

April 13, 1948.

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2,439,732

RADIO TIME SWITCH

Filed July 27, 1944

2 Sheets-Sheet 1

Fig. 1.

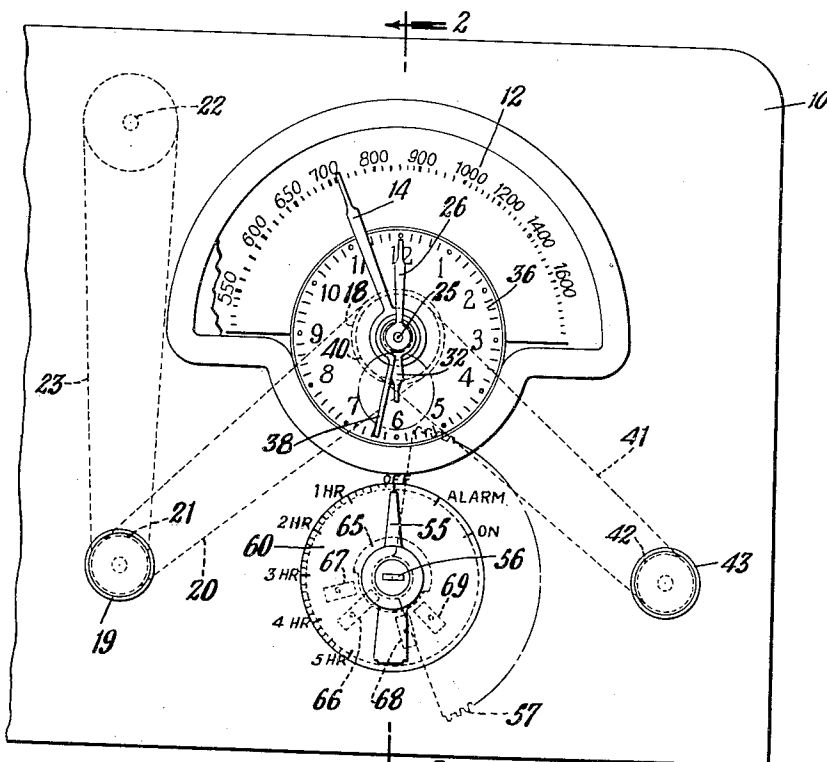


Fig. 2.

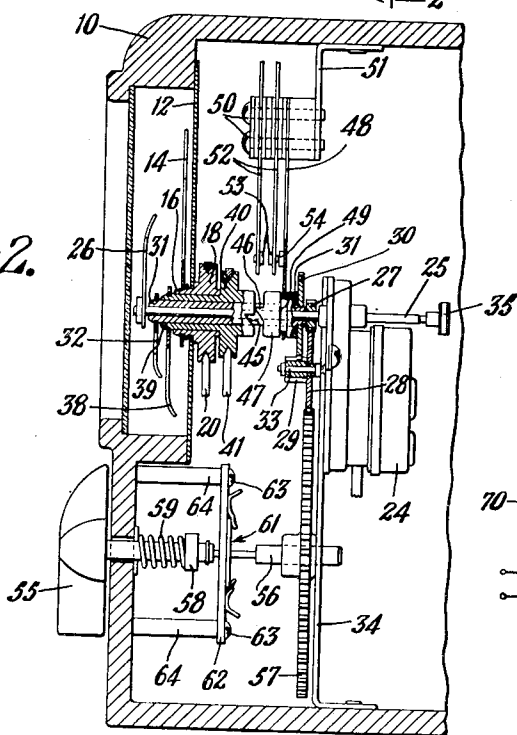
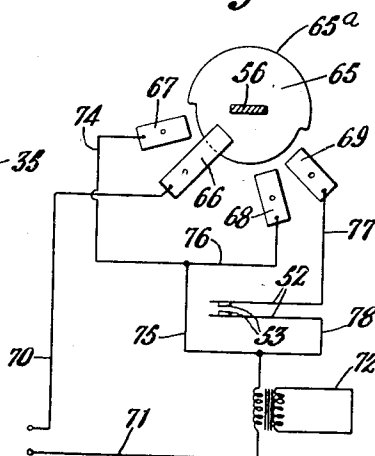


Fig. 3.



