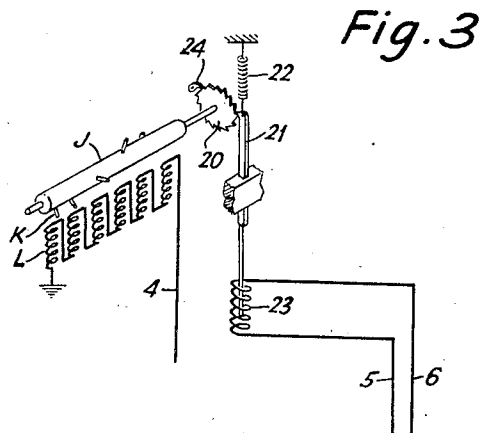
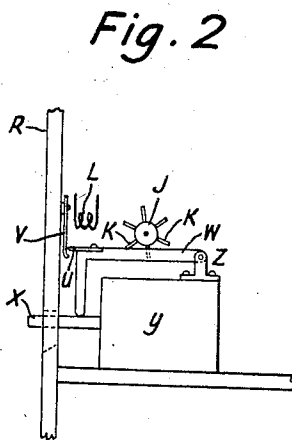
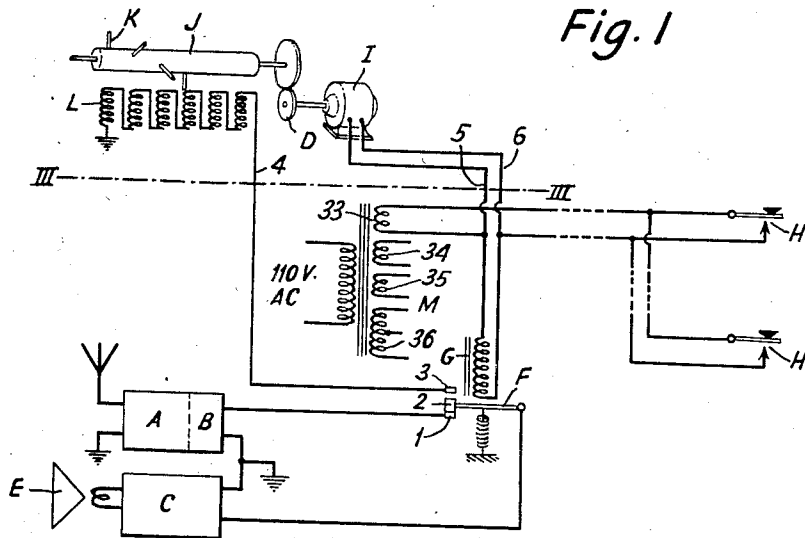


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2 Sheets-Sheet 1



INVENTOR
W. W. STOLZENBERG
BY *H. S. Stone*
ATTORNEY

April 20, 1943.

