March 30, 1937. E. A. ZADIG 2,075,257

RECEIVER CONTROL

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Fig. 1.

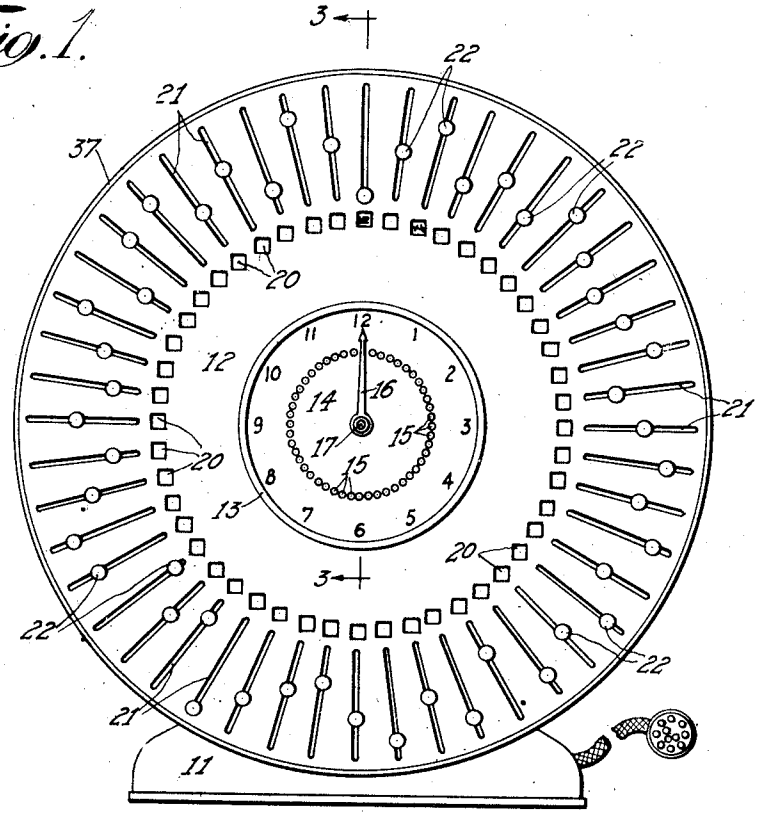
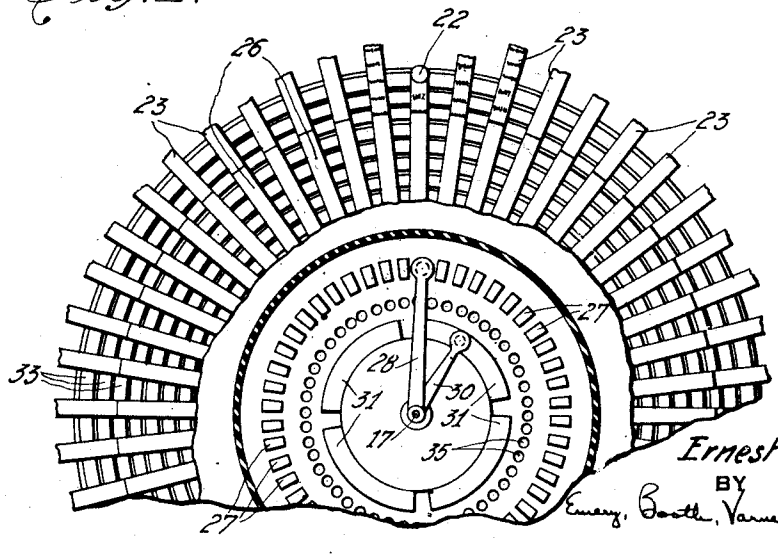


Fig. 2.

