Oct. 4, 1932. S. BERTOMEU 1,880,693

REMOTE CONTROL

Filed July 10, 1931 2 Sheets-Sheet 1

FIG.1.

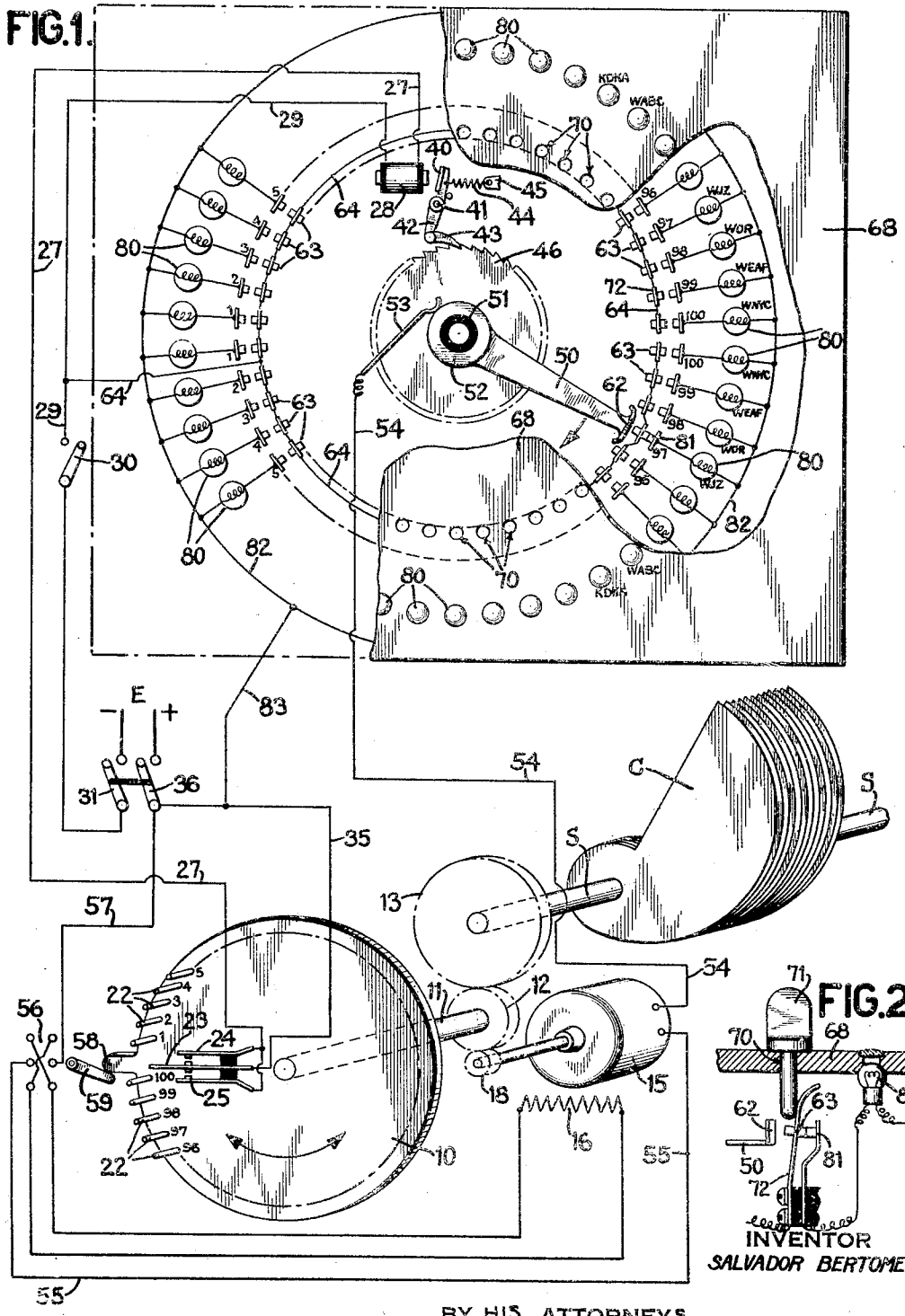


FIG.2.