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2 Sheets-Sheet 2

Fig:4.

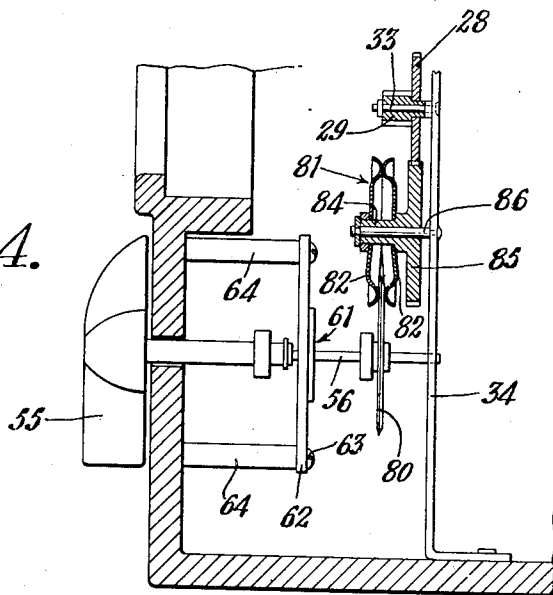
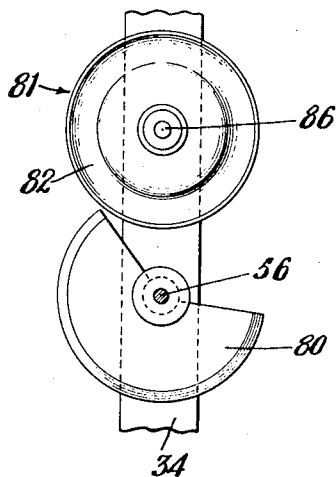


Fig:5.



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RADIO TIME SWITCH

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2 Claims. (Cl. 161-1)

1

This invention relates to a selective control system for a radio set and is concerned more particularly with a time control mechanism that is adapted to operate the radio set in accordance with any of several preselected time arrangements.

The time control mechanism of my invention comprises essentially a time device including a clock mechanism and a time selector operatively connected with each other and adapted for installation in a radio set. The time selector is connected into the electric circuit of the radio receiver and, upon manual manipulation thereof to set it to a predetermined time selection, automatically operates the radio set for the selected time period. The clock mechanism, which is advantageously electrically driven, actuates the time selector upon the selection of the predetermined time interval and thereby controls the automatic operation of the set.

My time control system may be used to operate a radio receiver for a given, fixed time interval ranging from a few minutes to several hours, at the end of which time it automatically shuts off the radio receiver. It may also be used as an alarm device, upon which adjustment the radio receiver may be operated for a relatively short period of a few minutes or less, long enough to wake a sleeping person, for example, or for a longer and continuous period if desired. Provision may also be included in the time selector arrangement to permit continuous operation of the radio receiver.

The clock mechanism and the time selector may advantageously be operatively connected through gearing that includes a segmental gear mounted on a shaft, on which is also mounted a time selection knob for selection of the predetermined time period, and adapted to mesh with a gear in the gear train drive of the clock mechanism. The periphery of the segmental gear corresponds to the angle through which the time selection knob is turned in order to select the longest fixed time interval of operation. The shaft carrying the segmental gear and the time selection knob is provided with a spring arrangement to permit meshing of the segmental gear with the gear train upon turning of the knob for selection of the desired fixed time interval, at the end of which the segmental gear and the gear train are again in unmeshed relation. The segmental gear and the gear train remain unmeshed when the radio is operated as an alarm or continuously or is shut off.

The clock mechanism and the time selector

2

may also advantageously be operatively connected through a frictional drive that comprises a segmental friction wheel mounted on a shaft, on which is also mounted the time selection knob, and adapted to engage another friction member included in the gear train drive of the clock mechanism. The periphery of this segmental friction wheel also corresponds to the angle through which the time selection knob is turned for the longest selected fixed time interval of operation. The segmental friction wheel and the friction member are placed in frictional engagement upon turning of the knob for the selection of a fixed period of operation, at the end of which time they are again in disengaged relation. When the radio receiver is operated as an alarm or continuously or is shut off, the segmental friction wheel and the friction member remain disengaged.