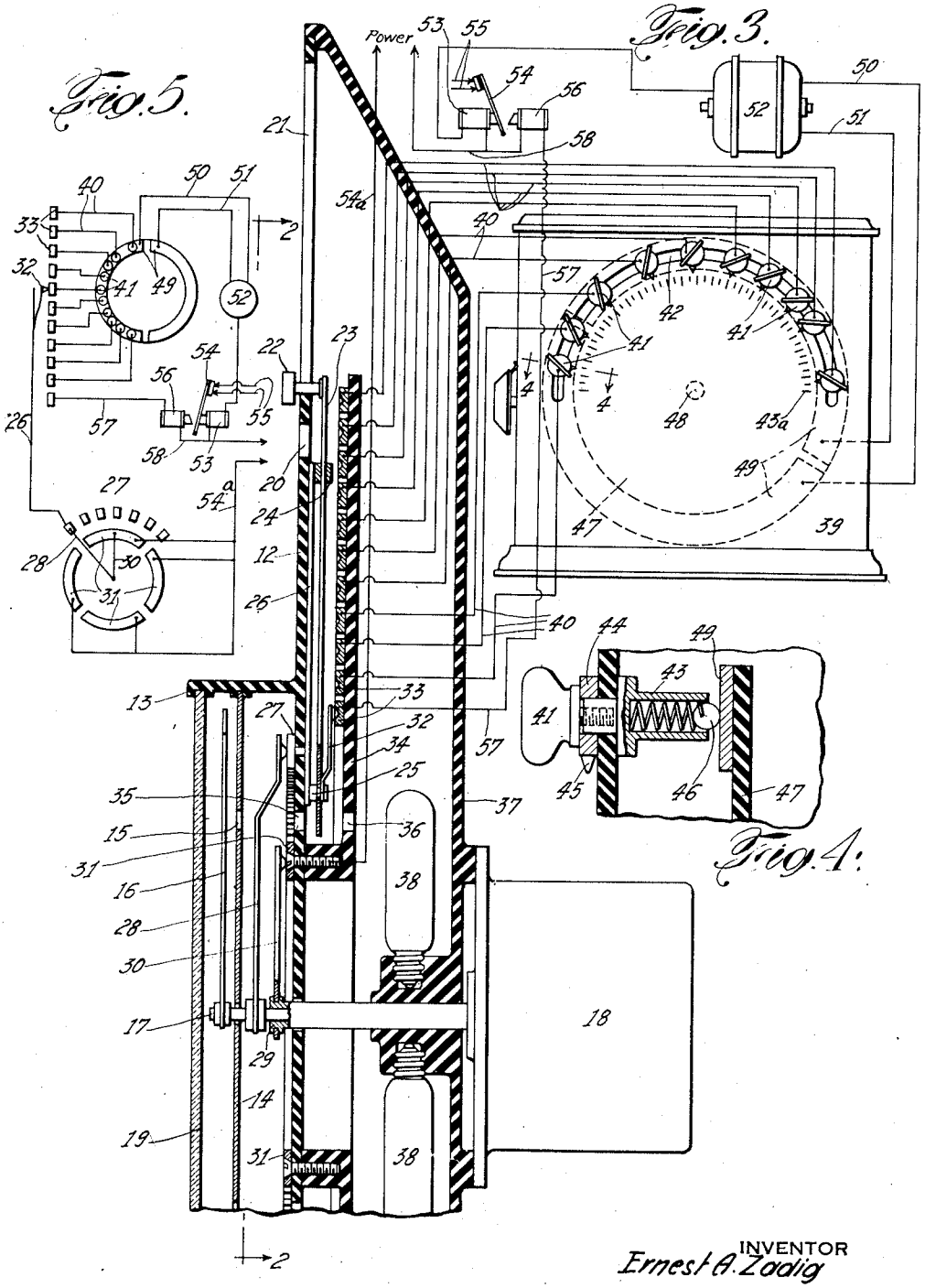


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UNITED STATES PATENT OFFICE

2,075,257

RECEIVER CONTROL

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26 Claims. (Cl. 250—20)

This invention relates to apparatus for the reception of radiant energy at different frequencies, and more particularly to a method of and means for controlling the operation of a radio receiver whereby the receiver may be adjusted automatically for the reception of currents of different frequencies at different times according to a pre-arranged schedule. It is an object of this invention to provide an improved method and apparatus of the character described. Another object is to provide an improved switch. Other objects and advantages of the invention will appear hereinafter.

The nature and objects of the invention will be better understood from a description of a particular illustrative embodiment thereof, and for the purpose of such description reference should be had to the accompanying drawings forming a part hereof, and in which:

Fig. 1 is a front view of a device for controlling the operation of a radio receiver automatically in accordance with a pre-arranged schedule;

Fig. 2 is a fragmentary view to enlarged scale of the control device shown in Fig. 1, the clock hand and dial being removed, and a portion of the panel broken away to disclose more clearly the electrical contacts for the station pre-selector means, Fig. 2 being substantially a sectional view taken on the line 2—2 of Fig. 3;

Fig. 3 is a view partially in section, partially in elevation, and partially diagrammatic, showing a vertical sectional view to enlarged scale through the control device substantially on line 3—3 of Fig. 1, an end elevation of a radio receiver, and a diagram of the wiring connections between the control device and the radio receiver;

Fig. 4 is a sectional view to enlarged scale substantially on line 4—4 of Fig. 3; and

Fig. 5 is a simplified wiring diagram.

Radio receivers used for the reception of broadcast programs have tuning mechanism which is adjustable for the reception of currents of different frequencies, and at the present time the tuning mechanism of most receivers may be adjusted by means of a single control, commonly a rotatable shaft. Desirably, apparatus will be provided for adjusting the tuning of a radio receiver automatically in response to the adjustment or actuation of a station pre-selector device. For example, by the actuation of a selected one of a plurality of buttons representing different transmitting stations, the tuning mechanism may be adjusted for the reception of the desired currents. Except as hereinafter described, the apparatus for receiving, detecting, amplifying and reproducing the radiant energy forms no part of this invention, and consequently no more of the receiver has been shown than is necessary for a clear understanding of the illustrative embodiment of the invention.

This invention contemplates, among other things, the provision of a device for controlling the operation of a radio receiver, such control device including a plurality of station pre-selector devices, apparatus for adjusting the tuning mechanism of a receiver automatically in accordance with the adjustment of said pre-selector devices, and a continuously operating time measuring device for making said several pre-selector devices successively effective at definite time intervals to cause an adjustment of the tuning mechanism, whereby the receiver may be operated over an appreciable period of time according to a pre-arranged schedule, without supervision other than that involved originally in arranging the schedule by adjusting the pre-selector devices.

