilst closing the button PB' will operate my motor in the opposite direction. In Fig. 2, H is merely a mounting of the switch and F3 an insulation method.

Referring further to Fig. 4, it will appear that the circuit from the receiving set RR, coming from plus A, runs through a small ohmic resistance RC, also mounted on my remote control unit CU. This, of course, gives me volume control, regulating the amount of energy imparted to the tube filaments, or regulating the volume control connected in any part of the circuit through any well-known method. In Fig. 5, I show a handle WH for holding my remote control housing, whilst the control cord CC is mounted preferably on a sheave AR, which may be revolved at the will of the operator, to give greater or less distance, as desired. This sheave may be of the self-return type. It will now appear that a person remotely situated from the set, holding the control unit CU, and pushing button PB'', will operate the motor M in a given direction, and the tuning condensers will operate simultaneously with the brush P. As the brush P moves along the resistance R in conjunction with the condenser shaft C³ the voltage across the voltmeter will change, indicating to the operator the frequency or wave length to which the set RR is tuned for each position of the condensers.

It will be clearly understood from the above that the application of my invention to the remote control of receiving set RR contemplates positioning the remote control unit of any point convenient to the operator, which may be within audible range of the receiving set RR. Furthermore, it will be obvious to any one skilled in the art that the use of such remote control even though it be at fairly close range but still beyond arm's reach of the receiving set provides a very great convenience in that the operator when wishing to tune the set to some station different from that to which he has been listening is enabled to do so with the utmost facility and at the same time with the greatest satisfaction as regards coordination of the tuning and volume controls.

On my drawings and specifications showing two preferred embodiments of my invention, it must be understood that there are other methods of driving the tuning means of the set, and there are other methods of motivating the visible meter at the operator's position, as well as other methods of co-ordinating the functioning of the operator's meter with the radio frequency position of the set, and all of these methods are intended to be within the general scope of my invention which is limited only by the scope of the appended claims; and any change or modifications that may be apparent to a person skilled in the art are to be construed as being within the scope of this invention.

Having thus described my invention, what I claim and desire to secure by United States Letters Patent is:

1. A radio receiver comprising means for tuning the receiver to a desired frequency, means for actuating said tuning means, means for controlling said actuating means located at a point remote from said receiver, and volume control means at said remote point for controlling the output of said receiver at any wave length to which the receiver is tuned.

2. In a radio receiver, means for tuning the receiver to the desired frequency, means for actuating said tuning means, manually operable means for controlling said actuating means from a point remote from said receiver, means at said remote point and operating in conjunction with said tuning means for indicating the tuning adjustment of said tuning means, and a manually operable volume control located at said remote point for controlling the output of said receiver.

3. In a radio receiver, means for tuning the receiver to the desired frequency, an electric motor for actuating said tuning means, manually operable means for controlling said motor from a point remote from said receiver, a potentiometer operated by said tuning means in accordance with the position thereof, an indicator located at said remote point and adapted to give a visible indication of the tuning adjustment of said tuning means when the position thereof is adjusted from said remote point, and a manually operable volume control for said receiver located at said remote point to control the output of said receiver.

4. In a radio receiver, means for tuning the receiver to the desired frequency, an electric motor for actuating said tuning means, manually operable means for controlling said motor from a point remote from said receiver, an impedance unit operated in conjunction with said tuning means, an indicator located at said remote point and responsive to the operation of said impedance unit to give a visible indication of the tuning adjustment of said tuning means when the position thereof is adjusted from said remote point, and a manually operable volume control for said receiver located at said remote point to control the output of said receiver in relation to the input signals from a station to which said receiver is tuned.

5. A control system for a radio receiver including a multiplicity of simultaneously operable tuning elements rotatable to different angular positions, a volume control circuit, a remote control panel and means carried by said remote control panel and connected to said radio receiver for shifting said tuning elements, actuating said volume control circuit and independently determining the operating frequency of said radio receiver.

6. In a radio receiver, means including a condenser for tuning the receiver to a selected frequency, means including an electric motor for actuating said tuning means, means including a plurality of switches for controlling said actuating means from a point remote from said receiver, means at said remote point for visibly in-

dicating the tuning adjustment of said tuning means, and a manually operable rotary volume control located at said remote point for controlling the output of said receiver.

