April 27, 1937. J. V. FEDOR 2,078,487

AUTOMATIC SELECTOR FOR RADIO RECEIVING SETS AND LIKE DEVICES

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Fig. 1.

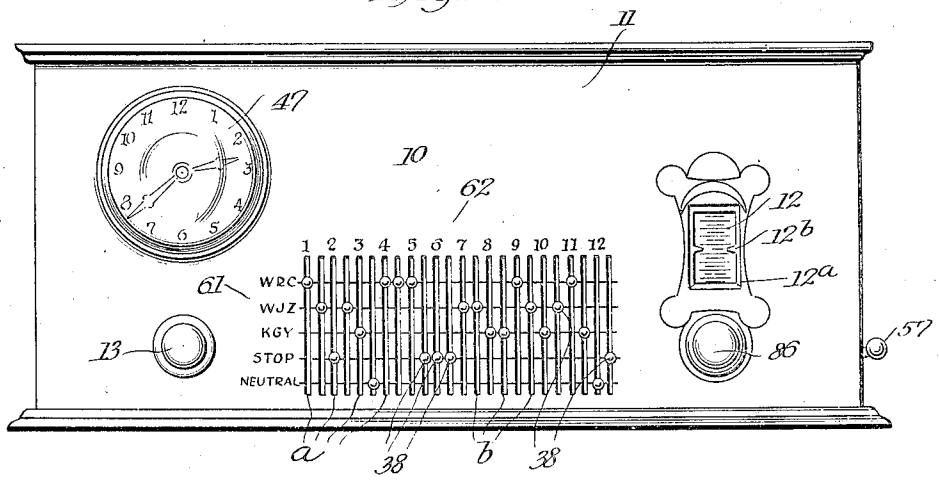
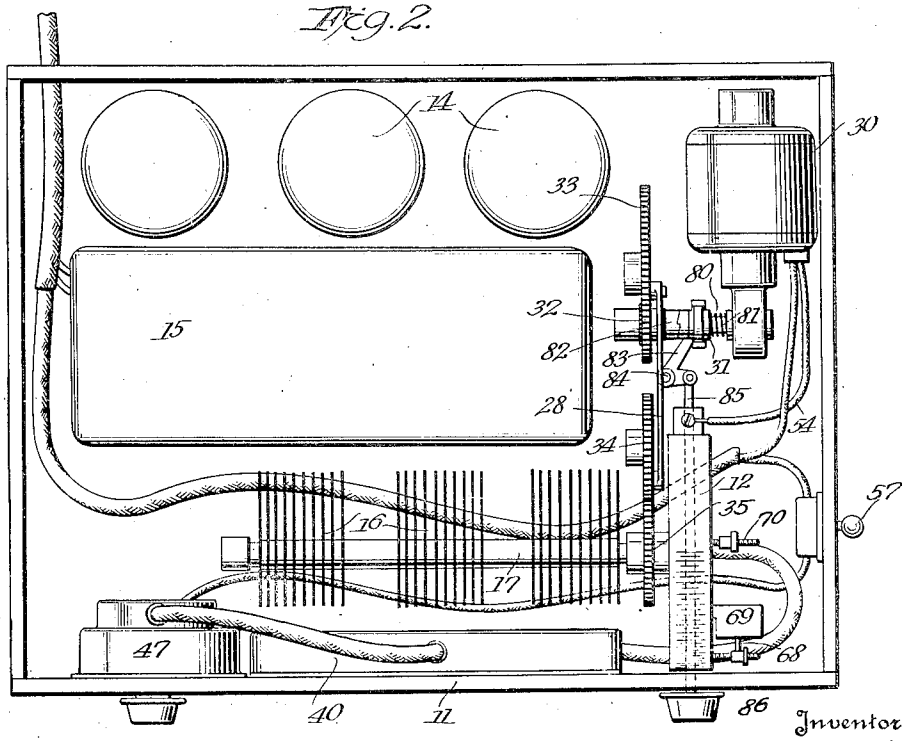



Fig. 2.




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Fig. 3.