BY HIS ATTORNEYS

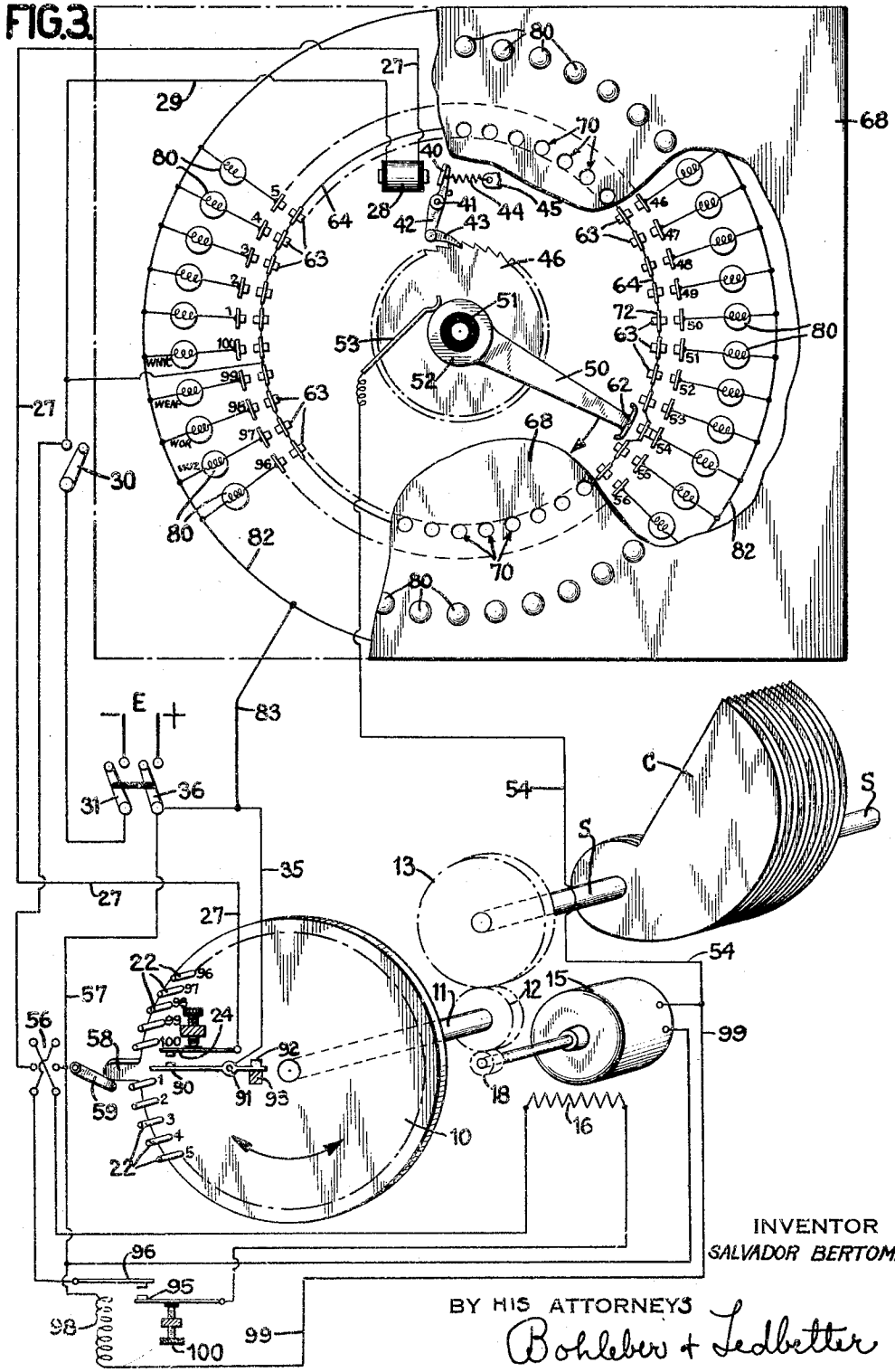
Bohleber & Ledbetter

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REMOTE CONTROL

Filed July 10, 1931 2 Sheets-Sheet 2

FIG.3.



Patented Oct. 4, 1932

1,880,693

UNITED STATES PATENT OFFICE

SALVADOR BERTOMEU, OF NEW YORK, N. Y.

REMOTE CONTROL

Application filed July 10, 1931. Serial No. 549,883.

The invention relates to a remote control for radio receivers by means of which the receiver which is located at some remote point, may be tuned to any desired broadcasting wave length or station by proper manipulation of a control means contained within a box which may be moved to any desired location. The remote control is easily operated and its parts are few and not complicated which assures trouble free operation.

An object of the invention is to construct a remote control for a radio receiver in which the variable condensers are continually oscillating or rotating through a complete cycle, whether such cycle is an oscillating cycle or a rotating cycle, throughout its tuning range. The remote control includes devices and combinations thereof of a novel construction for stopping the continuous oscillation or rotation of the variable condensers at any desired point in order to tune in a desired broadcasting station.

Other objects of the invention will be more apparent from the following description, taken in connection with the accompanying drawings, illustrating the preferred embodiment of the invention, in which:

Figure 1 shows a diagrammatic layout of the remote control as it is connected to the shaft of a gang of variable condensers of a receiving set.

Figure 2 illustrates the manner in which a key is plugged into any one of the various key holes for each tuning position of the receiver in order to tune the receiver to the particular station desired.

Figure 3 is a diagrammatic layout of the remote control with a construction somewhat different from that shown in Figure 1 but utilizing the principal and essential parts of the construction shown in that figure.

In a remote control device for tuning radio receivers, it is advisable in order to obtain the best tuning results, that the tuning mechanism be accurately tuned to the wave length of the receiving station. With the device to be described herein, any degree of accuracy may be obtained in tuning the receiver to the desired wave length merely by multiplying certain of the units as will appear hereinafter. Customarily in manual tuning of the receiver the condenser dial is provided with approximately 100 divisions and the remote control of the invention may be tuned to half or even quarter parts of a single division upon the tuning or condenser dial or, if a simpler construction is desired, the device may be constructed so that the receiver will be tuned only to single divisions of the condenser dial.

With the remote control of the invention, the radio receiver may be placed in any out of the way place, such as a closet, in the basement or cellar or any other remote place, and the control box which controls the tuning of the radio receiver may be positioned anywhere desired. The control box may also be moved at will to different rooms or different places within the same room. The speaker, of course, is either permanently fixed or preferably is also movable where desired and may be included in the control box if desired.

The remote control of the invention, that is, that part of it which operates or actuates the tuning means such as the condensers, is directly connected to the shaft S which carries the gang of condensers C for the receiver. The application of the remote control device is not limited to a receiver having a gang of condensers mounted upon the same shaft, but may also be connected with a radio receiver in which a separate shaft is provided for the condensers so long as these condensers may be connected together for single or combined control.

