Oct. 9, 1934. P. D. FLEHR 1,975,781

RADIORECEIVER CONTROL

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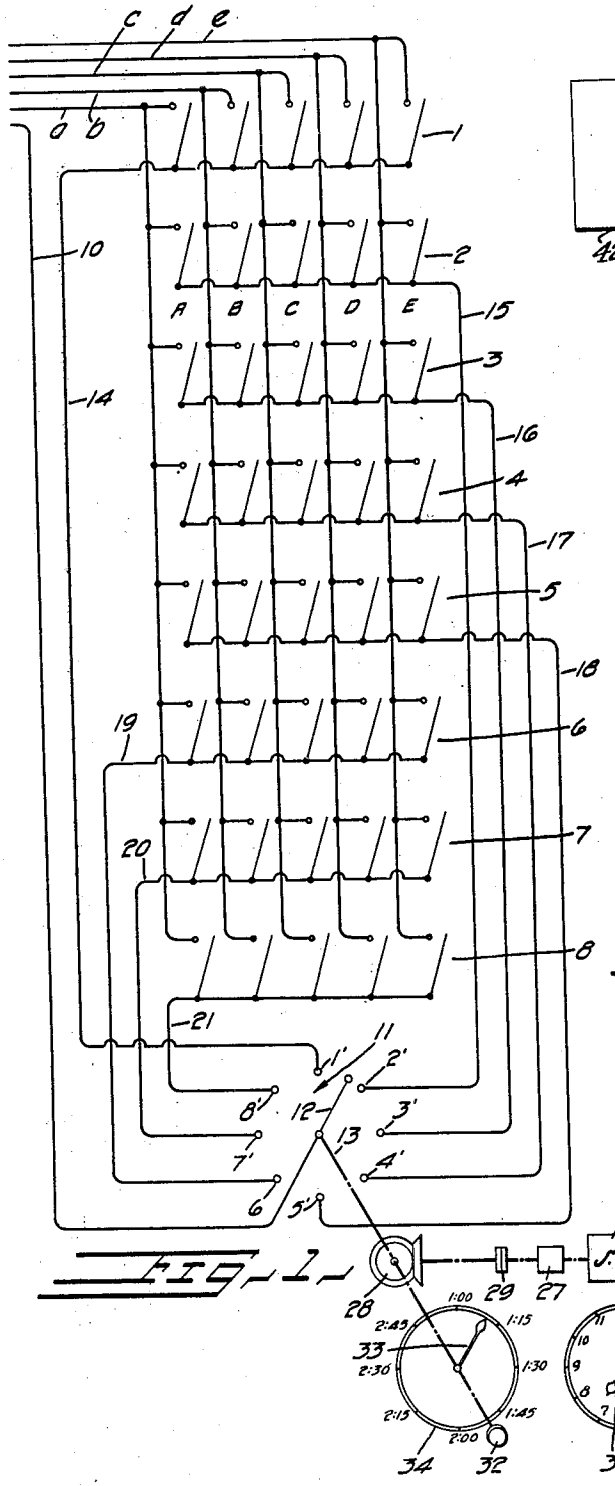


FIG. 1

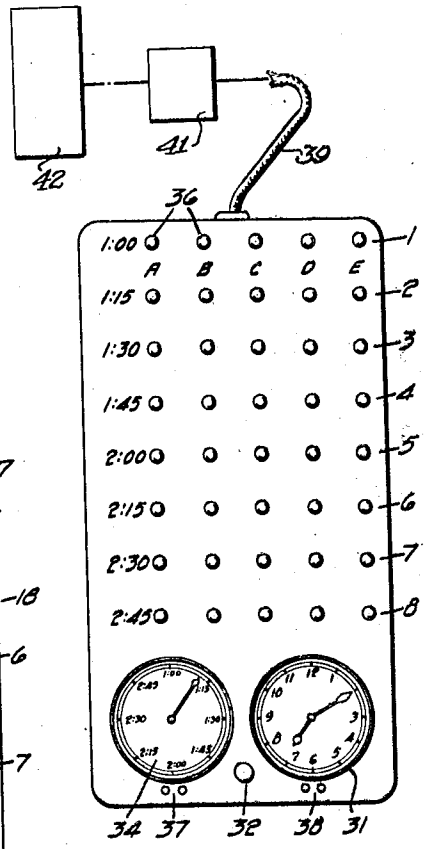


FIG. 2

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RADIORECEIVER CONTROL

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3 Claims. (Cl. 250—20)