Referring to the drawings, and first to Fig. 1, a base 11 supports a casing 37 having a front panel 12 which is provided centrally with a forwardly projecting continuous flange 13 carrying a clock dial 14. The clock dial 14 has an annulate row of perforations 15, the function of which will appear hereinafter, one of these perforations preferably being arranged at each quarter hour point on the dial. An hour hand 16 secured on the end of a shaft 17 of a continuously operating time measuring device 18 (Fig. 3) conveniently mounted in rear of the panel 12 and casing 37, is associated with the dial 14 for indicating the time. Any suitable time measuring device may be employed, and conveniently such device may take the form of an electric clock such as the "Telechron". As may be seen in Fig. 3, the clock dial and hour hand conveniently may be protected, as by means of a glass 19.

Again referring to Fig. 1, it will be seen that the panel 12 is provided with an annulate series of apertures 20 arranged concentrically around the clock dial 14, the number of apertures 20 being the same as the number of perforations 15, the apertures 20 and the perforations 15 being radially aligned. The apertures 20 provide for visual inspection of the condition of adjustment of the several station pre-selector devices, each pre-selector device comprising, as will appear, a radial slide 23 mounted in rear of one of the apertures 20 and bearing a series of call letters or other symbols each representing a different radio transmitting station, one of which series,

dependent on the adjustment of the pre-selector device, will be visible through the aperture 20. Surrounding and radially spaced from the annulate series of apertures 20 is a series of radial slots 21 through the panel 12, the number of slots corresponding to the number of apertures 20, the said slots being radially aligned with respect to the apertures 20 and the perforations 15. Projecting forwardly through each slot 21 is a lever or button 22 for adjusting the slide 23 of the respective pre-selector device.

Referring to Fig. 3, it will be seen that the lever 22 is secured to the outer end of its respective slide 23, the movement of which may be guided by any suitable means, such as the guide 24. The slides 23 carry on their forward faces the series of station call letters or other symbols representing stations for which the tuning of the receiver may be adjusted by suitable automatic tuning apparatus. Secured to the inner end of each slide 23 is an electrical contact button 25 adapted to slide along a radially extending conducting strip 26 conveniently secured on the rear of the panel 12. Each of the conducting strips 26 is connected electrically adjacent its inner end, as by means of a pin extending through the panel 12, with one of a series of similar contact members 27. These contact members 27 conveniently are arranged, (Fig. 2) on the panel 12 in an annulate row around the hour hand shaft 17 of the continuously operating time measuring device 18, in rear of the clock dial 14. Engaging the contacts 27 successively is a switch arm 28 secured on the hour hand shaft 17 of the time measuring device between the panel 12 and the clock dial 14. As may be seen in Fig. 3, the time measuring device has a minute hand shaft 29 in the form of a sleeve surrounding the hour hand shaft. Secured on the minute hand in rear of the switch arm 28 is a switch arm 30 for engaging successively a series of similar contact members 31 arranged in an annular row on the panel 12 radially inwardly of the contacts 27. The switch arms 28 and 30 are connected electrically, conveniently through the shafts 17 and 29.

The contacts 27 and 31, and the switch arms 28 and 30 are used for completing successively a series of alternative electrical circuits controlling the operation of the receiver, including the apparatus for tuning the receiver automatically for the reception of currents from a selected station. At the present time most of the broadcast programs have a minimum length of fifteen minutes, and the length of a program usually is a quarter of an hour or some multiple thereof, the programs commonly beginning exactly on the hour or a quarter hour. Accordingly, in the illustrative embodiment means are provided for operating a radio receiver according to a pre-arranged schedule whereby the tuning mechanism may, if desired, be adjusted every quarter hour for the reception of different programs. As will appear more fully hereinafter this arrangement requires that for the usual twelve hour clock there be four contacts 31, and twelve times four, or forty-eight contacts 27.

The arrangement of these contacts is shown more clearly in Fig. 2. Since the minute hand shaft moves 12 times as fast as the hour hand shaft, the time required by each of the switch arms in moving across one of its contacts may be made substantially the same. Desirably, the contacts 27 are arranged relative to the clock dial 14 so that the leading edges of the contacts are engaged by the switch arm 28 substantially exactly on the hour and quarter hour. To reduce the possibility of a slight error in the time at which an electrical circuit is completed through a contact 27 and the switch arm 28, due either to lost motion or inaccuracy in adjustment, the additional circuit controlling device comprising the switch arm 30 and the contacts 31 has been provided. The leading edges of the contacts 31 are arranged relative to the clock dial 14 so that the leading edge of each contact is engaged by the switch arm 30 exactly on the hour or quarter hour. Since the minute hand shaft moves at a relatively high speed, the arrangement of the contacts 31 may be made so that the switch arm 30 engages the leading edge of a contact 31 almost exactly at an hour or quarter hour on the clock dial. If the switch arm 28 engages a contact 27 a few seconds, or even a minute or two ahead of the hour or quarter hour, the electrical circuit controlling the operation of the receiver and the adjustment of the tuning mechanism will not be completed until the switch arm 30 engages the contact 31. It may be desirable to have the leading edges of the contacts 27 slightly ahead of the hour and quarter hour point so that the switch arm 28 will engage a contact 27 a short time before the switch arm 30 engages the leading edge of its respective contact 31.