My invention will now be described in detail in connection with the accompanying drawings illustrative thereof, in which:

Fig. 1 is a face view of a radio set provided with my selective time control system.

Fig. 2 is a vertical sectional view taken along the line 2-2 of Fig. 1 and showing the details of the selective time control device.

Fig. 3 is a diagrammatic view of the time selector and the electric circuit connected therewith.

Fig. 4 is a fragmentary vertical sectional view of a modification of the selective time control system shown in Fig. 2.

Fig. 5 is a fragmentary elevational detail of the modified apparatus shown in Fig. 4.

I have shown in Fig. 1 a radio receiver cabinet 10 of customary design provided with a station selection dial 12 and the radio receiver pointer 14 affixed to the outer end of hollow shaft 16, which has a pulley 18 at its other end desirably formed integrally therewith. The particular station desired may be selected by turning the knob 19, which operates the pointer 14 by means of a belt 20 passing over pulley 18 and over a pulley 21 on the shaft to which knob 19 is fastened. Turning of knob 19 also correspondingly moves the condenser (not shown) on condenser shaft 22 by means of the pulley and belt system 23.

In accordance with my invention, I have provided a selective time control system designed to operate in conjunction with this radio receiver station selection system. This time control system comprises a time device and a time selector device operatively connected with each other whereby the radio receiver is operated in accord-

ance with a time selection determined by the time selector device.

The time device consists of a clock mechanism including the motor 24, which may advantageously be electrically operated and which may be of the type described in my prior Patent, No. 2,049,261. This motor drives shaft 25, on the outer end of which the minute hand 26 is fastened, and also drives by means of the gear train 27, 28, 29 and 30, the hollow shaft or arbor 31, through which shaft 25 passes and on the outer end of which is fastened the hour hand 32. Gears 28 and 29 are freely mounted on shaft 33, which is fixed in the bracket 34 attached to the base of the cabinet 10. A time-set knob 35 is provided on the inner end of shaft 25 to permit setting of the minute and hour hands to the proper time. Clock dial 36 is advantageously incorporated into the station selection dial 12.

In combination with this clock mechanism, I also provide the alarm pointer 38 affixed to the outer end of the hollow shaft 39, through which pass arbor 31 and shaft 25. Near the inner end of shaft 39 there is provided a pulley 40, desirably formed integrally therewith. A belt 41 passes over this pulley and over another pulley 42, to the shaft of which is fastened the knob 43, whereby the alarm pointer 38 may be set to any desired time. As shown in Fig. 2, hollow shafts 16, 39, and 31 are desirably made concentric with shaft 25, hollow shaft 16 being the outermost.

The inner end of hollow shaft 39 is provided with a recess 45 adapted to receive the corresponding projection 46 on the boss 47, which is designed to slide along the outer surface of arbor 31. The space between the inner end of shaft 39 and gear 30 is made just sufficient to normally accommodate boss 47, which is positively driven by arbor 31, in any appropriate manner so that the projection 46 on boss 47 will engage recess 45 as the rotation of arbor 31 moves the boss into such position. Boss 47 is loosely journaled in the spring fork 48, which is carried in the annular recess 49 in boss 47 and is attached as by means of bolts 50 to the bracket 51 conveniently fastened to the top of the cabinet 10. Also attached to bracket 51 by means of bolts 50 but suitably insulated from each other and from spring fork 48 is a pair of spring contact members 52 provided with the contact points 53. An insulator button 54 on spring fork 48 prevents this member from making contact with spring contact members 52.