This invention relates generally to apparatus for the automatic tuning of radio receivers, particularly receivers adapted for broadcast reception.

In the broadcasting of radio programs, it has become customary in the United States to divide the broadcasting time into fifteen minute intervals. This is not only for the purpose of making station announcements in compliance with Federal regulation, but also because programs sponsored by advertisers are paid for on a time basis. Such division of the radio programs causes considerable inconvenience to the owners of radio receivers. Because of the continual changing character of programs received from one station, the user must repeatedly retune his receiver through an evening's entertainment to receive the character of programs desired. Frequently a desirable program is not heard, due to failure to tune in at the proper time. Likewise it is difficult under prevailing conditions for a broadcasting chain to advertise a series of programs for an evening's entertainment from different stations, as the users of the individual receivers cannot be relied upon to tune their sets accordingly.

Apparatus for the automatic or semi-automatic tuning or dialing of radio receivers is incorporated on many sets now available upon the market. One type of automatic tuning apparatus is constructed and operated as follows:—Associated with the rotatable tuning shaft of the receiver, there is a small slow speed motor which can be connected to drive the tuner shaft through a magnetically actuated clutch. By means of an arrangement of contactors and relays, this motor and the magnetic clutch, is adapted to be controlled by a plurality of electrical control circuits. Closing of the separate control circuits is effected by a plurality of push button switches, generally located at a remote point. One button is provided for each of the stations to which the receiver can be automatically tuned. To operate such an apparatus, a button, corresponding to the station to which it is desired to tune the receiver, is pressed to close its associated control circuit. The electrical motor and the magnetic clutch are then immediately actuated to cause the motor to drive the tuner shaft in one direction. When the tuner shaft reaches a certain predetermined angular position, the magnetic clutch is deenergized automatically and the electrical motor is likewise automatically deenergized. The depressed button can then be released. If another button is now depressed, the tuning shaft is likewise automatically turned angularly to another predetermined angular position. Since the tuner shafts are generally not completely rotatable through 360°, and to effect tuning in as short a time as possible, the driving motor is generally made automatically reversible.

While automatic tuners of the above character are desirable in that they permit automatic operation of the radio receiver from a remote point, they do not overcome the inconveniences previously mentioned, due to the segregation of the programs in fifteen minute intervals.

It is an object of the present invention to provide an automatic receiver control which after being once set or conditioned by an operator, will automatically tune the receiver to different desired stations for a series of time intervals of say fifteen minutes, without further manual attention.

It is a further object of the invention to provide a receiver control of the above character which can be conditioned or set by an operator at any given time, and which will be relatively simple in construction.

Further objects of the invention will appear from the following description in which the preferred embodiments of the invention have been set forth in detail in conjunction with the accompanying drawing. It will be understood that the appended claims are to be accorded a range of equivalents consistent with the state of the prior art.

Fig. 1 is a circuit diagram, illustrating diagrammatically an apparatus incorporating the present invention.

Fig. 2 is a plan view of a control unit incorporating the apparatus illustrated in Fig. 1, the connections between the unit and the tuning or dialing apparatus of a radio receiver being shown schematically.