It will be seen from Fig. 2 that while the contact members 27 and 31 desirably are arranged so that their leading edges will be engaged by the switch arms 28 and 30 exactly on the hour and quarter hour, their lengths are slightly less than the distances travelled by the respective switch arms in a quarter hour. Consequently, the switch arms will move off of the trailing edges of the contacts shortly before the hour and quarter hour to prepare the control device for operation in accordance with the adjustment of the pre-selector device next made operative when the switch arms 28 and 30 engage the following respective contacts 27 and 31.

Since, in the illustrative embodiment, no continuous electrical circuit is necessary to maintain the tuning mechanism in adjusted position once such adjustment has been attained, the operation of the receiver is not affected when the switch arms 28 and 30 move off of the trailing edges of the contact members. Desirably, however, the electrical circuit through a contact 27, the switch arms 28 and 30, and a contact 31 is not broken until shortly before the hour or quarter hour. As will appear hereinafter, so long as such circuit exists it is possible to change the tuning of the receiver merely by readjusting the station pre-selector device. Desirably the contacts 27 and 31 terminate two or three minutes before the hour and quarter hour, thereby insuring preparation of the control device for operation with the following pre-selector device, while at the same time permitting readjustment of the receiver tuning at any time except during said last two or three minutes before the hour or quarter hour.

Referring to Fig. 3, carried on the inner end of each of the slides 23, as by means of the contact button 25, is a sliding spring contact member 32 engaging, dependent upon the radial adjustment of the slide 23, one of a series of concentric conducting rings 33, conveniently secured on the face of a sub-panel 34, which sub-panel may be secured to the panel 12 in the rear thereof and spaced slightly therefrom. Conveniently, the conducting rings 33 are grooved on their forward faces to insure accurate adjustment of the slides 23 to complete a circuit from a slide through the

button 25, spring contact member 32, and ring 33.

Desirably, the panel 12 and the sub-panel 34 are provided respectively with perforations 35 and 36, which perforations are aligned with the perforations 15 in the clock dial 14. Mounted within the control device, in the space defined by the sub-panel 34 and the rear wall of the casing 37 are one or more lamps 38 which may be supplied with electric current in any suitable manner so that light will be projected outwardly through the aligned openings 36, 35 and 15. As will appear more fully hereinafter, when the slides 23 are moved to the inner limits of their adjustment, the station pre-selector devices are inoperative to affect the tuning of the receiver, and the receiver is turned off. Conveniently, this condition is indicated on the front of the panel by having the inner end of the slide 23 intercept the beam of light passing through the aligned openings 36 and 35 when the slide is moved to its innermost position, whereby the corresponding perforation 15 in the clock dial 14 will appear dark. It will be apparent that in the event the clock dial 14 is made of translucent material the perforations 15 will be unnecessary, and the condition of the pre-selectors will be indicated by spots of light projected through the perforations 35 and 36 against the translucent dial.

In this manner the operator may be instantly apprised by a glance at the clock dial which station pre-selector devices are adjusted to cause operation of the receiver, and at what times the receiver will be operating. By further inspection of the station call letters visible through the apertures 20 in the panel, the operator will be able to tell which transmitting station will be tuned in at any time.

The concentric conducting rings 33, except one, are connected by electrical leads 40 to suitable apparatus for tuning the receiver automatically for the reception of currents of desired frequencies. Preferably, a circuit completed through any ring 33 will effect an adjustment of the tuning mechanism for the reception of currents of a particular frequency, such adjustment being different for each ring. In the illustrative embodiment eleven rings 33 are shown, but since the slide 23 is ineffective at its innermost adjustment to change the tuning of the receiver, only ten of these rings are available for adjusting the receiver tuning. The eleventh ring 33 conveniently is employed for turning the radio receiver off, i. e. disconnecting the power. The invention is in no way limited as to the number of rings 33 which may be supplied, but ordinarily a receiver used for broadcast program reception is not regularly tuned to receive currents from more than perhaps four to six or possibly eight stations.

The rings 33, except the inner one, are connected by leads 40, shown diagrammatically in Fig. 3, to the apparatus for adjusting the tuning mechanism of the receiver. One suitable embodiment of such tuning apparatus is shown in Fig. 3. The radio receiver is shown in end elevation at 39, and each of the leads 40 connects one of the conducting rings 33 with an adjustable contact stud 41 mounted in an arcuate slot 42 in the end of the receiver cabinet. Associated with the slot 42 is a reference scale 43*a*.

As may be seen more clearly in Fig. 4, each of the contact studs 41 comprises a wing nut screwthreadedly engaging the end of a flanged member 43 extending through the arcuate slot 42. The flange of the member 43 bears against the inner surface of the end of the receiver cabinet, and the portion of the member 43 extending through the arcuate slot preferably is rectangular to prevent turning movement in the slot. The member 43 is adjustably secured in position in the slot by tightening the wing nut against a washer 44 which is slipped over the end of the member 43 projecting through the slot 42. Preferably, the washer 44 has a rectangular opening to prevent turning relative to the member 43, and has a teat 45 cooperating with the reference scale 43*a* to give an indication of the setting of the contact stud. Each of the flanged members 43 is provided within the receiver cabinet with a resilient contact, for example a ball 46 mounted within an axial opening in the member 43, and pressed outwardly as by means of a spiral spring.