In the time selector device of my selective time control system, I provide a time selection knob 55 affixed to the outer end of shaft 56, the other end of which carries segmental gear 57 that meshes with gear 28 of the clock mechanism. Shaft 56 may be appropriately journaled in one of the cabinet walls and in the bracket 34. Boss 58 fastened to this shaft confines spring 59 between itself and the radio cabinet 10 so that, when knob 55 is pulled out to unmesh gears 28 and 57, the confined spring will return shaft 56 to its initial position. Dial 60, which is appropriately marked with the desired time selections, may be conveniently positioned in the cabinet below dial 12. As shown in Fig. 1, I have provided this dial with an "off" selection, an "alarm" selection, an "on" selection for continuous playing, and a "time interval" selection of a maximum of five hours. The periphery of the segmental gear 57 corresponds to the peripheral portion of dial 60 re-

quired by the "time interval" selection, which obviously may have a maximum of more or less than five hours.

Between gear 57 and boss 58, shaft 56 is provided with the wafer switch 61, the base 62 of which is fastened to the cabinet 10 by means of screws 63 and is separated therefrom by spacers 64. This wafer switch is provided with the contact cam 65, which is loosely carried on shaft 56 and is rotatable thereby, with the long contact member 66, which maintains a continuous contact with the center of the contact cam 65, and with the shorter contact members 67, 68 and 69, which maintain contact with the raised portion 65a of cam 65 only when this cam is rotated into contact therewith by the setting of the time selection knob 55.

As shown in Fig. 3, these several contact members are all connected to form a control circuit connected to the electric circuit of the radio receiver, one line lead 70 being connected to the long contact member 66 and the other line lead 71 being connected to the radio receiver circuit indicated at 72. Short contact member 67 is connected by leads 74 and 75 to the radio receiver circuit 72; contact member 68 is connected by leads 76 and 75 to the radio receiver circuit 72; and contact member 69 is connected by lead 77 to one of the spring contact members 52, the other spring contact member being connected by lead 78 to the radio receiver circuit 72. Accordingly, when the time selection knob 55 is set to the desired selection, the respective circuit will be completed, and the radio set will be operated in accordance with the time selection made.

In the utilization of my time control device as an alarm, the alarm pointer 38 is set to the time at which the operator wishes to be called, for example, and the time selection knob 55 is set to the "alarm" selection on dial 60. At the same time pointer 14 is also set to the desired station. In this setting cam 65 is rotated so that it is in contact with contact members 66 and 69. When the clock reaches the time to which the alarm pointer has been set, projection 46 on boss 47 engages recess 45 in arbor 39; spring fork 48 is moved forward and brings contact members 52 together; the circuit is thereby completed through leads 77 and 78; and the radio set is automatically turned on and operated for a length of time determined by the nature of recess 45 and projection 46, which are conveniently so designed as to permit operation of the radio receiver for at least a few minutes or long enough, for example, to wake the average sleeping person.

When it is desired to operate the radio receiver for a given interval of time, as for instance, one hour, the time selection knob 55 is pulled out and set to "1 hour" on dial 60; and the radio receiver pointer is set to the station whose program is desired to be heard. In this setting cam 65 is rotated so that it is in contact with contact members 66 and 67; the circuit is immediately completed through leads 74 and 75; and the radio receiver begins to operate. The setting of knob 55 has also meshed gear 57 with gear 28 at a point which, with the dial 60 as shown, is one-fifth around the periphery of segmental gear 57. The continued operation of the clock mechanism slowly rotates gear 57, contact cam 65, and control knob 55. At the end of the hour, gears 28 and 57 have again reached an unmeshed position; cam 65 has broken contact with contact member 67; the circuit has been broken; and the radio is

5

automatically shut off with the control knob 55 again occupying the "off" position. Contact member 67 is so positioned on wafer switch 61, of course, that its contact with cam 65 is not broken until the full selected time interval has passed.

A radio set equipped with my time control device may also be operated continuously. In such event, the time selection knob 55 is set to the "on" position, in which case cam 65 is in contact with contact member 66 and 68, the circuit is completed through leads 76 and 75, and the radio receiver is turned on and operated in accordance with the selection made by pointer 14.

When the radio set is not in use, the time selection knob 55 is, of course, set to the "off" position, in which setting no circuit is completed and the radio receiver cannot be operated.

