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T. A. CHENEY

2,187,373

RADIO RECEIVING SET TIME CONTROL DEVICE

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Fig. 2

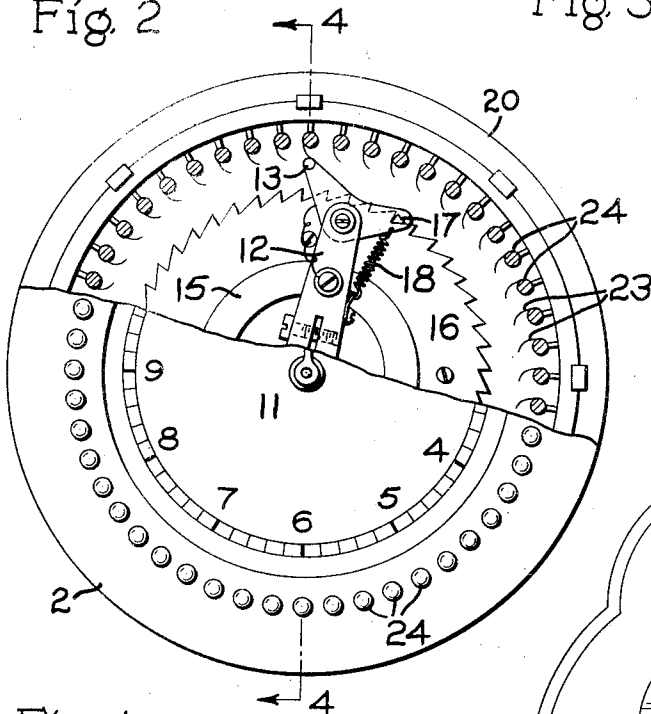


Fig. 3

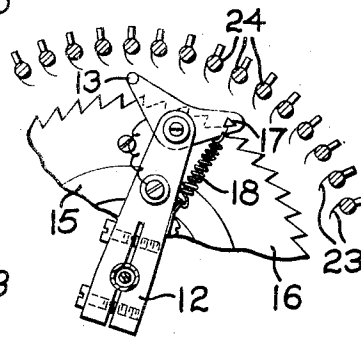


Fig. 4

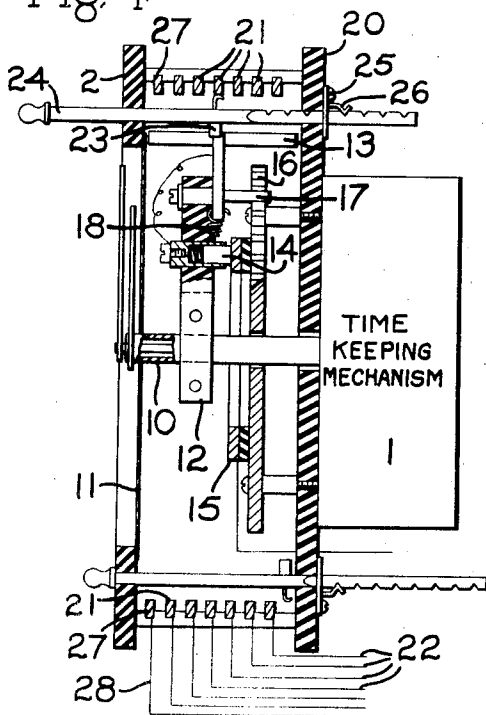
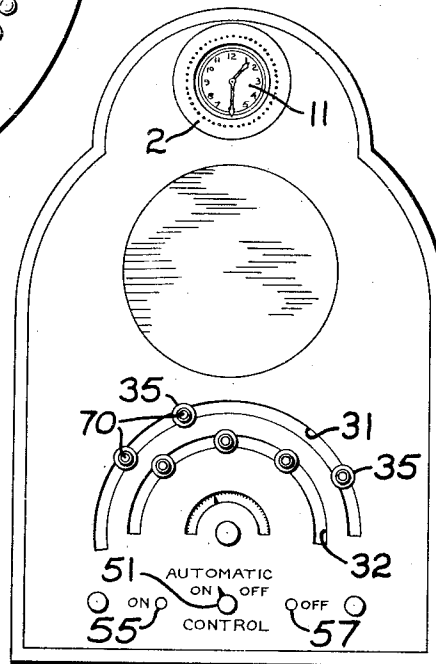


Fig. 1

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UNITED STATES PATENT OFFICE

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RADIO RECEIVING SET TIME CONTROL
DEVICE

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3 Claims. (Cl. 200—37)

My invention relates to an automatic tuning device for radio receiving sets, and more particularly to such a device which can be set to control the receiving set automatically at selected times to tune in or out a series of programs for which the apparatus has been arranged previously. This application discloses an improvement upon the device of Patent No. 2,060,037, and is particularly directed to the time control device, and to the mechanism whereby the automatic operation may be accomplished accurately on time.

It is often desired to listen to a sequence of programs throughout the day which may be selected from published lists of broadcast station programs. One may forget, however, to change the tuning of a radio receiving set from one station to another desired station precisely at the commencement of a program which a listener wishes to hear. Moreover, if it is desired to hear two programs from the same station which are not consecutive, but it is not desired to hear the intervening program, the listener ordinarily would have to turn the set off, and then keep watch of the clock to turn it on again at precisely the proper time to hear the beginning of the subsequent program.