The contacts 46 of the several members 43 press against a disk 47 secured on the end of a rotatable shaft 48, either the main tuning control shaft of the receiver, or a shaft connected thereto in suitable manner so as to rotate therewith. The disk 47 is provided on its face adjacent its outer edge with a conducting ring 49 against which the ball contacts 46 are pressed. This conducting ring 49 is split at diametrically opposite points to divide it into two electrically isolated sectors.

The sectors of the ring 49 are connected by leads 50 and 51 to a motor 52, the connections to the motor being such that current supplied to the motor through the lead 50 causes the motor shaft to turn in one direction, while current supplied to the motor through the lead 51 causes the motor to turn in the opposite direction. The third lead of the motor 52 is connected through an electromagnet 53, a suitable source of electric power, and a lead 54*a* to the contacts 31, all of which are connected in multiple. The motor 52 conveniently will be mounted within the receiver 39, and will be connected to the control shaft of the tuning mechanism through suitable speed reduction means for adjusting the tuning of the receiver. The direction of rotation of the shaft of the motor 52 will be determined by the particular ring sector 49 and lead 50 or 51 completing a circuit from an energized one of the contacts 41 to the motor 52.

Flow of current through the electromagnet 53 attracts a double throw armature 54, thereby completing an electric circuit through the leads 55. Conveniently, the leads 55 comprise the power supply circuit to the radio receiver, and it will be apparent that during the operation of the tuning motor 52 the armature 54 will be attracted to close the energizing circuit for the receiver. Desirably, the armature 54, when moved to complete the receiver energization circuit through the leads 55, remains in that position after the tuning of the receiver has been completed and the motor circuit broken by movement of the ring sector 49 out of engagement with the energized contact stud 41. Alternatively, energization of the electromagnet 53 might be controlled by additional narrow contacts arranged on the disk 47 between adjacent edges of the ring sectors 49, in which case the electromagnet 53, instead of being connected in series between the motor 52 and a terminal of the power source, would be connected directly between the said additional narrow contacts and the terminal of the power source. With such an arrangement the electromagnet 53 would not be energized to turn the set on until after the tuning operation had been completed.

Desirably, means are provided for opening the energizing circuit for the receiver when a slide 23 is in its innermost position. In the illustrative embodiment such means comprise an electromagnet 56 oppositely disposed to the electromagnet 53, and connected through the leads 57 and 58 to the inner one of the conducting rings 33, and to one terminal of the source of electric power for the motor 52. When one of the slides 23 is in its innermost position and the time measuring device closes a circuit through the respective contacts 27 and 31 by means of the switch arms 28 and 30, a circuit is completed through the electromagnet 56 to attract the armature 54 and open the energizing circuit for the radio receiver. Desirably, the armature 54 will remain in this latter position until again attracted by the armature 53.

In operation of the illustrative embodiment of the invention the several station pre-selector devices will be adjusted according to a schedule of programs which are to be received. Assume, merely for example, that the receiver is turned off, and the operator desires to receive the program transmitted from WJZ between 6:00 and 6:30 o'clock, the program from WEAF between 7:00 and 8:00 o'clock, and the program from WOR between 8:00 and 9:00 o'clock. The levers 22 of the station pre-selectors at 6:00 and 6:15 on the clock dial will each be adjusted until the letters WJZ appear in the respective apertures 20, the levers of the pre-selectors at 7:00, 7:15, 7:30 and 7:45 o'clock will be adjusted until the letters WEAF are visible through the respective apertures 20, and the levers of the pre-selectors at 8:00, 8:15, 8:30 and 8:45 o'clock will be adjusted to expose the letters WOR through the respective apertures 20. The other station selectors will be adjusted to their radially innermost positions, in which positions no station call letters will appear in the several apertures 20. Having made these adjustments, no further attention is necessary on the part of the operator.

At 6:00 o'clock the switch arm 30 engages one of the contacts 31, which contact is connected through the lead 54*a* to one terminal of the source of electrical power. Simultaneously, the switch arm 28, which is connected electrically to the switch arm 30 through the shafts 17 and 29, engages a contact 27. The contact 27 is connected through the conducting strip 26, contact button 25, sliding spring contact member 32, one of the rings 33 and its lead 40 to the contact stud 41 which is adjusted in the arcuate slot 42 to effect an adjustment of the tuning mechanism for the reception of currents from station WJZ. The circuit is continued from the stud 41 through one of the ring sectors 49, lead 50 or 51, motor 52, and electromagnet 53 to the other terminal of the source of electrical power. This circuit was prepared by the adjustment of the pre-selector device at 6:00 o'clock and was completed by the engagement of the switch arms 28 and 30 with the contacts 27 and 31 at 6:00 o'clock.