One of the principal parts of the remote control is an impulse generator which, in the embodiment shown herein, consists of a disc 10 carried upon a shaft 11. The shaft 11 carries a gear 12 in mesh with a gear 13 which latter gear is carried upon the shaft S of the condensers C. An electric motor 15 having a field coil 16 is operatively connected to the impulse generator and condensers through the gear 18 meshing with the gear 12. Any connection of the motor to the condensers or impulse generator is within the scope of the invention, the primary object being that the impulse generator and condensers should rotate together or oscillate together continuously through a complete cycle, whether that

cycle is an oscillating cycle because the condensers cannot be rotated through a complete cycle, or whether that cycle is a rotating cycle in case condensers are used which are capable of a complete rotation. The impulse generator in being operatively connected with the condensers oscillates therewith and continues to oscillate with the condensers so long as they or the impulse generator are being driven by the driving means which, in the embodiment shown, is the electric motor 15.

The electrical impulses of the impulse generator 10 are produced in the embodiment shown by providing the disc 10 with a plurality of pins 22 at spaced intervals thereon. The pins or operating means 22 as they rotate, successively engage the flexible spring member 23 and flex it so that it contacts with an adjacent switch member 24 or 25. The flexible switch element 23 engages its cooperating switch element 24 when the disc 10 rotates in a clockwise direction. Similarly, the flexible switch member 23 engages its cooperating switch member 25 when the disc is rotating in a counter-clockwise direction, as will be apparent since the direction of movement of the pins or switch actuators 22 controls the direction of movement of the flexible switching member 23. The cooperating switch members 23, 24 and 25 comprise then impulse switches since they produce electrical impulses each time that they close or contact together.

As mentioned hereinbefore, the usual condenser dial of a radio receiver is provided with 100 dial graduations and, for the purpose of illustration, the impulse generator or disc 10 is shown as being provided with 100 operating means or pins 22. This means that there will be an electrical impulse generated for each division upon the usual condenser dial. Obviously, any number of electrical impulses may be generated merely by increasing the number of pins 22 so that a finer degree of tuning of the condensers may be obtained if desired. Similarly, the number of pins may be reduced and the gear ratio between the disc and condensers proportionately increased in order to retain the same degree or accuracy of tuning.

Ordinarily a condenser or condenser gang is rotated through 180° in order to tune a radio receiver throughout its entire tuning range. The impulse generator disc 10 may be provided with operating means or pins 22 for the impulse switch throughout substantially its entire circumference if desired, and then provide a two to one gear ratio between the shafts 11 and S for the condensers. To be exact, the ratio of the gears 12 and 13 would be in the proportion of the degrees of the disc 10 utilized for pins 22 or the number of degrees of rotation of the disc 10 in relation to the 180° rotation of the condenser shaft S. By this construction the impulse generator disc 10 may be a complete circumference and thereby enable the pins 22 to be spaced farther apart than would have been possible if the disc were not geared to the condenser shaft with approximately a two for one ratio. Obviously, if a larger number of pins is desired, the circumference of the impulse generator disc 10 may be enlarged thereby providing additional circumferential distances within which to position the pins so that they will not be too close together.

The cooperating switch members 24 and 25 are electrically connected together and are connected by the wire 27 to an electro-magnet 28. The return circuit for the electro-magnet passes over the wire 29 through the switch 30 to the bar 31 of a power switch which is connected with the source E of electrical energy. The flexible switch member 23 is connected by a wire 35 to the other bar 36 of the power switch which is connected with the other side of the source E of electrical energy. It will be observed therefore that an electrical impulse is transmitted to the electro-magnet 28 by each pin 22 engaging the flexible switch element 23 to bring it into contact with either of the cooperating switch members 24 and 25. As described above, the direction of rotation of the disc 10 determines whether the switch member 24 or 25 is contacted, but this is of no particular importance since they are both electrically connected together.

Each electrical impulse produced by the impulse generator energizes the electro-magnet 28 and each energization of the electro-magnet 28 draws the armature 40 into contact with the core of the electro-magnet 28. The armature is pivotally mounted upon a pin 41 and carries an arm 42 upon which is carried a pawl 43. A spring 44 attached at one end with some stationary part or bracket 45 and at the other end with the armature 40 draws the latter away from the electro-magnet 28 as soon as the electro-magnet becomes deenergized. The pawl 43 engages with the teeth of a ratchet wheel 46 and conseqnently, for each impulse generated by the impulse generator, the armature and pawl will be actuated to rotate the ratchet wheel 46 one unit for each actuation of the armature or each impulse. It will be observed therefore, that the disc 10 and the ratchet wheel 46 rotate together at the same speed, irrespective of the fact that one is a continuous rotation and the other is the intermittent rotation produced by ratchet means, such as the pawl 43 and the ratchet wheel 46. It should be noted, however, that the ratchet wheel 46, in the embodiment shown, rotates in one direction only, whereas the impulse generator disc 10 rotates or oscillates sub-

stantially a complete revolution in both directions.