It has been proposed heretofore to provide mechanism which may be set in advance to operate at a later time either to turn the set on to a tuned station, to turn the set off, or to change the tuning of the set from one station to another, without attention of the operator. These various operations may be accomplished automatically in any sequence during a given time period, such as a twelve-hour or a twenty-four-hour interval, after the mechanism has been pre-set. It is necessary, however, that the change-over be made accurately on time, as otherwise the new program is not tuned in from the beginning, or is tuned in too early, interrupting a preceding program. It is an object of this invention to provide mechanism which is accurate and quick-acting, to avoid such overlaps.

Especially is it my object to provide a mechanism of the general type described, which will be of simple and rugged construction, and which will be extremely convenient to operate, yet which will be selective and accurate in its operation.

The objects more specifically inherent in the particular mechanism which I employ will become evident as the description thereof progresses.

My invention, then, comprises the novel construction of an automatic radio receiving set time control device shown in the drawing and described hereafter, with particular attention to the

construction of the several principal elements of my mechanism, and to the manner in which these elements operate, both separately and in conjunction with the other elements of such a device.

The drawing illustrates the particular mechanism in the form which I now prefer, representing an improvement over the mechanism disclosed in Patent No. 2,060,037, referred to above.

Figure 1 is a front elevation view of a radio receiving set as it might appear with automatic tuning mechanism built into it.

Figure 2 is a front elevation, with parts broken away, of the time-controlled station selector, while Figure 3 is a fragmentary view of the mechanism shown in Figure 2, illustrating the parts in a slightly different relation. Figure 4 is a transverse section of the time-controlled station selector, taken along the line 4—4 of Figure 2.

In general the device illustrated includes a time-controlled station selector, which is a device which may be set to close a selected circuit at a selected time in the future. Closing of such a circuit may energize either a switching circuit, to control the set power circuits, or a driving circuit to control a reversible motor (not shown herein, but such as is illustrated in Patent No. 2,060,037, for instance) which drives a station tuner, or completion of a circuit may accomplish both of these operations; arrangements to such ends are known, and any suitable arrangement may be employed. The station tuner, of any known type, in conjunction with the time-controlled station selector, controls the driving circuit of the motor and the switching circuit for the set power control. In addition to the automatic mechanism certain manual controls may be provided, which will be mentioned hereafter.

The time-controlled station selector may be driven by any suitable clock mechanism 1, mechanically or electrically driven, which is provided with a long hour-hand arbor 10 extending through a conventional clock face 11, over which the usual hour and minute hands move.

About the clock face is disposed a ring 2, spaced from a plate 20 upon which the clock mechanism 1 is mounted. Between this ring 2 and plate 20 are secured in registering spaced relation a group of metal contact rings 21 lying in parallel planes and insulated from each other. The group as a whole defines a cylinder. Each ring is connected to a station brush, which latter corresponds to a preselected frequency of the radio set circuit tuning device of a chosen station. These rings are at all times fixed in the group with relation to each other, and the rearmost ring is spaced

from the plate 20, as will be seen in Figure 4. The number of rings provided is, of course, a matter of choice. One is provided for each frequency to which the set is to be tuned.

5 An arm 12 is carried by the hour-hand arbor 10 to rotate an oscillatably mounted head carrying a finger 13 through a definite path. This finger 13 is disposed inside of the cylinder defined by the rings 21, and lies parallel to the axis of such cylinder. As it rotates its path defines generally
10 the surface of a cylinder of smaller diameter than that defined by the group of contact rings 21. The finger 13 is electrically connected through a brushing contact 14 to a ring 15 which defines a
15 circuit common to all the station circuits 22.

To complete a connection between the finger 13 and some one ring 21, a plurality of connectors 23 are provided, which are carried by reciprocable
20 sliders or rods 24, guided in the ring 2 and plate 20. These rods may be shifted in and out, always remaining in position for engagement of the inner end of the connector 23 by the finger 13, but having its outer or blade end disposed in contact
25 with any one selected ring 21, according to the station which the listener desires to hear, or in the space between the last ring and the plate 20, in which position no circuit will be completed between 15 and 22 when the inner end of the
connector 23 is engaged.

30 After assembly the rods 24 cannot be withdrawn from the ring 2 because of the engagement of the contact 23 with the inner face of that ring. The connectors 23 are always kept in interconnecting
35 position by flattening the sides of the rods 24 and extending them through slotted brackets 25, secured to the rear face of the plate 20. The rear ends of these rods are also notched at intervals, the spacing of such notches corresponding to the
40 spacing of the rings 21; see Figure 4. In these notches a spring detent 26 automatically engages, which detent may be punched outward from and
formed integral with the bracket 25.