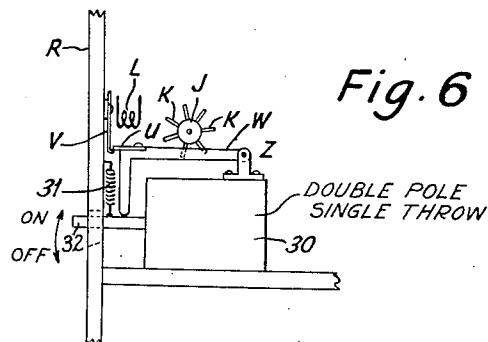
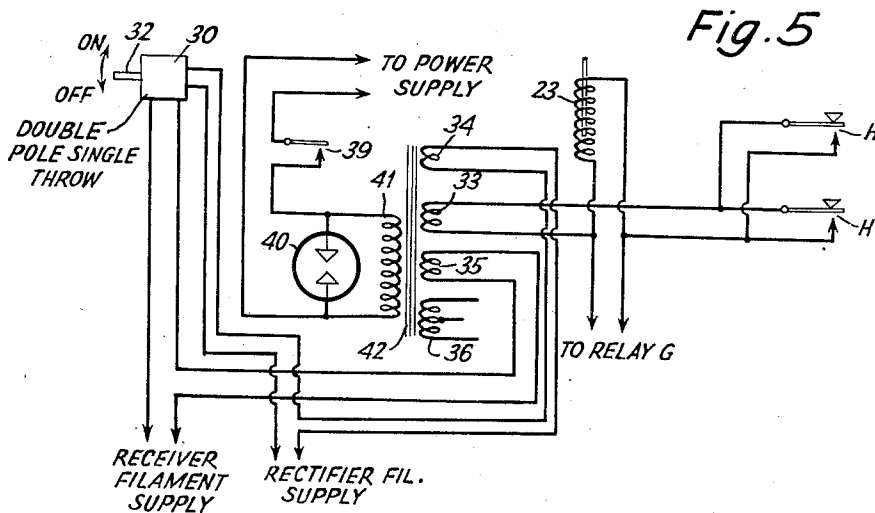
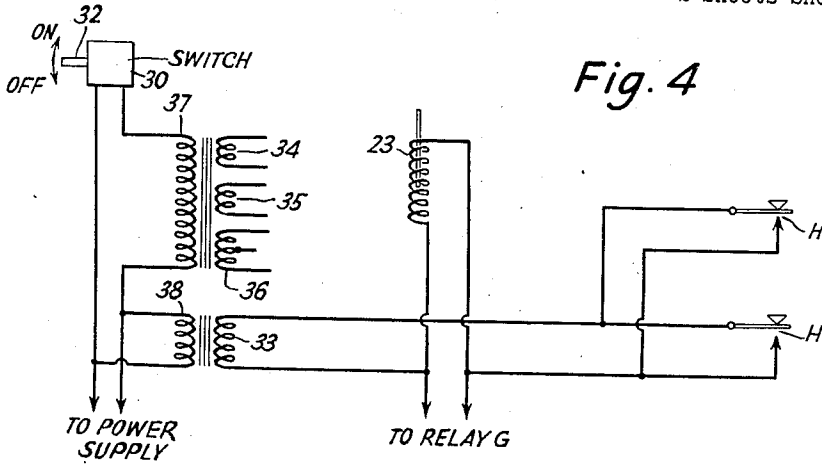
W. W. STOLZENBERG

2,316,899

REMOTE CONTROL

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2 Sheets-Sheet 2



INVENTOR
W. W. STOLZENBERG
BY *H. S. Brown*
ATTORNEY

UNITED STATES PATENT OFFICE

2,316,899

REMOTE CONTROL

Walter Willie Stolzenberg, Riverhead, N. Y., assignor to Radio Corporation of America, a corporation of Delaware

Application December 28, 1940, Serial No. 372,187

6 Claims. (Cl. 250—40)

This application is a continuation in part of my co-pending application Serial No. 294,431 filed September 12, 1939.

The present invention relates generally to remote control systems and more particularly to arrangements for remotely controlling radio apparatus.

In the past, remote control devices as applied to home radio broadcast receivers have been relatively complicated and expensive requiring, at the control point, either a miniature transmitter or a control box containing numerous contacts connected to the radio receiver through a cable of perhaps a dozen wires. Because of this it has not been economically feasible to install any of the above remote control systems on present day low priced radio receivers.

It is an object of the present invention to provide a remote control system which is much simpler than the above mentioned types, and which requires but a single pair of conductors to connect the receiver to the remote control point. Furthermore, according to the invention, proper control of the receiver from the remote control point may be provided by means of a single push-button switch.

The basic idea of one embodiment of the invention may comprise the following:

A motor driven cam device is arranged so that when the motor is energized the cam device is slowly rotated and depresses first one then another, in sequence, of all the push buttons or levers of the tuning unit in the receiver. The motor may be controlled by a switch which may be remotely located from the receiver. When the switch is closed, all the stations to which the push-button unit is adjusted will be tuned in one after another. When the desired station is reached the listener at the remote point releases the switch and his receiver will remain tuned to the station corresponding to the last push-button depressed. The invention also provides for giving the listener an indication as to which station he is tuned to. For this purpose the cam mechanism, which depresses the tuning levers, is provided with means to strike or pluck a series of musically tuned reeds which are arranged so that as each station lever is depressed a characteristic musical note is emitted from the receiver. If each of the musical reeds is arranged to give a different tone, the operator will soon learn to associate a particular tone with a broadcasting station.