The ratchet wheel 46 is operatively connected to a movable switch actuator or rotating switch arm 50. This switch arm is insulated from the ratchet wheel 46 by means of an insulated bushing 51. A circular hub 52 is carried by the switch arm 50 with which a brush 53 contacts. The brush 53 is electrically connected by means of the wire 54 to the armature circuit of the electric motor 15 and is in series therewith. The armature of the motor 15 is in turn connected by means of the wire 55 to a reversing switch 56 and is connected from the reversing switch by means of a wire 57 to the bar 36 of the power switch and the source of electrical potential E. The reversing switch is actuated by the lever 59 which is engaged by a reversing member 58 carried by the impulse generator disc 10. As the impulse generator disc 10 rotates, the projection 58 engages the switch reversing lever 59 to reverse the switch which in turn reverses the direction of the motor 15 and consequently reverses the direction of rotation of the disc 10.

The disc 10 continues to rotate in the reverse direction until the reversing projection or means 58 engages the reversing switch lever 59 to swing it in the opposite direction and again reverse the current through the motor armature which in turn reverses the direction of rotation of the motor and the disc 10. It is by this construction that the impulse generator or disc 10 and the condensers C are continually reversing their direction of rotation through a complete cycle of rotation or oscillation. Obviously, the reversing switch may be operatively controlled from the condenser shaft as well as from the disc 10.

The movable switch actuator or arm 50 carries a contact plate 62 which normally engages with a plurality of circularly disposed switch contacts 63. Each of the switch contacts 63 are connected together or connected to the source of electrical energy through the wire 64 which is connected with the wire 29 or with the switch 30. The switch 30 as previously described, is connected to the bar 31 of the power switch. Each switch contact 63 is then normally connected with the power switch. It will be observed, therefore, that irrespective of the position of the rotating switch arm 50, that a current will be maintained through the motor armature 15 in a circuit which will now be traced. This circuit begins with the bar 36 of the power switch and continues over the wire 57 to the reversing switch 56. From the reversing switch the circuit passes through the field coil circuit 16, then over the wire 55 to the armature of the motor 15, then through the wire 54 to the brush 53, hub 52, switch arm 50 to the switch plate 62. The switch plate 62 normally contacts with any one of the switch contacts 63 and the circuit continues from whichever switch contact 63 the switch plate 62 may be contacting to the wire 64, switch 30 and the bar 31 of the power switch connected with the source E of electrical potential.

The switch plate 62 upon the rotating switch arm 50 has been described as being normally in contact with at least one of the switch contacts 63. So long as the circuit is closed at this point, the motor 15 will continue to rotate first in one direction and then in the other direction as the reversing switch 56 is thrown by the mechanism described to change the direction of the current through the field coil 16 of the motor. As described above, the movable switch arm 50 is always engaging a contact 63 excepting, of course, when a station is to be tuned as will be described. The plurality of contacts 63 are electrically connected together so that this plurality of contacts are in effect both in operation and construction, a single switch element and the rotating switch arm 50 is the other switch element. Switch means are therefore provided in order to stop the oscillation of the condensers by stopping the continuous drive between the motor and the condensers such as by stopping the drive of the motor itself.

The switch contacts 63 are flexibly mounted so that they may be moved radially away from the path of the switch plate 62. Now when the rotating switch arm 50 reaches a switch contact 63 which has been removed out of the path of the switch plate 62, the circuit to the armature of the motor 15 will be broken and it will stop its rotation. Upon the motor 15 stopping its rotation, the impulse generator disc 10 will also cease its rotation and hence no more electrical impulses will be generated thereby. The circuit may be broken, if desired, by removing the contact plate 62 away from engagement with a contact 63 at the desired point in the rotation of the switch actuator or arm 50.

Without electrical impulses being generated and actuating the electro-magnet 28, the rotating switch arm 50 will stop in the position in which the circuit is broken. The motor will therefore remain stationary with the condensers in a position corresponding with the relative position of the switch contact which has been depressed away from normal contact with the switch plate 62. The condensers and the entire remote control apparatus will remain in this position so long as the circuit is broken at this point.

In order to break the circuit at any one of the switch contacts 63, the top 68 of the box in which the rotating switch arm 50 and its associated mechanism is contained, is provided with a plurality of holes 70 to receive a plug-in key 71. Upon plugging in the key

71 into a desired hole, the end of the key engages a detractor 72 which removes the switch contact 63 out of the normal path of contact with the switch plate 62. Any construction by means of which the switch contact 63 may be deflected away is contemplated by the invention and that shown herein is merely illustrative. In the embodiment shown, the switch contact 63 is carried upon a flexible member 72 so that upon withdrawal of the key 71 from the selected hole 70, the switch contact 63 will return to its original position so that it will normally be contacted by the switch plate 62.

It will be clear, therefore, that upon removing the key 71 from its plug-in hole 70, the contact 63 will be brought into contact with the switch plate 62 by the spring member 72 thereby again completing the circuit through the motor which will continue its rotation and oscillation of the condensers C and impulse generator. In order to tune in any other station, the key is plugged into some other hole 70 which will depress the switch contact 63 at this position away from normal contact with the rotating switch arm 50 or the plate 62 carried thereby and the motor and condensers will stop rotating in a position corresponding with the position of this switch contact 63 which has been deflected. The condensers will therefore tune the radio receiver to the station corresponding with the wave length of the then position of the condensers and the selected station indicated upon the control box.

Although the switch arm 50 and the switching plate 62 carried thereby have been described as constituting one of the switch elements with the switch contact 63 as the other element, it is clear that the rotating switch arm 50 need not necessarily be one of the switch elements. The switch arm is also a switch actuator, whether the arm is one of the elements of the switch or whether it merely actuates a switch at each position, in that by its rotation it normally actuates the closing of the switches in circuit with the motor. When, however, the key is inserted in any desired hole 70, the actuation of the particular switch at this keyed position is rendered inoperative or unable to close the circuit to the motor and hence the condensers halt their continuous oscillation and tune the receiver to the desired station.