In addition to the station contact rings 21 I provide a stop ring 27 to which is connected a stop
45 circuit 28. When any selected rod 24 is pulled clear out its contact 23 will engage this stop ring 27. When the finger 13 engages the connector 23, so disposed, at the time to which the rod 24
50 corresponds, a circuit will be completed which will deenergize the set power circuits. Hence by manipulation of a single rod 24, through circuits not shown, but corresponding to such as are
shown in Patent No. 2,060,037, for instance, the radio receiving set may be controlled automati-
55 cally, at the time corresponding to the selected rod, either to energize or to deenergize the set power circuits, or merely to change the tuning of the set without affecting the set power circuits.

I prefer that there be forty-eight of the rods 24 and their associated buttons, arranged about the
60 space of a conventional twelve-hour clock, so that there will be a fifteen-minute time interval between adjacent buttons, and each button will always correspond to the same time. It is optional, however, whether there be forty-eight
65 buttons or more or fewer than this number, or whether a twelve-hour or twenty-four-hour clock be employed, for in any case the principle of operation is the same.

70 It has been found difficult in such devices to insure that contact is made at precisely the proper time, or within a few seconds thereof. I have devised mechanism which will operate to make contact between the finger 13 and the connector
75 23 within a range of approximately ten seconds,

and without requiring extraordinary precision in manufacture or assembly.

The means which I employ for obtaining this accurate operation consists of a toothed cam 16
5 secured in fixed position relative to the plate 20, over which cam rides a pin 17, carried by the head which supports the finger 13, the pin 17 constituting a cam follower. This head is pivoted
upon the arm 12, and the arm and head are interconnected by a spring 18 which urges the
10 follower 17 into engagement with the cam. As the arm 12 is rotated by the clock arbor, therefore, the pin 17 will ride up on the sloping faces of the cam, which action will rock the head and its finger 13 gradually to displace the latter away
15 from and out of contact with the connector 23. When the next instant for connection arrives the pin 17 will ride over the top of a cam tooth, and the spring 18 will draw the pin end of the head
20 down as the pin drops to the valley. An instantaneous contact will consequently be made between the finger 13 on the opposite end of the oscillatable head, and the connector 23 on the
rod 24, corresponding to the valley of the cam into which the follower 17 has dropped. Thus for
25 each rod 24 there is a valley in the cam 16, and each valley is cut precisely for the time to which its respective rod corresponds.

The station tuner and setting means therefor are provided to effect movement of the circuit
30 tuning device of the receiving set in an automatic manner, according to the particular circuit 22 closed by the time-controlled station selector. Since the particular mechanism and arrange-
35 ment to this end is not part of the present invention, it is only necessary to note that it includes knobs 35 movable along slots 31 and 32, which are disposed concentrically with the axis of rotation
of the usual manual station tuner, circuit tuning device of the radio receiving set, and the
40 dial control therefor, as shown in Figure 1. The position of each knob 35 along its slot determines the setting of the set tuning means, by mechanism not necessary to illustrate, since such arrange-
45 ments are known.

A switch is provided at 51 to render the automatic tuning mechanism effective or ineffective
50 at will. When it is closed the automatic mechanism may operate, and when it is open the automatic mechanism will not operate. Push buttons 55 and 57 are provided to initiate or to terminate operation of the set, by circuits not necessary to describe, but usual in radio receiving sets.

What I claim as my invention is:

1. A radio receiving set time control device,
55 comprising time-keeping mechanism, an arm rotated thereby, a single elongated contact carried by said arm in a path defining the surface of a cylinder, a plurality of reciprocable station
60 selecting members defining the surface of a cylinder of larger diameter than the path of said contact, a plurality of stationary contact rings defining the surface of a cylinder of larger diameter than that defined by said station selecting
65 members and concentric therewith, a connector carried by each of said station selecting members projecting inwardly and outwardly therefrom for interengagement between said arm contact and a
selected one of said contact rings, means guiding said station selecting members for reciprocation
70 to engage the connector of any selected station selecting member with any selected contact ring, and means for completing a circuit through such selected station selecting member and contact
75 ring upon engagement of said arm contact with

the connector of the station selecting member selected.

2. A radio receiving set time control device, comprising time-keeping mechanism including a rotatable arbor, an arm carried by said arbor, a plurality of annularly disposed contacts arranged concentrically about said arbor, a generally circular toothed cam arranged concentrically of said arbor and fixed with relation to said contacts, a finger pivotally mounted on said arm to rock with respect thereto for engagement with said contacts one at a time, and a cam follower carried by said arm and engageable with said cam to control rocking of said finger into engagement with the respective contacts at predetermined times.

3. A radio receiving set time control device, comprising time-keeping mechanism including a rotatable arbor, an arm carried by said arbor, a

generally triangular head pivoted by an apex on the free end of said arm, a contact member on a swinging apex of said head, a plurality of annularly disposed contact points arranged concentrically about said arbor and engageable one at a time by said contact member, a generally circular toothed cam arranged concentrically of said arbor and fixed with relation to said contacts, and having a valley corresponding to each contact point, a cam follower carried by the third apex of said head, and a spring reacting between said arm and said head to press the cam follower continuously into contact with said cam and to snap the head contact member into instantaneous engagement with a contact point as the follower is drawn into the cam valley corresponding to such contact point.

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