Completion of the circuit traced in the preceding paragraph energizes the motor 52, resulting in an adjustment of the tuning mechanism and rotation of the shaft 48 and disk 47. The contact stud 41 which is in the energized electrical circuit previously has been adjusted in the slot 42 so that at the instant the receiver is tuned for the reception of currents from station WJZ the disk 47 will have turned to carry the ring sector 49 out of contact with the contact stud 41, thereby opening the circuit and discontinuing adjustment of the tuning mechanism.

Flow of current through the motor 52 for adjusting the tuning mechanism energizes the electromagnet 53, attracting the armature 54, and closing a circuit through the leads 55 to turn the radio set on. Thus it will be seen that at 6:00 o'clock the receiver is turned on and tuned for reception of currents from WJZ without effort on the part of the operator.

A few minutes before 6:15 o'clock the contacts between the switch arms 28 and 30 and their respective contacts 27 and 31 are broken, but the operation of the receiver is in no way affected, because the circuit had previously been opened between the ring sector 49 and the contact stud 41 upon the completion of the tuning operation.

At 6:15 o'clock the switch arms 28 and 30 engage the following respective contacts 27 and 31, but since the receiver already is tuned for the reception of currents from WJZ, the circuit prepared by the adustment of the 6:15 o'clock preselector remains open at the contact stud 41 and ring sector 49, and there is no change in the operation of the receiver.

A few minutes before 6:30 o'clock the switch arms 28 and 30 move off of the respective contacts 27 and 31, and at 6:30 o'clock engage the succeeding contacts 27 and 31 respectively. The 6:30 o'clock station pre-selector is set for non-operation of the receiver, and an electrical circuit is completed from the source of power through the leads 54*a*, the contact 31, the switch arm 30, the shafts 29 and 17, the switch arm 28, the contact 27, the conducting strip 26, the button 25, the spring contact 32, the inner ring 33, the lead 57, the electromagnet 56, and the lead 58 to the source of power. The electromagnet 56 is energized and attracts the armature 54, thereby opening the energizing circuit for the receiver.

The receiver remains in non-operating condition until 7:00 o'clock, at which time the receiver will be turned on, and tuned automatically for the reception of currents from WEAF. The operation will be similar to that occurring at 6:00 o'clock, the control circuit, however, being completed through a different ring 33, lead or conductor 40 and contact stud 41, which latter is adjusted in the slot 42 to open the control circuit when the receiver is tuned for reception of currents from WEAF. The program from WEAF will be received until 8:00 o'clock, at which time the adjustment of the tuning mechanism will be changed automatically for the reception of currents from WOR. At 9:00 o'clock the receiver will be turned off in the manner similar to that described for 6:30 o'clock.

It will be apparent that if, at any time during the reception of any program, the operator desires to change the tuning of the receiver so as to receive currents from a different station, such change may be effected, except during the last two or three minutes before the hour or quarter hour merely by readjusting the station preselector device.

The foregoing description of an illustrative embodiment of the invention discloses apparatus for controlling the operation of a radio receiver, over an appreciable period of time automatically in accordance with a pre-arranged schedule.

The description of the illustrative embodiment is not intended as defining the limits of the invention, and it will be understood that the inven-

tion may be variously modified and embodied within the scope of the appended claims.

I claim:

1. In apparatus for receiving radiant energy, the combination of tuning mechanism, power means including an electric motor for adjusting said tuning mechanism for the reception of currents of different frequencies, a plurality of radially disposed station pre-selector devices which are normally stationary but capable of adjustment, means permitting individual radial adjustment as desired of said station pre-selectors, a continuously operating time measuring device, and means controlled by said time measuring device for rendering said station pre-selectors operative successively to energize said motor power means to adjust said tuning mechanism for the reception of currents from the respective selected stations.

2. In apparatus for receiving radiant energy, the combination of tuning mechanism, power means including an electric motor for adjusting said tuning mechanism for the reception of currents of different frequencies, a plurality of radially arranged station pre-selector devices which are normally stationary but capable of adjustment, said station pre-selector devices being radially adjustable to prepare alternative electrical control circuits severally effective, when completed, to cause said power means to adjust said tuning mechanism for the reception of currents from a selected station, a continuously operating time measuring device, and means controlled by said time measuring device for completing successively at definite time intervals the control circuits prepared by said station pre-selectors.

3. In apparatus for receiving radiant energy, the combination of tuning mechanism, power means including an electric motor for adjusting said tuning mechanism for the reception of currents of different frequencies, a plurality of radially arranged station pre-selector devices which are normally stationary but capable of adjustment, means permitting individual radial adjustment as desired of said station pre-selectors, a continuously operating time measuring device, means controlled by said time measuring device for rendering said station pre-selectors operative successively at definite time intervals to energize said motor power means to adjust said tuning mechanism for the reception of currents from the respective selected stations, and means permitting readjustment of any desired station pre-selector to re-adjust the tuning mechanism for the reception of currents from a different station.

4. In a control mechanism for a radio receiver, the combination of power means for adjusting the tuning of a receiver, a continuously operating time measuring device, a plurality of radially arranged station pre-selector elements which are normally stationary but capable of being individually adjustable in radial directions to prepare severally alternative electrical circuits each of which, when subsequently completed, will effect an operation of the power means to adjust the tuning of the radio receiver for the reception of currents from the selected station, and means controlled by said time measuring device for successively completing at definite time intervals according to a prearranged schedule the several electrical circuits prepared by the adjustment of the station preselector elements.