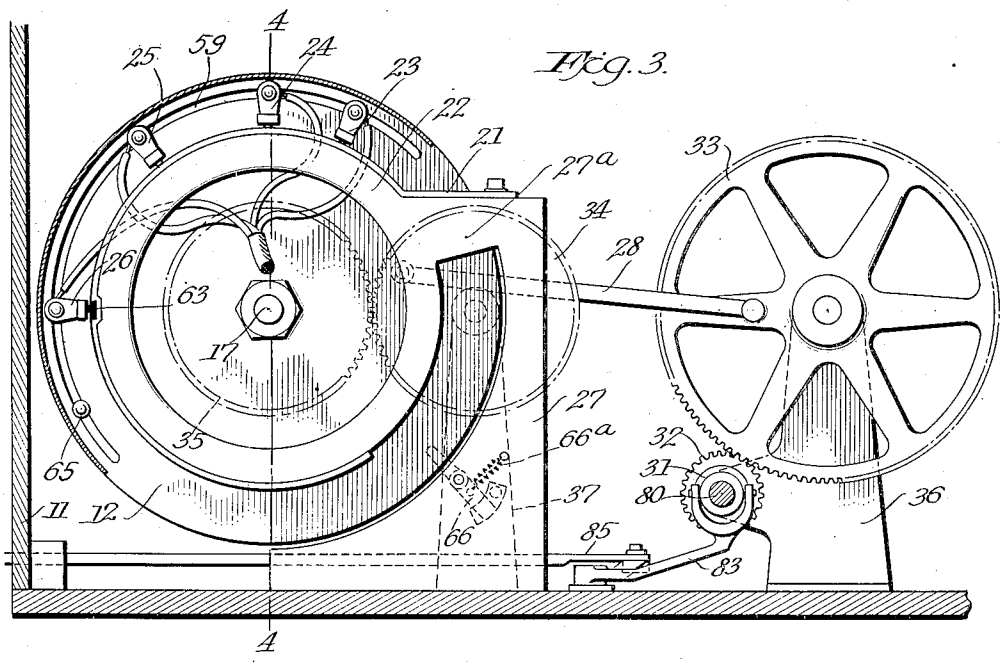



Fig. 4.

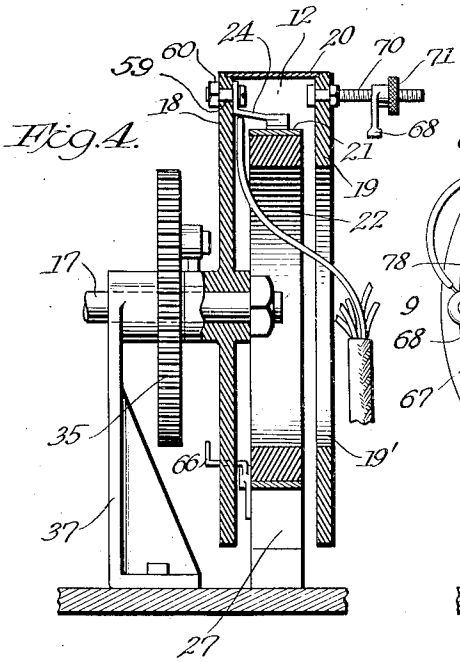
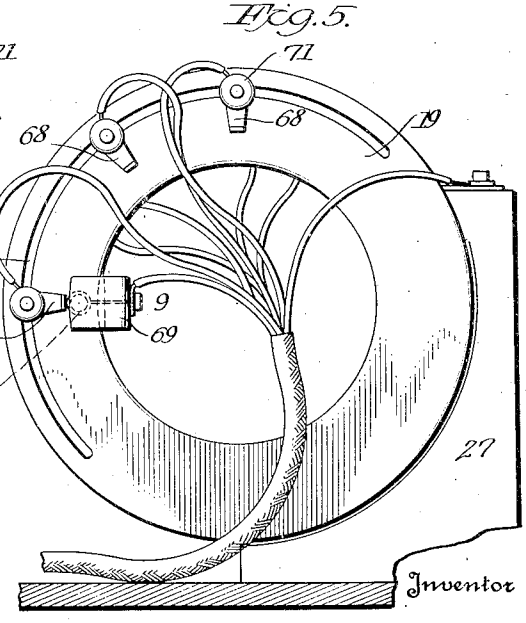



Fig. 5.




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AUTOMATIC SELECTOR FOR RADIO RECEIVING SETS AND LIKE DEVICES

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Fig. 6.