In another embodiment of the invention a magnetically operated pawl and ratchet mech-

anism is used to drive the cam device and the arrangement is such that upon each operation of the remote switch the cam device is advanced one step. In this case, the cam device is preferably arranged so that each step corresponds to one of the positions at which a push-button is depressed.

The invention also provides for turning the receiver on and off from a remote point. For this purpose an "on" and "off" switch usually provided at the receiver is adapted for operation by the cam device.

The invention will be more readily understood from the following detailed description thereof when read in conjunction with the appended drawings.

In the drawings, Figure 1 is a schematic circuit diagram of an embodiment of the invention using a motor driven cam;

Fig. 2 illustrates one way in which the distinctive tones may be produced;

Fig. 3 illustrates the invention with a magnet operated ratchet and pawl cam drive;

Fig. 4 illustrates an "on" and "off" switching arrangement adapted to be controlled from a remote point in accordance with the invention;

Fig. 5 illustrates another modification of the invention using only one power transformer; and,

Fig. 6 illustrates an arrangement for producing a distinctive signal upon operation of the "on" and "off" switch.

In Figure 1 of the drawings, A represents the preliminary circuits of a radio receiver, B the demodulator or detector, C the audio frequency amplifier and E the loud-speaker.

The demodulator B is provided with two output terminals one of which is connected to contact 1 of a single pole double throw relay FG while the other is connected to ground. The audio frequency amplifier C is provided with a pair of input terminals one of which is connected to ground and the other to contact 2 of relay FG. The relay armature F is spring biased in a direction so as to maintain contacts 1 and 2 closed when the relay is de-energized. Energization of the relay pulls the armature F upwardly from the position shown thereby opening contacts 1 and 2 and closing contacts 2 and 3. From the arrangement shown, it will be seen that the output of demodulator B is fed to the input of audio frequency amplifier C only when contacts 1 and 2 are closed.

For the purpose of explaining the present invention, it will be assumed that the radio receiver ABCE is of the push button type and that it is

provided with a plurality of station levers which are adapted to be depressed for tuning the receiver to different frequencies. For operating the station levers, there is provided a plurality of cam devices K mounted on a cylindrical member J which is adapted to be rotated by means of an electric motor I through the intermediary of suitable gears D. The cam devices K are arranged to depress the receiver tuning levers and also to pluck associated musical reeds hereinafter described more fully. The sound emitted by the musical reeds is picked up by means of a series of pickup coils L which are arranged adjacent their respective musical reeds in such a way as to pick up voltages corresponding to the reed vibrations. The pickup coils L are all connected in series between ground and contact element 3. Accordingly, any voltages impressed on the coils L will be impressed upon the input of audio frequency amplifier C only when contacts 2 and 3 are connected together as is the case when the relay FG is energized.

Transformer M which represents the usual radio receiver power transformer is provided with a primary winding adapted to be connected to a suitable source of alternating current power and several secondary windings 33, 34, 35, and 36. Winding 33 which is preferably a low voltage winding is utilized to energize the motor I and the relay FG. For this purpose the motor I is connected in series with winding 33 and a switch H so that closure of switch H causes voltage to be applied across the motor I. The winding of relay FG is also connected in series with secondary winding 33 and switch H so that closure of the switch H also causes the energization of the relay. Obviously several switches such as H may be provided in parallel, thus providing for remotely controlling the receiver from several points. It will be seen from Figure 1 that upon closing switch H motor I is set in motion and that relay FG disconnects the audio amplifier C from the radio receiver diode output B and connects it to the reed pickup coils L. As motor I revolves it slowly turns cylinder J whereby cams K act to depress first one and then another of the push-buttons in the tuning unit and at the same time pluck the corresponding musical reeds. The tone from each reed, as it is plucked, passes into audio amplifier C and is emitted from the speaker. The operator listens until he hears the particular musical tone associated with the station he desires and then releases push-button H. This stops the motor I on the station he desires and relay FG allows its armature to drop thereby disconnecting the reed pickup coils and connecting the diode output B to the audio amplifier C.