7. A remote control system for a radio receiver having tuning and volume adjustments comprising means to actuate the tuning and volume adjustments of said receiver from a point remotely situated from said receiver.

8. A remote control system for a radio receiver having a tuning adjustment, comprising means for selectively actuating the tuning adjustment of said receiver from a point remotely situated from said receiver, means for indicating at the remote point the tuning adjustment of said receiver, and means for adjusting the output volume of said receiver from the remote point.

9. The combination with a radio receiving mechanism including a tuning device and a radio frequency tube, of an electric motor, a driving connection between the motor and the tuning device for adjusting the latter, an easily portable support adapted to be held in the hand of the operator, a control switch for the motor mounted on the support, a flexible connection from the switch to the motor, and a control means for the filament circuit of said tube mounted on said support and having flexible connection with said circuit.

10. The combination with a radio receiving mechanism including a tuning device and a radio frequency tube, of an electric motor, a driving connection between the motor and the tuning device for adjusting the latter, a freely movable support adapted to be held in the hand of the operator, a control switch for the motor mounted on the support, a flexible connection from the switch to the motor, a resistance mounted on the support, a flexible connection between said resistance and the filament circuit, and means mounted on the support for varying said resistance to control the volume of the signals.

11. In a radio receiving apparatus including tuning and volume controlling means, a cabinet in which the apparatus is located, means for controlling the tuning means of said apparatus and means for controlling the sound volume, said means including a unitary device readily transportable towards and away from the cabinet but connected to the cabinet by a flexible cable, said device including a manually operable switch and a manually operable device for controlling the volume controlling mechanism.

12. In a radio receiving apparatus a cabinet, tuning devices in the cabinet and volume controlling means, and means for controlling the tuning devices including a device remote from said cabinet and having therein a switch for controlling the tuning devices and also having therein volume controlling mechanism with a cable connecting the device with said cabinet.

13. In a radio receiving mechanism, a tuning device and an indicator to indicate with what stations the tuning device is tuned, an electric motor connected with said tuning device and indicator, a source of current for operating the motor and indicator, a portable device remote from the tuning device but connected thereto by a cable, a switch in the portable device for starting and stopping the motor and operating the indicator and a volume control device also in the portable device to control the sound volume of the mechanism.

14. In a radio receiving apparatus, a cabinet, tuning devices including an electric motor for operating the same and sound volume controlling filament and battery in the cabinet, a portable device remote from the cabinet with a cable to connect the device with the cabinet, said remote device having therein a switch for controlling the motor and also having therein sound volume controlling means.

15. In a radio receiver, means including an electric motor for tuning the receiver to a desired frequency, a plurality of selectively operable means for controlling said electric motor from a point remote from the receiver, and manually operable means located at said remote point for controlling the intensity of the output of said receiver.

16. The combination with an adjustable tuning element of a radio receiving system, actuating means for the tuning element comprising an electric motor, a plurality of selectively operable means for controlling rotation of said electric motor from a point remote from the receiver, said selectively operable means acting upon selective operation to control the operation of said motor and thereby the adjustment of the tuning element, manually operable means located at the remote point for controlling the intensity of the receiver output, and means at the remote point for visibly indicating the tuning adjustment of the receiver.

17. In a radio receiver, means including an electric motor for tuning the receiver to a desired frequency, selectively operable means for controlling said electric motor from an arbitrarily selected point, and manually operable means located at said point for controlling the intensity of the output of said receiver.

18. In a radio receiver, means including motor means for tuning the receiver to a desired frequency, means for controlling said motor means from an arbitrarily selected point, and manually operable means located at said point for controlling the intensity of the output of said receiver.

19. In a radio receiver, means including an electric motor for tuning the receiver to a desired frequency, a plurality of selectively operable means for controlling said electric motor from a point arbitrarily selected irrespective of the location of the first mentioned means, manually operable means located at said point for controlling the intensity of the output of said receiver, and means at said point for visibly indicating the tuning adjustment of the receiver.

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