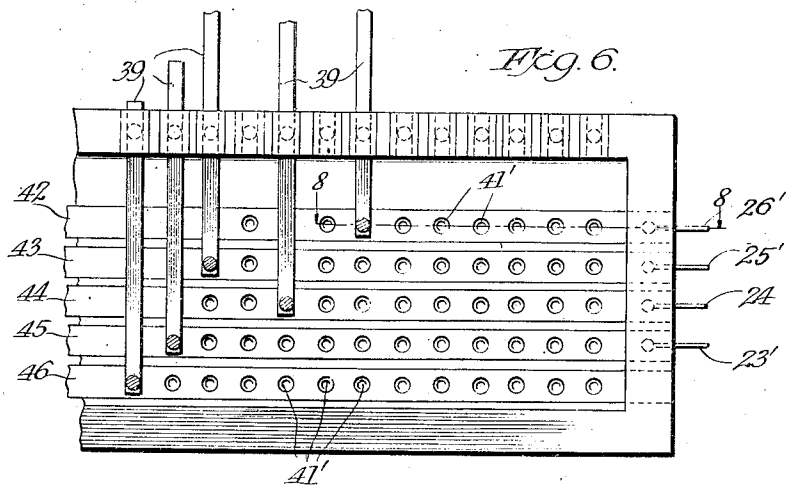



Fig. 7.

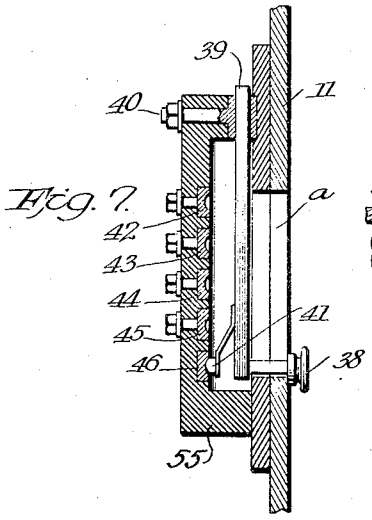



Fig. 8.

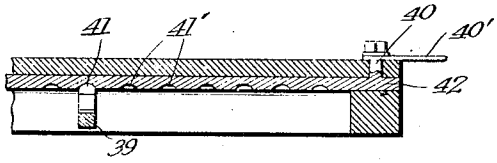
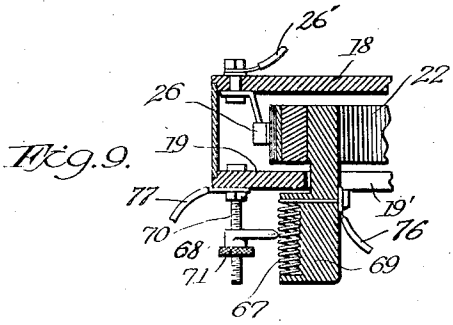



Fig. 9.