The apparatus as illustrated in the drawing is adapted to be substituted for the remote control unit, of automatic tuning apparatus of the character briefly outlined in the preamble to this specification. In other words, it is intended to be substituted in place of the remote unit which comprises a series of push buttons for controlling the driving motor connected to the tuning shaft of the radio receiver. Thus extending from the radio receiver, there is a common circuit conductor 10, and a series of individual circuit conductors *a*, *b*, *c*, *d*, and *e*. Closing of any one of these individual circuit conductors, with a common conductor 10, serves to automatically tune the receiver to a particular station. Associated

with the individual conductors *a*, *b*, *c*, *d* and *e*, I have shown a plurality of groups of contact switches, Nos. 1 to 8 inclusive. The switches of each group have been lettered A, B, C, D, and E, corresponding respectively to conductors *a*, *b*, *c*, *d* and *e*. Letters A, B, C, D and E can also be assumed to indicate the stations to which the receiver can be automatically tuned.

Associated with the groups of switches referred to above, I provide a commutating device 11, which as will be presently explained, is adapted to be driven by a synchronous electrical motor. Commutating device 11 can be of simple construction, consisting for example of stationary contacts 1' to 8' inclusive, together with a movable contact arm 12 carried by rotatable shaft 13. Contact arm 12 is connected to conductor 10. One side of each of the switches of group 1 is shown connected to contact 1' by conductor 14. Similarly conductors 15, 16, 17, 18, 19, 20 and 21, connect groups 2 to 8 inclusive, to contactors 2' to 8' inclusive. The other side of each of the individual switches is connected to one of the conductors *a* to *e* inclusive.

To drive shaft 13 I have shown a synchronous electrical motor 26, connected to shaft 13 through suitable gearing 27 and 28. A suitable slip clutch 29 has been shown interposed in this drive connection. Synchronous motor 26 is of the type commonly employed in electrical clocks which are adapted to be connected to ordinary 60 cycle alternating current power distribution lines. This motor is also shown driving the hand of an ordinary time piece or clock 31.

To effect manual adjustment of shaft 13, there is shown a knob 32, fixed to shaft 13. To indicate the positioning of contact 12, there is also fixed to shaft 13 an indicating hand 33, associated with a graduated dial 34. The markings on dial 34 divide the periphery of the same into eight major divisions, which can be numbered as indicated, to represent fifteen minute time intervals.

Before explaining operation of my apparatus, it should be noted that slip clutch 29 transmits sufficient torque to adequately drive shaft 13 at a uniform predetermined speed, but will permit the setting of shaft 13 by turning knob 32, without stopping the synchronous motor. Likewise in the embodiment of the invention illustrated, since eight groups of switches are provided, and since it is desired to effect automatic changing of stations every fifteen minutes, over a two hour period, the driving connection between the synchronous motor and shaft 13 is such as to cause this shaft to complete one revolution in two hours.

To explain manipulation of the apparatus described above, it will be presumed that an operator starts the radio receiver at 8:10 P. M. and desires continuous operation automatically on several stations until 10:00 P. M. The first operation is to set up different ones of the switches in groups 1 to 8 inclusive. For example if the operator desires to listen to a program from station B until 8:15 P. M., switch B of group 1 is closed. If he wishes to listen to the station C, from 8:15 P. M. to 8:30 P. M. switch C of group 2 is closed. If he wishes to listen to station E from 8:30 P. M. to 8:45 P. M. switch E of group 3 is closed. Similarly switches are closed in groups 4, 5, 6, 7 and 8 corresponding to stations which he desires to listen to for the fifteen minute periods represented by these groups. Knob 32 is now turned until the hand 33 points to the graduation 1. Movable contact arm 12 is now electrically connected with contact 1' of the commutating means, and therefore a circuit is closed including conductor 10, movable contact 12, stationary contact 1', conductor 14, switch B of group 1, and conductor B'. The radio receiver will then be automatically tuned to station B. The operator now notes the correct time as by reference to the clock 31, and if the time is for example ten minutes after 8:00 P. M., he then, by turning knob 32, sets hand 33 forwardly ten divisions towards the marking 1:15. Thereafter shaft 13 will be driven by the synchronous motor 26, and precisely at 8:15 P. M., movable contact 12 will be closed upon contact 2' to close another circuit in accordance with the setting of switch group 2, and accordingly effect automatic tuning of the receiver to the station selected for the next fifteen minute interval. Similarly the successive stations set up on the groups of switches will be automatically tuned in at fifteen minute intervals, until 10:00 P. M., at which time the first station will again be tuned in. At this time a new set of stations can be set up upon the apparatus, for the next two hour period.