An electrical impulse is generated by the impulse generator for each one of the pins 22 in both directions of rotation. It will be clear therefore that an impulse is generated in the sequence 1, 2, 3, 4, etc., in one direction up to 98, 99 and 100 and then when the reversing switch reverses the direction of the rotation of the disc 10, the impulses will continue to be generated but in a reverse order namely, 100, 99, 98, etc., to 4, 3, 2, 1, at which time the rotation of the disc 10 will again be reversed. The pins continue in this manner to generate or initiate impulses so long as the motor 15 continues to rotate and result in the generation of two impulses for each pin in one complete cycle. It will be recalled that the numbers of the pins correspond with the position of the variable condensers from closed to open position. There are, therefore, 200 impulses generated by the impulse generator for each cycle and hence 200 impulses for each cycle of oscillation of the condensers C.

There is a switch contact 63 or a switch which is closed for each of the 200 impulses generated in one complete cycle in the oscillation of the impulse generator disc and condensers. This construction is required in the embodiment shown, inasmuch as the switch actuator 50 rotates in one direction only and the impulse generator disc 10 rotates in both directions or oscillates. It will be apparent, therefore, that the switch contacts 63 which correspond in position with the pin 100 will be adjacent each other and, similarly, the switch contacts 63 corresponding in position with the pin 1 in both directions of its rotation will be adjacent to each other and diametrically opposite from the switch contacts 63 corresponding with the pin 100. With this construction the radio receiver can be tuned to any desired station without delay since the tuning may take place in either direction of rotation or oscillation of the condensers.

In order to indicate the station which has been selected, the top of the control box 68 may be provided with a plurality of lights 80 which are normally in an open circuit so long as the key 71 has not been plugged into one of the openings 70. Plugging in of the key 71 in the selected station opening 70, closes an electrical circuit with the contact 81 which is connected with the light 80 marked WJZ. Each of these lights is connected to a wire 82 which wire connects with a wire 83 connected with the switch 36 to the source of electrical energy E. The complete circuit to the lights 80 therefore is through the switch 36, wires 83 and 82, through the light 80 to the light contact 81, then to the adjacent contact 63, the wire 64, through the switch 30 and to the switch 31 which is connected to the outer side of the source E of electrical energy. The single key 71 or the station selector means also controls a station indicator or light.

It will be noted that in the construction described hereinabove, the selecting mechanism for the remote control device may be housed within a box which also carries the switch 30 by means of which the entire control device may be connected or disconnected for operation. It will also be noted that by the device described herein, there are only four wires, namely, the wires 54, 83, 29 and 27, be-

tween the control box and the radio receiver located in some remote position. In fact, if the remote control device is not provided with the lights 80, the wire 83 may be dispensed with so that in the more simple construction only three connecting wires are necessary between the control box and the radio receiver. Obviously, this simplifies the wiring construction as well as reducing the size of the cable connecting the radio receiver with the control box to a three wire instead of a four wire cable.

The remote control will function essentially the same when the device is constructed so that the impulses are generated by the oscillating disc 10 in one direction of its rotation and not in the other direction, as shown in Figure 3. In this construction only 100 switches or switch contacts 63 need be provided instead of the 200 shown in that of Figure 1. In other words, there is one switch provided for each impulse generated by the impulse generator. It will also be noted that the switch contact 63 which corresponds in position with the pin 100 is adjacent to the switch contact 1. In other respects the construction of the remote control of Figure 3 may be identical with that shown in Figure 1 and therefore, these like elements of the construction will not be again described.

The operation of the construction of the remote control of Figure 3 is also essentially the same as that shown in Figure 1 with this difference that the rotating switch actuator or arm 50 makes a complete revolution synchronously with the rotation of the disc 10. The switch arm 50 rotates by intermittent movements because of the ratchet mechanism but the rotation of the disc and switch actuator is together and hence synchronous. Upon the return rotation of the disc 10, however, there are no impulses generated and, consequently, the electro-magnet 28 is not energized so that the switch actuator 50 remains stationary upon the switch contact 63 in the position 100 or until the disc 10 is again reversed and impulses again generated to energize the electro-magnet 28. The switch actuator 50 then continues its rotation for another complete revolution.

It will be noted that with the construction above described, it is not possible to tune the radio receiver upon the counter-clockwise rotation of the disc 10. It also should be noted, however, that the construction of Figure 3 is simpler and there are not two sets of key holes 70 or two sets of contacts 63 or switch mechanism provided for each station or position of the condensers. The operation and construction is simpler therefore.

In the construction of Figure 3, the impulse generator switch 90 functions essentially similarly to the flexible switch member 23. If the contacts carried by the switch members 24 and 90 are relatively close together, these contacts may engage due to the flexing back of the switch member 90 to generate an impulse during the counter-clockwise rotation of the disc 20. This cannot happen if the pins 22 are spaced close enough together so that as soon as the flexible switch member 90 is disengaged from contact with one pin 22 it will engage the next pin 22 which has advanced sufficiently in its rotation to engage the flexible switch member 90 without its flexing back far enough to engage the contact 64.