5. In a control mechanism for a radio receiver, the combination of a dial, two concentrically arranged annulate rows of electrical contacts, a continuously operating time measuring device, a switch arm secured on the hour hand shaft of said device to engage successively the contacts of one of said rows, a switch arm secured on the minute hand shaft of said device to engage successively the contacts of the other of said rows, said switch arms being electrically connected, means for adjusting the tuning of a receiver, control means for said adjusting means, said control means comprising a plurality of alternative circuits for effecting adjustment of said receiver for the reception of currents of different frequencies, and manually operative means, including a plurality of radially arranged slide members, each of which is associated with a corresponding one of the contacts engageable by the switch arm which is secured to the hour hand shaft, for selectively connecting said last mentioned contacts at different times in the alternative control circuits, thereby effecting adjustment of said tuning mechanism in accordance with a definite schedule.

6. In a time control mechanism for a radio receiver, the combination of a plurality of normally stationary but pre-adjustable station pre-selector devices, said devices extending in radial directions and uniformly spaced, a continuously operating time measuring device, means controlled by said time measuring device for making said preselector devices successively operative, and means arranged on a common plane for selectively adjusting said pre-selector devices in radial directions to pre-arrange a schedule of signals to be received over a given period of time.

7. In a time control mechanism for a radio receiver, the combination of a plurality of normally stationary but pre-adjustable station pre-selector devices, said devices extending in radial directions and uniformly spaced means for selectively adjusting said pre-selector devices in radial directions in accordance with the signals to be received over a given period of time, and means responsive to adjustment of said devices providing a visual indication of the complete schedule of signals to be received during such period of time.

8. A control system for a radio receiver comprising a tuning device, a motor for actuating the tuning device, tuning device position-determining means including a number of adjustable contacts, a series of spaced concentrically arranged conducting ring members equal to the number of adjustable contacts, a series of radially-disposed slide members manually and transversely adjustable with respect to the series of conducting members for contacting with any predetermined one of said members, a plurality of normally open circuits, each interconnecting the motor, one of the adjustable contacts, a corresponding conducting member and an adjustable slide member, and a time-controlled switch for consecutively completing individual one of said circuits at predetermined time intervals.

9. A control system for a radio receiver comprising a tuning device, a motor for actuating the tuning device to predetermined positions, tuning device position-determining means including an arcuate conducting strip movable with the tuning device and a number of stationary but pre-adjustable contacts cooperating with said strip, a series of spaced concentrically-arranged conducting ring members equal to the number of said stationary contacts, a series of radially-disposed slide members manually and transversely adjustable with respect to the series of conducting members

for contacting with any predetermined one of said members, a plurality of normally open circuits, each interconnecting the motor, one of the stationary contacts, a corresponding conducting member and an adjustable slide member, and a time-controlled switch for consecutively completing individual one of said circuits at predetermined time intervals, whereby the motor is energized to actuate the tuning device until the arcuate conducting strip movable therewith is carried beyond the stationary contact included in the just completed circuit to break said circuit at this point, deenergizing the motor and causing the tuning device to stop at the predetermined position.

10. The invention defined in the preceding claim wherein each of the series of adjustable slide members is calibrated to correspond with the tuning device position-determining means.

11. The invention described in claim 9 wherein there is provided a series of uniformly spaced contacts arcuately arranged in the path of the time-controlled switch, there being one such contact for each of the manually adjustable slide members, and an electrical connection between each of said contacts and its corresponding slide member.

12. The invention described in claim 9 wherein there is provided a series of uniformly spaced contacts arcuately arranged in the path of the time-controlled switch, there being one such contact for each of the manually adjustable slide members, an electrical connection between each of said contacts and its corresponding slide member, a second series of uniformly spaced contacts, concentrically arranged with respect to the first series and fewer in number, and a second time-controlled switch electrically connected with the first switch cooperating with said second series of contacts.

13. A control system for a radio receiver comprising a tuning device, a motor for actuating the tuning device to predetermined positions, tuning device position-determining means including an arcuate conducting strip movable with the tuning device and a number of stationary but pre-adjustable contacts cooperating with said strip, a series of concentrically-arranged conducting ring members equal to the number of said stationary contacts, a series of radially-disposed slide members transversely and manually adjustable with respect to the series of conducting ring members for contacting with any predetermined one of said members, a plurality of normally open circuits, each interconnecting the motor, one of the stationary contacts, a corresponding conducting ring member and a transversely adjustable slide member, and a time-controlled switch for consecutively completing individual one of said circuits at predetermined time intervals.

14. The invention defined in the preceding claim wherein there is provided a receiver "off" switch and a relay for operating said switch, and an additional ring member connected in circuit with said switch relay, whereby adjustment of any slide member tc contact with said additional ring member and the electrical connection of the time controlled switch with said slide member at a pre-determined time will cause operation of the switch relay to turn off the receiver.