In Figs. 4 and 5 I have shown a modified system for operatively connecting the shaft 56 of the time selector with the gear train drive of the clock mechanism. In this construction, shaft 56 is provided with the segmental friction wheel 80 that engages the friction member 81, which may conveniently consist of two cup-shaped spring washers 82 or the like affixed to the boss 84 of gear 85. This gear is freely mounted on shaft 86, which is fixed in the bracket 34, and meshes with the gear 28 freely mounted on shaft 33. The periphery of the segmental friction wheel 80 corresponds to the peripheral portion of the dial 60 required by the maximum "time interval" selection. Because of the opposite direction of rotation imparted to shaft 56, however, the arrangement of dial 60 in this modification is opposite to that shown in Fig. 1.

When it is desired to operate a radio receiver equipped with this modified construction for a fixed interval of time, such as one hour, the time selection knob 55 is turned and set to "1 hour" on the dial; and the radio pointer 14 is set to the desired station. The circuit is completed as described in connection with the use of the segmental gear, and the radio receiver begins to operate. The turning of knob 55 has engaged friction wheel 80 with friction member 81 at a point which, with the dial as shown, is one-fifth around the periphery of segmental wheel 80. The continued operation of the clock mechanism slowly rotates friction wheel 80 and contact cam 65 so that, at the end of the hour, the friction wheel and the friction member have again become disengaged, cam 65 has broken contact with contact member 67, the circuit has been broken, and the radio receiver is automatically shut off.

For operation of the radio receiver either continuously or as an alarm, the procedure with the frictional drive is the same as that with the gear drive except, of course, that the knob 55 is turned in the opposite direction.

I claim:

1. In a time control system for a radio receiver having a radio receiver circuit and station tuning mechanism, the combination of a control circuit for controlling the supply of current to the receiver circuit to start and stop the radio receiver, a pair of time switch contacts in said control circuit, clock mechanism, means for closing said time switch contacts for a fixed period of time comprising a manually adjustable cam and a cam follower driven by said clock mechanism and connected to said switch contacts whereby they close and open the time switch contacts at instants determined by the adjustment of the cam, a master selector switch knob having at least two selector positions, a master switch con-

6

tact in the control circuit and connected to said knob, a switch element connected in the control circuit in series with said time switch contacts, and a second switch element connected in the control circuit in shunt relation to said time switch contacts, the said switch elements being positioned with respect to the master switch contact so that with said knob in one of said selected positions the master switch contact engages said second switch element to complete the control circuit, and with said knob in another selected position the master switch contact engages said first switch element and does not engage said second switch element, whereby the control circuit is then completed only when the clock mechanism operates to close said pair of time switch contacts, and a disengageable driving element connected to said master switch contact and engaging said clock mechanism to be driven thereby when said master switch contact engages said second switch element, whereby the master switch contact is driven until it disengages said second switch element to open the control circuit and stop the radio receiver.

2. In a time control system for a radio receiver having a radio receiver circuit and station tuning mechanism, the combination of a control circuit for controlling the supply of current to the receiver circuit to start and stop the radio receiver, a pair of time switch contacts in said control circuit, clock mechanism, means for closing said time switch contacts for a fixed period of time comprising a manually adjustable cam and a cam follower driven by said clock mechanism and connected to said switch contacts whereby they close and open the time switch contacts at instants determined by the adjustment of the cam, a master selector switch knob having at least two selector positions, a master switch contact in the control circuit and connected to said knob, a switch element connected in the control circuit in series with said time switch contacts, and a second switch element connected in the control circuit in shunt relation to said time switch contacts, the said switch elements being positioned with respect to the master switch contact so that with said knob in one of said selected positions the master switch contact engages said second switch element to complete the control circuit, and with said knob in another selected position the master switch contact engages said first switch element and does not engage said second switch element, whereby the control circuit is then completed only when the clock mechanism operates to close said pair of time switch contacts, a disengageable driving element connected to said master switch contact and engaging said clock mechanism to be driven thereby when said master switch contact engages said second switch element, whereby the master switch contact is driven until it disengages said second switch element to open the control circuit and stop the radio receiver, and a third switch element connected in the control circuit in shunt relation to the time switch contacts and positioned with respect to the master switch contact so that with said knob in still another position the master switch contact engages the third switch element to complete the control circuit and the driving element is disengaged from the clock mechanism, whereby the radio receiver may operate continuously.

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