In Figure 3 the flexible switch member 90 is pivoted upon the pin 91. The lower end of the switch member carries a counterweight 92 and a stop 93 engages the flexible switch member 90 so that it cannot pass beyond a vertical position in one direction, excepting by flexing, namely, the direction in which the impulse generations are generated and that is, when the disc 10 rotates in a clockwise direction. In the reverse direction of rotation of the disc 20 the flexible switch member 90 need not flex but pivots upon the pin 91. The counterweight 92 tends to return the flexible switch member 90 to vertical position but its inertia prevents its return to vertical position so long as the disc 10 is rotating in a counter-clockwise direction. As soon however, as the disc 20 ceases its rotation just prior to the reverse in direction of rotation thereof, the counterweight 92 swings the flexible switch member 90 into vertical position ready to be again engaged by the pins 22 for flexure into contact with the cooperating switch member 24 to generate impulses by contact of the switch members 24 and 90.

Another modification in the construction of Figure 1 is shown in the remote control device of Figure 3 which is applicable to the constructions of either Figure 1 or Figure 3. Incidentally, it might be pointed out that the field coil 16 for the motor 15 in Figure 3 is connected in shunt with the motor or directly across the supply lines 31 and 36. This means that when a station has been tuned in, the field winding continues to consume current. A shunt wound or direct connected field for the motor has the advantage that the motor 15 stops practically immediately upon the breaking of the armature circuit at one of the contacts 63 when the field of the motor is still energized.

A series wound motor may be used but where the motor is directly connected with the condensers and the armature current is opened at a contact 63, this would cut off the field current at the same time that the current is cut off in the armature. There may be some possibility that the inertia of the motor will cause rotation sufficiently to rotate the impulse disc 10 far enough to generate another impulse even though the gearing ratio between the motor and the condensers

or disc 10 is great. If necessary, braking devices may be used to obviate this. In the use of a series wound motor as well as a shunt motor, the drive between the motor and condensers and impulse generator may be broken by known clutch means which operate at high speed. Immediate stopping of the motor or drive means will then not be a factor in the operation of the mechanism.

The field winding 16 of the shunt wound or directly connected field motor 15 in Figure 3 is connected in series with a contact 95. A flexible contact arm 96 is positioned adjacent thereto and connected with one of the contacts on the reversing switch 56. An electro-magnet 98 is positioned to control the flexing of the arm 96 and is therefore connected with the wire 57 on one side of the armature winding and is connected by means of a wire 99 to the wire 54 on the other side of the armature winding of the motor 15. A regulating screw 100 is provided to adjust the space between the respective contacts 95 and 96.

The operation of the electro-magnet 98 closes the switch between the contacts 95 and 96. The electro-magnet 98 is energized and controlled by the circuit through the contact 63 so that when the switch 30 is closed to operate the remote control device, the circuit to the motor 15 is closed also and the electro-magnet 98 is energized to close the circuit through the switch contacts 95 and 96 to the field coil 16 whereupon the motor will rotate. Now when the circuit is broken at a contact 63, the lag of the magnetization of the electro-magnet 98 will hold the contacts 95 and 96 closed long enough so that there will be momentary field, set up by the field coil 16 after the armature circuit is broken, sufficiently long to stop the rotation of the armature of the motor 15 practically immediately. The contacts 95 and 96 will then separate to break the circuit to the field coil 16 and the coil will therefore not consume current while the radio receiver is tuned to the desired station.

Various modifications will occur to those skilled in the art in the configuration, composition and disposition of the various component elements going to make up the invention as a whole, as well as the application thereof to various purposes and no limitation is intended by the phraseology of the foregoing description or illustrations in the accompanying drawings except as indicated in the appended claims.

What is claimed is:

1. A remote control for a radio receiver comprising an impulse generator operatively connected to the variable condenser shaft of the receiver, the generator producing an electrical impulse for each tuning position of the condensers, a motor connected to and continuously driving the impulse generator and condensers in complete cycles, a movable switch actuator, means actuated by each impulse generated by the impulse generator to advance the switch actuator one position for each impulse, switch means normally closed by the switch actuator at all positions thereof and controlling the continuous drive of the motor for the impulse generator and condensers, and manual means rendering the switch means inoperative at any position of the switch actuator thereby stopping the continuous drive between the motor and the condensers to stop the latter in desired position.

2. A remote control for a radio receiver comprising an impulse switch, operating means connected to the variable condenser shaft of the receiver and actuating the switch to produce an electrical impulse for each tuning position of the condensers, a motor connected to and continuously driving the operating means and condensers in complete cycles, a movable switch actuator, means actuated by each impulse generated by the impulse switch to advance the switch actuator one position for each impulse, switch means normally closed by the switch actuator at all positions thereof and controlling the continuous drive of the motor, and manual means rendering the switch means inoperative in any position of the switch actuator thereby stopping the continuous drive between the motor and the condensers to stop the latter in desired position.

3. A remote control for a radio receiver comprising an impulse generator operatively connected to the variable condenser shaft of the receiver, the generator producing an electrical impulse for each tuning position of the condensers, means to continuously drive the impulse generator and condensers in complete cycles, a movable switch actuator, means actuated by each impulse generated by the impulse generator to advance the switch actuator one position for each impulse, a switch normally closed by the switch actuator at each position thereof, each switch controlling the continuous drive for the impulse generator and condensers, and manual means rendering any desired switch inoperative thereby stopping the continuous drive between the driving means and the condensers to stop the latter in desired position.