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AUTOMATIC SELECTOR FOR RADIO RECEIVING SETS AND LIKE DEVICES

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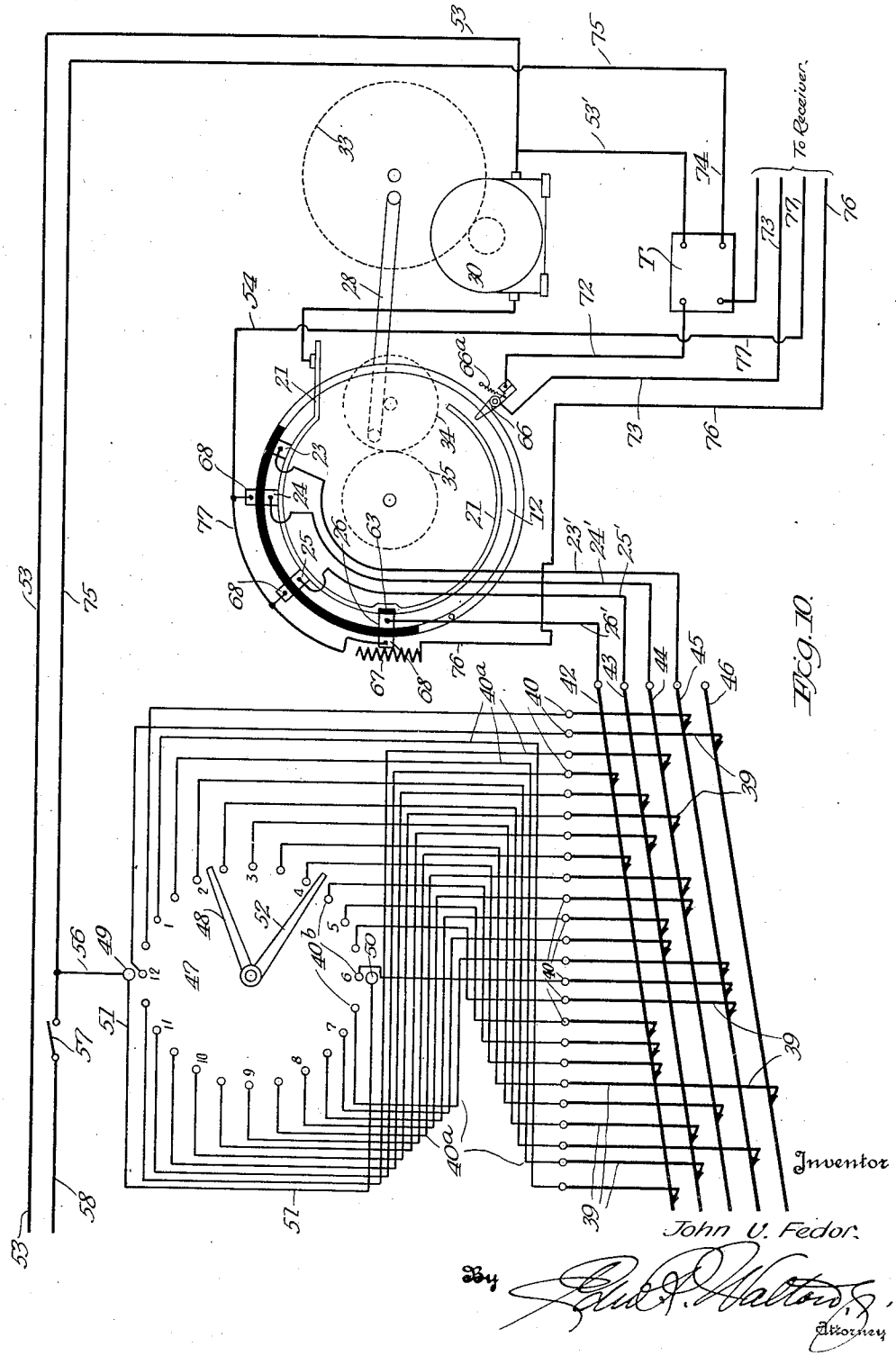



Fig. 10.

Patented Apr. 27, 1937

2,078,487

# UNITED STATES PATENT OFFICE

2,078,487

## AUTOMATIC SELECTOR FOR RADIO RECEIVING SETS AND LIKE DEVICES

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Application August 27, 1929, Serial No. 388,713

19 Claims. (Cl. 250—20)

It is known that radio receiving sets now commonly and generally used are provided with a number of manual controlled dials or similar operating devices which must be adjusted to nicety for tuning the set to receive a radio wave or signal of any given station, and that considerable skill in the tuning operation of these manually movable devices is necessary in order to secure the best results.

It has lately been proposed, however, to perform this tuning operation for few pre-selected stations by the so-called "casual" operation of a number of auxiliary manually operable elements, each for a previously selected station, thereby not requiring of the operator the skill ordinarily necessary in the operation of the tuning devices. Also, in other instances, it has been proposed to open and close a circuit of the radio receiving set at predetermined times so as to render the set inoperative or operative. It has never been proposed, so far as the applicant is aware, to provide a radio receiving set such as is capable of producing time controlled automatic station selection.

The present invention is broadly a time-controlled automatic station selector or tuning mechanism for radio receiving sets, and has for its principal object such a mechanism whereby one or a plurality of predetermined stations may be selected for successive tuning in at present or future determined times and for desired durations of time, whereby said selective tuning will be automatically accomplished by a time controlled mechanism.

By tuning or tuning means is meant the operation of a device or devices for effecting the condition of an electric circuit or circuits of a radio receiving set usually, at the present time, by relative movement of associated active parts of a condenser or reactance as in a variable condenser, or the associated active parts of an inductance such as a variometer, whereby the set will emit in audible fashion the signals or broadcasting of a broadcasting station; and it is this successive tuning in of pre-selected stations at pre-selected times, and the discontinuance of other stations, which the present device accomplishes automatically, without further attention on the part of the operator, after having been adjusted and set as desired.