In connection with the above mode of operation, it should be noted that ordinarily the movable contact will be in engagement with the stationary contact for a sufficiently long period to complete a tuning operation. It is likewise apparent that at any time desired, the entire set-up can be changed, and the apparatus again started upon a two hour period.

It is apparent that the invention can be modified in various ways. For example, the number of groups of switches can be varied in accordance with the length of the total period over which it is desired to have the apparatus operate automatically. A sufficient number of groups can be employed to cover as much as a 12 or even a 24 hour period, but this is undesirable because of the complicated nature of the resulting apparatus, and because it may be difficult to construct a commutating device which will operate accurately over a long period. It is likewise apparent that a time piece need not be directly incorporated with the apparatus, although this is desirable to secure accurate operation.

Fig. 2 illustrates the appearance of a control panel incorporating the apparatus of Fig. 1. Push buttons 36 control the switches previously described with reference to Fig. 1, and are arranged in groups Nos. 1 to 8 inclusive. Dial 34, and clock 31, are mounted below the series of push buttons, and the setting knob 32 is also located for convenient operation. Buttons 37 are indicated for turning the receiver on and off and buttons 38 for controlling the sound level of the receiver. In connection with the sound level, it is to be noted that when my apparatus is employed, the receiver should be provided with means, such as is well known in the art, for maintaining the sound level substantially constant, for varying intensities of received signals. This will avoid the necessity of changing the volume setting of each fifteen minute interval. The cable 39 leading from this unit, and including the circuit conductors *a* to *e* inclusive and 10 and 14, is diagrammatically shown connected to the motive dialing apparatus 41, which in turn tunes the radio receiver 42.

If commutating means having greater accuracy is required, a commutator similar to 11 can be actuated by notching mechanism and a solenoid. The solenoid in turn can be connected to a circuit adapted to be opened and closed by a contactor

connected to the synchronous motor. Such an arrangement permits the omission of a slip clutch, provided the notching mechanism is constructed so as to always stop contact arm 12 upon one of the associated stationary contacts. Likewise with such an arrangement indicating hand 33 would be set upon the nearest preceding graduation shown, corresponding to the end of a preceding fifteen minute interval.

I claim:

1. In control apparatus connected to the dialing apparatus of a radio receiver by a plurality of electrical circuits, closing of each of said circuits serving to dial the receiver to a particular station, a plurality of duplicate groups of switches associated with said circuits, there being a switch in each group for a particular circuit, timing means for rendering said groups successively operative for controlling said circuits at regular successive time intervals, said timing means including a synchronous electrical motor, commutating means driven by the motor, and manual means for changing the phase relationship between the commutating means and the synchronous motor.

2. In control apparatus connected to the dialing apparatus of a radio receiver by a plurality of electrical circuits, closing of each of said circuits serving to dial the receiver to a particular station, a plurality of duplicate groups of switches associated with said circuits, there being a switch in each group for a particular circuit, and timing means for rendering said groups successively operative for controlling said circuits at regular successive time intervals, said timing means including a synchronous electrical motor, commutating means, and a drive including a slip clutch connecting the motor with the commutating means, whereby the phase relationship between the motor and the commutating means can be changed.

3. In control apparatus connected to the dialing apparatus of a radio receiver by a plurality of electrical circuits, closing of each of said circuits serving to dial the receiver to a particular station, a plurality of duplicate groups of switches associated with said circuits, there being a switch in each group for a particular circuit, timing means for rendering said groups successively operative for controlling said circuits at regular successive time intervals, said timing means including a synchronous electrical motor and commutating means driven by the motor, means for changing the phase relationship between the commutating means and the synchronous motor, and means for indicating the positioning of the commutating means at any particular instant.

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