4. A remote control for a radio receiver comprising an impulse generator operatively connected to the variable condenser shaft of the receiver, the generator producing an electrical impulse for each tuning position of the condensers, means connected at all times to the condensers to continuously drive the impulse generator and condensers in complete cycles, a movable switch actuator, means actuated by each impulse generated by the impulse generator to advance

the switch actuator one position for each impulse, a switch normally closed by the switch actuator at each position thereof, each switch controlling the continuous drive means for the impulse generator, and manual means rendering any desired switch inoperative thereby stopping the drive means and causing the impulse generator and the condensers to stop with the latter in desired position.

5. A remote control for a radio receiver comprising an impulse generator operatively connected to the variable condenser shaft of the receiver, the generator producing an electrical impulse for each tuning position of the condensers, means to continuously drive the impulse generator and condensers in complete cycles, a rotatable switch actuator, means actuated by each impulse generated by the impulse generator to rotate the switch actuator one position for each impulse, a plurality of switches circularly disposed and normally closed by the switch actuator at each position thereof, each switch controlling the continuous drive for the impulse generator, and manual means rendering any desired switch inoperative thereby stopping the continuous drive between the driving means and the condensers to stop the latter in desired position.

6. A remote control for a radio receiver comprising an impulse generator operatively connected to the variable condenser shaft of the receiver, the generator producing an electrical impulse for each tuning position of the condensers, means connected at all times with the condensers to continuously drive the impulse generator and condensers in complete cycles, a rotatable switch actuator, means actuated by each impulse generated by the impulse generator to advance the switch actuator one position for each impulse, a plurality of switches circularly disposed and normally closed by the switch actuator at each position thereof, each switch controlling the continuous drive for the impulse generator, and manual means rendering any desired switch inoperative thereby stopping the drive means and causing the impulse generator and the condensers to stop with the latter in desired position.

7. A remote control for a radio receiver comprising an impulse generator disc operatively connected to the variable condenser shaft of the receiver, at least one impulse switch adjacent to the disc, means carried by the disc to actuate each switch for each tuning position of the condensers thereby producing an electrical impulse for each tuning position of the condensers, means to continuously drive the impulse generator and condensers in complete cycles, a movable switch actuator, electro-magnet means actuated by each impulse generated by the switch to advance the switch actuator one position for each impulse, a switch normally closed by the switch actuator at each position thereof, each switch controlling the continuous drive for the impulse generator, and manual means rendering any desired switch inoperative thereby stopping the continuous drive between the driving means and the condensers to stop the latter in desired position.

8. A remote control for a radio receiver comprising an impulse generator disc operatively connected to the variable condenser shaft of the receiver, at least one impulse switch adjacent to the disc, means carried by the disc to actuate each switch for each tuning position of the condensers thereby producing an electrical impulse for each tuning position of the condensers, means to continuously drive the impulse generator and condensers in complete cycles, a rotatable switch actuator, electro-magnet means actuated by each impulse generated by the impulse generator to advance the switch actuator one position for each impulse, a plurality of switches circularly disposed and normally closed by the switch actuator at each position thereof, each switch controlling the continuous drive for the impulse generator, and manual means rendering any desired switch inoperative thereby stopping the continuous drive between the driving means and the condensers to stop the latter in desired position.

9. A remote control for a radio receiver comprising an impulse generator disc operatively connected to the variable condenser shaft of the receiver, at least one impulse switch adjacent to the disc, means carried by the disc to actuate each switch for each tuning position of the condensers thereby producing an electrical impulse for each tuning position of the condensers, means to continuously drive the impulse generator and condensers in complete cycles, a rotatable switch actuator, electro-magnet means actuated by each impulse generated by the impulse generator to advance the switch actuator one position for each impulse, a plurality of switches circularly disposed and normally closed by the switch actuator at each position thereof, each switch controlling the drive means for the impulse generator, and manual means rendering any desired switch inoperative thereby stopping the drive means and causing the impulse generator and the condensers to stop with the latter in desired position.

10. A remote control for a radio receiver comprising an impulse generator operatively connected to the variable condenser shaft of the receiver, the generator producing an electrical impulse for each tuning position of the condensers, a motor connected to the condensers and impulse generator to continuously drive the impulse generator and condensers in complete cycles, a field coil for the motor directly connected to the electrical source, means retaining the field current for

a short period after the armature circuit has been broken, a movable switch actuator, means actuated by each impulse generated by the impulse generator to advance the switch actuator one position for each impulse, a switch normally closed by the switch actuator at each position thereof, each switch controlling the continuous drive for the impulse generator, and manual means rendering any desired switch inoperative thereby stopping the continuous drive between the driving means and the condensers to stop the latter in desired position.

11. A remote control for a radio receiver comprising an impulse generator operatively connected to the variable condenser shaft of the receiver, the generator producing an electrical impulse for each tuning position of the condensers, means to continuously drive the impulse generator and condensers through complete cycles, electro-magnet means electrically connected with the impulse generator and energized by each impulse generated thereby, a rotatable switch actuator, means connecting the electro-magnet means with the rotatable switch actuator to advance the latter one unit for each impulse, a switch for each position of the switch actuator and normally closed for each position thereof, each switch controlling the continuous drive means for the impulse generator, and manual means rendering any desired switch inoperative thereby stopping the impulse generator and the condensers in desired position.

12. A remote control for a radio receiver comprising an impulse generator operatively connected to the variable condenser shaft of the receiver, the generator producing an electrical impulse for each tuning position of the condensers, means to continuously drive the impulse generator and condensers alternately in complete cycles in opposite directions, electro-magnet means electrically connected with the impulse generator and energized by each impulse generated thereby, a rotatable switch actuator, means connecting the electro-magnet means with the rotatable switch actuator to advance the latter one unit for each impulse, a switch for each position of the switch actuator and normally closed for each position thereof, each switch controlling the continuous drive of the impulse generator, and manual means rendering any desired switch inoperative thereby stopping the impulse generator and the condensers in desired position.