Moreover, the present invention employs mechanism which does not require skill, careful manipulation, fine adjustments or any particular knowledge of tuning in operations of radio for desired stations, as the tuning of stations can be performed in a casual manner and all that is required of the operator is to know the stations desired and the time the particular station or stations is desired to be heard (either present or future). If the operator is not particular as to the station it desires or the time, a manipulation of the device can be made at random.

The invention also provides that if the aforesaid automatic selection control is not desired, it may be rendered inoperative and the tuning of the radio set can be rendered entirely manual as is common practice today.

By the employment of the present invention, any radio set may be adjusted to bring in successively at predetermined times and for desired duration of times, a number of pre-selected stations by the mere casual operation or adjustment of a plurality of setting elements, these setting elements being in the form of slidable knobs, push-buttons, levers, keys or other equivalent operating devices; and after this adjustment has been effected, no further attention or adjustment is required in order to produce a continuous entertainment through a period of twelve hours or more according to the adjustments which have been made.

It is the aim of the present invention to accomplish the functions and results above enumerated with a mechanism adaptable to all radio receiving sets and which may be used, if desired, as a remote control device.

The above and other objects and purposes of the invention, more or less specific than those above referred to, will be in part obvious and in part pointed out in the description of the elements, combination and arrangement of parts and the application of principles constituting the invention, and the scope of the protection contemplated will be indicated in the appended claims.

As one example of a mechanism or device for carrying out the invention, the accompanying drawings illustrate a specific embodiment of the invention, which, up to the present time, is the preferred embodiment devised, and while this embodiment is illustrated merely by way of example, the invention will be best understood by reference to the drawings and a reading of the following description.

In said drawings:

Fig. 1 is a front elevation of one type of radio receiver cabinet equipped with the present invention;

Fig. 2 is a plan view of the cabinet shown in Fig. 1 with the top removed showing the radio

receiving set within the cabinet in diagrammatic form and illustrating the operating mechanism of the invention;

Fig. 3 is a vertical sectional view taken substantially on line 3—3 of Fig. 2;

Fig. 4 is a vertical sectional view taken substantially on line 4—4 of Fig. 3;

Fig. 5 is a side view of the station selector or finding member shown in Fig. 4;

Fig. 6 is a fragmentary front elevation of the time selector switch which is disposed in back of the front panel of the cabinet;

Fig. 7 is a vertical sectional view of the selector switch applied to the front panel;

Fig. 8 is a sectional plan view taken substantially on line 8—8 of Fig. 6;

Fig. 9 is a fragmentary plan view taken substantially on line 9—9 of Fig. 5 and illustrating in detail the adjustable rheostat connection of volume input for pre-selected stations; and

Fig. 10 is a diagrammatic layout of the electrical circuits employed in the present invention.

Throughout the specification and drawings like parts of the mechanism will be referred to by similar and like characters. With particular reference to the drawings, 10 denotes a radio receiving cabinet or casing having the usual front panel 11 with an opening 12a therein through which the station selector member or tuning dial 12 is exposed and further equipped with the usual dial 13 for operating the rheostat or volume control. The panel may have other instrumentalities common and usual for manually regulating and governing the tuning of the set. Within the cabinet or casing and behind the panel 11 is disposed the radio receiving set indicated by the numerals 14, 15 and 16, the latter being variable condensers of the tuning mechanism and are connected in the receiving circuit, according to any desired hook-up of circuits, and are usually employed with corresponding inductances so that the set may be tuned at any desired wave length. Electrical energy for operating the radio set may be from any source, such as a battery, house circuit and so forth.

The condensers 16 are usually mounted on a rotatable shaft 17 and operatively connected with the detector or tuning dial 12, by which latter the set may be tuned to bring in desired stations by manipulating the dial 12. The mechanism thus generally described, or its equivalent, will be found in practically all radio receiving sets.

The time-controlled automatic station selector mechanism of the present invention, which will, after being set or adjusted by the operator, automatically tune the receiving set to bring in one or a plurality of pre-selected stations at desired different times and for the desired duration of time, will now be described.