15. The invention defined in claim 13 wherein there is provided a series of uniformly spaced contacts circularly arranged in the path of the time-controlled switch, there being one such contact for each radially-disposed slide member, and an electrical connection between each of said contacts and its corresponding slide member.

16. The invention defined in claim 13 wherein there is provided a series of uniformly spaced contacts circularly arranged in the path of the time-controlled switch, there being one such contact for each radially-disposed slide member, an electrical connection between each of said contacts and its corresponding slide member, a second series of uniformly spaced contacts, concentrically arranged with respect to the first series and fewer in number, and a second time-controlled switch electrically connected with the first switch cooperating with said second series of contacts, the rates of travel of said time-controlled switches being such that both switches remain in contact with any one of its associated contacts for equal intervals of time.

17. A control system for a radio receiver comprising a tuning device, a motor for actuating the tuning device to predetermined positions, tuning device position-determining means including a number of adjustable contacts, a series of spaced concentrically-arranged conducting ring members equal to the number of adjustable contacts, a radially-disposed slide member manually and transversely adjustable with respect to the series of conducting members for contacting with any predetermined one of said members, and a plurality of circuits, each interconnecting the motor, one of the adjustable contacts, a corresponding conducting member and the transversely adjustable slide member, individual of said circuits being energized depending upon the particular transverse adjustment of the slide member, resulting in the actuation by the motor of the tuning device to a position corresponding to the slide member adjustment.

18. A control system for a radio receiver comprising a tuning device, a motor for actuating the tuning device to predetermined positions, tuning device position-determining means includng a number of adjustable contacts, a series of spaced concentrically-arranged conducting ring members equal to the number of adjustable contacts, a radially disposed slide member calibrated to correspond to the tuning device positions and transversely and manually adjustable with respect to the series of conducting members for contacting with any predetermined one of said members, a plurality of normally open circuits, each interconnecting one of the adjustable contacts, a corresponding conducting member and the manually adjustable slide member, and means for energizing individual of said circuits depending upon the particular transverse adjustment of the slide member, resulting in the actuation by the motor of the tuning device to a position corresponding to the slide member adjustment.

19. The invention defined in the preceding claim wherein said circuit energizing means has associated therewith means operative at the predetermined tuning device position for breaking the circuit to deenergize the motor.

20. Mechanism for adjusting the tuning device of a radio receiver to receive a series of programs in a predetermined sequence and at predetermined time intervals, comprising means for intermittently actuating said tuning device, a series of adjustable contacts for determining the respective tuning device adjustments, an equal number of fixed concentric conducting ring members, each electrically interconnected with a corresponding adjustable contact, a series of radially-disposed manually-operative program selec-

tors, each adjustable to coact with a predetermined one of said fixed conducting members, a time measuring device, and means controlled by said time measuring device for periodically and sequentially energizing a series of tuning device actuating circuits, each including the intermittent actuating means, the time controlled means, one of the series of adjusted program selectors, the fixed conducting member contacting therewith, and the adjustable contact electrically connected with the conducting member, all connected in series.

21. The invention defined in claim 20 wherein the tuning device is provided with a conducting strip movable therewith and electrically connected with its actuating means, said movable strip adapted to be in sliding contact with several of said tuning device position-determining means so that upon energization of a particular circuit to actuate the tuning device, the conducting strip is moved to assume a non-contacting position with respect to the contact included in said circuit.

22. The invention defined in claim 20 wherein the tuning device is provided with a pair of separated arcuate conducting strips movable therewith and each electrically connected with its actuating means, said movable strips adapted to be in sliding contact with said tuning device position-determining means so that upon energization of a particular circuit to actuate the tuning device, the conducting strips are moved to assume a non-contacting position with respect to the contact included in said circuit, the particular conducting strip with which the contact included in the energized circuit is in sliding engagement determining the direction of travel of said tuning device.

23. The invention defined in claim 20 wherein the program selectors are in the form of strips radially arranged with respect to the concentric ring members and are radially adjustable to contact with any desired one of said members.

24. The invention defined in claim 20 wherein the program selectors are in the form of strips radially arranged with respect to the concentric ring members and are radially adjustable to contact with any desired one of said members, said program selector strips having manual gripping means at their outer ends, and a casing provided with elongated radial slots through which the gripping means extend and within which they are adapted to move.

25. The invention defined in claim 20 wherein the program selectors are in the form of strips radially arranged with respect to the concentric ring members and are radially adjustable to contact with any desired one of said members, said program selector strips having manual gripping means at their outer ends and being calibrated along its length with station call letters, and a casing provided with elongated radial slots through which the gripping means extend and within which they are adapted to move, and being further provided with openings in radial alignment with the elongated slots whereby the particular setting of a program selector is made known by the station call letter viewable through said opening.

26. The invention defined in claim 20 wherein the program selectors are in the form of strips radially arranged with respect to the concentric ring members and are radially adjustable to contact with any lesired one of said members, a casing provided with a series of openings circularly arranged and each being aligned with the inner end of one of the selector strips, and a light source disposed to the rear of both the casing and the strips, whereby when the selector strips are in adjusted positions other than in their innermost positions light from said source is visible simultaneously through the openings associated with the selector strips so adjusted, but light is not visible through the openings associated with the strips that are in their innermost positions.

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