Figure 2 illustrates one possible arrangement in which the rotating cylindrical member J containing cam devices K may be made to depress the tuning buttons X and pluck the tuned reeds V.

In the arrangement shown in Figure 2, R represents the front panel of a radio receiver provided with a tuning mechanism Y which is adapted to be operated by a plurality of tuning levers X. The levers X are of the type that are adapted to be depressed for tuning purposes. There are as many levers X provided as there are stations desired to be tuned to automatically. Each station lever X has mounted over it an operating L-shaped bar W pivoted at Z so that there are as many bars W provided as there are tuning levers X.

The arrangement is such that rotation of a

bar W in a counterclockwise direction (Fig. 2) about its pivot Z, depresses the corresponding station lever X thereby tuning the receiver to a predetermined frequency. The cylindrical member J is mounted over the bars W and arranged so that as the cylindrical member J is rotated, the cams K depress the corresponding L-shaped bars W in a predetermined sequence, it being understood that there is provided a cam device K for each bar W. Each bar W is provided with a reed plucking arrangement U arranged to pluck its corresponding reed V when the bar is depressed.

It is to be understood that the arrangement just described is but one of several systems that may be used to achieve the desired results. For instance, instead of actuating the drum and cams with an electric motor, it may be rotated by a "notching relay" arrangement as shown in Fig. 3 wherein the motor drive of the arrangement shown in Fig. 1 has been replaced by a magnetically operated ratchet and pawl device.

In Fig. 3 the cam cylinder J is operated in steps by the ratchet and pawl arrangement 20, 21. Thus each depression of a remote key H energizes magnet 23, which pulls down pawl 21 against the force of spring 22 and causes the cam J to depress the next push-button. The remaining part of the circuit is the same as in Fig. 1 below the dot-dash line III, III.

The invention also provides for turning the receiver on and off from a remote point. Referring to Fig. 6, it will be seen that the cylinder J has added to it an additional cam K which is located on the cylinder J between two of the station cams K previously referred to. The extra cam K actuates an on and off switch 30 which is arranged to shut off the power from the receiver power transformer.

It will be noted from Fig. 6 that the proper cam K will press down on the pivoted arm W and depress the lever 32 against the action of spring 31. When lever 32 is depressed, the power is shut off from the receiver. As soon as arm W is depressed by its associated cam K, its reed V is plucked by the reed-plucking arrangement U. Thus the vibrations of the reed V are picked up by the coil L and fed to the speaker as previously described.

On and off switch 30 is arranged so that the spring 31 pulls the lever 32 back to the on position as soon as the cylinder J is rotated to a station selecting position since in such a case cam K associated with the on and off switch is moved out of the way of arm W. It will be noted that the reed V and reed-plucking device U of the on and off switch are arranged so that the characteristic note sounds just before the switch 30 cuts the power off. This is desirable in order to prevent the sound dying out too soon after operation of the switch 30. In the case of the station selecting cams this is not necessary especially if the step by step driving mechanism is employed since in such a case the switch H may be held in a depressed position until a clear indication of the tone is obtained.

A suitable circuit arrangement with which the switch 30 may be associated is shown in Fig. 4 wherein it will be seen that when lever 32 is depressed, transformer 37 is disconnected from the power supply line.