13. A remote control for a radio receiver comprising an impulse generator operatively connected to the variable condenser shaft of the receiver, the generator producing an electrical impulse for each tuning position of the condensers, means to continuously drive the impulse generator and condensers alternately in complete cycles in opposite directions, electro-magnet means electrically connected with the impulse generator and energized by each impulse generated thereby, a rotatable switch actuator, means connecting the electro-magnet means with the rotatable switch actuator to advance the latter one unit for each impulse, a switch for each position of the switch actuator and normally closed for each position thereof, each switch controlling the continuous driving means for the impulse generator, and manual means rendering any desired switch inoperative thereby stopping the continuous driving means and the condensers in desired position.

14. A remote control for a radio receiver comprising an impulse generator operatively connected to the variable condenser shaft of the receiver, the generator producing an electrical impulse for each tuning position of the condensers, means to continuously drive the impulse generator and condensers through complete cycles, electro-magnet means electrically connected with the impulse generator and energized by each impulse generated thereby, a plurality of switches including a single rotatable switch element, means connecting the electromagnet means with the rotatable switch element to advance the latter one unit for each impulse, a cooperating switch element for each position of the rotatable switch element, each switch being normally closed when contacted by the rotatable switch element and controlling the continuous drive of the impulse generator, and manual means rendering any desired switch inoperative thereby stopping the impulse generator and the condensers in desired position.

15. A remote control for a radio receiver comprising an impulse generator operatively connected to the variable condenser shaft of the receiver, the generator producing an electrical impulse for each tuning position of the condensers, means to continuously drive the impulse generator and condensers through complete cycles, electro-magnet means electrically connected with the impulse generator and energized by each impulse generated thereby, a plurality of switches including a single rotatable switch arm, means connecting the electro-magnet means with the rotatable switch arm to advance the latter one unit for each impulse, a switch normally closed for each position of the rotatable switch element, each switch being normally closed when contacted by the rotatable switch element and controlling the continuous driving means for the impulse generator, and manual means rendering any dsired switch inoperative thereby stopping the continuous driving means and the condensers in desired position.

16. A remote control for a radio receiver comprising an impulse generator operatively connected to the variable condenser shaft

of the receiver, the generator producing an electrical impulse for each tuning position of the condensers in both directions, means to continuously drive the impulse generator and condensers alternately in complete cycles including rotation in opposite directions, electro-magnet means electrically connected with the impulse generator and energized by each impulse generated thereby, a rotatable switch actuator, means connecting the electro-magnet means with the rotatable switch actuator to advance the latter one unit for each impulse, a switch normally closed by the switch actuator for each position of the rotatable switch actuator, each switch controlling the continuous driving means for the impulse generator, and manual means rendering any desired switch inoperative thereby stopping the continuous driving means and the condensers in desired position.

17. A remote control for a radio receiver comprising a disc operatively connected to the variable condenser shaft of the receiver, switch means adjacent to the disc, means carried by the disc to actuate the switch means in both directions to produce an electrical impulse for each tuning position of the condensers, a motor connected to the condensers and impulse generator to continuously drive the impulse generator and condensers in complete cycles, a field coil for the motor directly connected to an electrical source, means retaining the field current for a short period after the armature circuit is broken, a movable switch actuator, means actuated by each impulse generated by the impulse generator to advance the switch actuator one position for each impulse, a switch normally closed by the switch actuator at each position thereof, each switch controlling the continuous drive for the impulse generator, and manual means rendering any desired switch inoperative thereby stopping the continuous drive between the driving means and the condensers to stop the latter in desired position.

18. A remote control for a radio receiver comprising an impulse switch, operating means connected to the variable condenser shaft of the receiver and rotated alternately in opposite directions, the operating means actuating the impulse switch in one direction of its rotation to produce an electrical impulse for each tuning position of the condensers, a motor connected to and continuously driving the operating means and condensers in complete cycles, a field coil for the motor directly connected to the electrical source, means retaining the field current for a short period after the armature circuit has been broken, a rotatable switch actuator, electro-magnet means actuated by each impulse generated by the impulse switch to advance the switch actuator one position for each impulse, switch means normally closed by the switch actuator at all positions thereof and controlling the continuous drive for the condensers and operating means, and manual means rendering the switch means inoperative in any position of the switch actuator thereby stopping the continuous drive between the motor and the condensers to stop the latter in desired position.

19. A remote control for a radio receiver comprising an impulse switch, operating means connected to the variable condenser shaft of the receiver and rotated alternately in opposite directions, the operating means actuating the impulse switch in one direction of its rotation to produce an electrical impulse for each tuning position of the condensers, a motor connected to and continuously driving the operating means and condensers in complete cycles, a field coil for the motor directly connected to the electrical source, means retaining the field current for a short period after the armature circuit has been broken, a rotatable switch actuator, electro-magnet means actuated by each impulse generated by the impulse switch to advance the switch actuator one position for each impulse, a plurality of circularly disposed switches normally closed by the switch actuator at each position thereof, each switch controlling the continuous drive of the motor for the operating means and manual means rendering any desired switch inoperative thereby stopping the motor and the condensers to stop the latter in desired position.

In testimony whereof I affix my signature.

SALVADOR BERTOMEU.