In the system shown in Figure 4, two transformers 37 and 33 are necessary in order that the cylindrical cam member may be operated by switches H when the primary of the receiving set

transformer is disconnected from the power supply line. Accordingly, the auxiliary transformer 38, 33 is provided and associated with the ratchet operating relay 23 and control switches H. Usually the use of an auxiliary transformer is not objectionable since a suitable transformer for this purpose may draw only about one-half watt per hour when idling. However, if the use of two transformers is not desirable, then a single transformer arrangement such as shown in Figure 5 of the drawings may be utilized. In this case the switch 30 when thrown to the off position cuts off the filament or filament and plate supply from the receiver and a characteristic sound may be emitted through the loudspeaker as previously described just before the switch 30 cuts the power supply off. Since it is desirable to shut the power off from the transformer 42 a switch 39 is ganged with the volume control knob and used to open the circuit when the volume control is operated to one of its extreme positions, usually to the position of minimum volume. A neon bulb 40 connected across the primary of transformer 42 and visible through the front panel of the receiver cabinet is used to indicate the "on" position of the manually operated switch 39. In the operation of the arrangement shown in Figure 5, the volume control knob is first turned sufficiently to close switch 39 thereby connecting the primary of transformer 42 across the power supply line.

It can be seen from the above that several on and off positions may be incorporated by simply providing on the cylindrical member J several cams to operate the lever W of the on and off switch at different angular positions of the cylinder J. In this way it would not be necessary to run the cylinder J a complete revolution to reach an "off" position.

I claim:

1. In radio signaling apparatus provided with tuning means and with a plurality of selectively operable devices each acting upon operation to control the tuning means so as to tune said apparatus to a predetermined frequency, a motor driven cam device acting upon operation to operate the selectively operable devices in a predetermined sequence, switching means for controlling the operation of said cam device and to stop it in any desired position, and means for producing a distinct audible signal upon the operation of each of said selectively operable means.

2. In radio receiving apparatus provided with tuning means, a plurality of selectively operable means acting upon selective operation thereof to operate the tuning means and thereby tune the receiving apparatus to predetermined different frequencies and a loudspeaker, operable cam means, means controlled by said cam means for operating the selectively operable means in predetermined sequence, an electric motor for operating said cam means, switching means for controlling the operation of the electric motor, and means acting upon operation of said cam controlled means for producing a distinguishing characteristic sound through the loud speaker to indicate the operation of each of said selectively operable means.

3. In radio receiving apparatus including an adjustable controlling element, a plurality of selectively operable levers each acting upon selective operation thereof to effect the movement of said element to a desired position, means acting upon operation of each of said levers for impressing upon said receiving apparatus a characteristic signal to indicate the operation of the selected one of said levers, motor driven means for depressing said levers in a predetermined sequence, and means operable from a remote point for controlling the starting and stopping of the motor driven means, whereby said last named means may be stopped upon depression of any one of said levers and while the lever is in its depressed position.

4. In radio receiving apparatus provided with a loud speaker, an adjustable tuning element, a plurality of selectively operable means acting upon selective operation thereof to effect the movement of said element to respectively different positions, operable cam means, means controlled by said cam means for operating said selectively operable means in predetermined sequence, an electric motor for operating said cam means, switching means for controlling the operation of said electric motor, and means acting upon operation of said cam controlled means for giving a distinguishing characteristic sound through said loud speaker to indicate the operation of each of said selectively operable means.

5. In a signalling system, a receiving set having a plurality of selectively operable devices, some thereof comprising presettable for adjusting said set to tune the same to any one of a plurality of frequencies and at least one of said operable devices comprising a switching means for turning the set on and off, selecting means for selecting a desired one of said operable means, said selecting means comprising a rotatable cylinder provided with a plurality of cam projections, means for operating said selecting means to select any one of said operable means including a solenoid for actuating said operable means, and a switching device for controlling the operation of said solenoid.

6. In a signalling system, a receiving set having a plurality of selectively operable devices for adjusting said set to tune the same to any one of a plurality of frequencies, means for selectively actuating said operable devices comprising a cylinder provided with a plurality of cam projections arranged in spaced relation to each other axially of said cylinder and angularly around the surface thereof, each of said devices including an actuatable element located in the path of motion of a respective one of said projections and normally out of engagement therewith, solenoid mechanism for revolving said cylinder about its axis in steps in accordance with the angular spacing of the projections about the cylinder, and a switching device for controlling the operation of the solenoid whereby said set tuning is performed in a sequential manner in accordance with said spaced relation of the projections as the cylinder revolves about its axis.

WALTER WILLIE STOLZENBERG.