The automatic station selector or finder element in the present disclosure is a modified construction of the present dial 12. However, if desired, this selector element may be separate and independent of the usual manually manipulated selector or tuning dial 12 by having suitable operative connection with the tuning elements 16. As at present illustrated, the automatic selector 12 comprises a hollow disc axially mounted for rotation on the condenser shaft 17 and includes two side members 18 and 19, one of which is fast on the condenser shaft 17 and the other having an enlarged axial opening therein for the purpose of permitting the entrance of circuit leads thereinto. The two discs 18 and 19 are connected together in spaced relation by a circumferential ring or band 20, or in any other suitable or conventional manner. The rim 20 may bear upon its outer surface, the scale or graduations indicating wave lengths, as is known in the art, and which appears through the opening 12a in the front panel 11 to cooperate with the index point 12b for obtaining the proper setting.

Disposed within the selector element 12 and between the spaced discs 18 and 19 thereof is a stationary contact bar or conductor 21 preferably concentric with the selector element 12 to be engaged by the sliding contacts 23, 24, 25 and 26 carried by the rotary selector 12 and sliding adjustable in a slot 72 in the disc 18. This contact bar 21 may be rigidly supported in position by any suitable means, such for instance as the annular ring 22 having a bracket supporting arm 27 secured to the base of the cabinet or to any other fixed part of the apparatus.

Since it is now common practice to employ condensers which rotate only at 180 degrees, mechanism has been provided to similarly rotate or oscillate the selector 12, and to this end a pitman rod 28 is employed to oscillate the selector 12. The pitman rod 28 is actuated by a motor 30 through a throw-off clutch 31 and reducing gears 32 and 33 and has one end connected to the gear 33 and its other end connected to a gear 34 which meshes the gear 35 fast upon the shaft 17 supporting the selector 12. The gears 32, 33 and 34 may be supported in any suitable manner, such as by bracket arms 36 and 37. Any other means for oscillating the selector 12 may be employed. In instances where it may be found desirable or advantageous to use condensers or tuning elements rotating or moving through 360 degrees, the selector 12 may be correspondingly rotated through an appropriate driving connection from the motor 30, and in which latter case the arm 27a of the bracket 27 may be offset or suitably modified to permit a full rotation of the selector. Thus it will be manifest that the motor 30 is energized, the selector will be oscillated through 180 degrees and that the contacts 23, 24, 25, and 26 will ride upon the contact bar 21.

The energy for plate and filament circuits of the radio set may be supplied by any suitable source of current as above stated, and may be taken from the conductor 53 passing through the transformer T, conductor 72 through the cut-off switch 66 to conductor 73 to the radio receiving set, returning by the conductor 74 to the transformer T and back through the conductor 75 to the conductor 58.

Now, the automatic movement of the station selector or finder 12 is controlled through the following mechanism, which consists of a plurality of selector keys 38, preferably extending through the panel 11 of the receiving set and which reciprocate in suitable slots in said panel.

As many keys and slots may be provided as there are periods of time at which it is desired to have the set function automatically. In the present disclosure, there are twenty-four keys and slots corresponding to twenty-four half hour periods on the clock. The first slot and each alternate slot, which are designated *a* correspond to the hours from 1 to 12 inclusive, as indicated by the scale 62 associated therewith; while the intermediate slots correspond to the half hour periods. Each key 38 controls a selective electrical switch which may be of any desired construction for accomplishing the results aimed at, but for the purposes of illustration, the switch consists of a

number of rods 39 slidably mounted in terminal members 40 and each having a spring contact 41 adapted to engage with buss bars 42, 43, 44, 45 and 46, the contacting extremity of the contact 41 being preferably rounded to engage in corresponding depressions 41' in the buss bars as shown clearly in Figs. 6, 7, and 8. These bus bars extend transversely with respect to the slots *a* and *b* and there may be as many buss bars and contacts 24, 25, and 26 as it is desired to have automatic selective operation of predetermined stations. The switch rod, buss bar and terminal members are arranged in an insulated casing 55 behind the panel 11.

In the present showing, five buss bars are shown, three of which, namely 42, 43, and 44, are for the automatic operation of pre-selected stations, when the user of the set desires to tune in upon them automatically, while the buss bar 45 is for automatically discontinuing the program on a selected station and the buss bar 46 is the neutral or starting position for the switches or keys, in which position the automatic mechanism of the device is inoperative, the bar 46 having no electric circuit connections.

Since there are twenty four manually operable keys 38, there are, consequently, twenty four switches 39 with corresponding terminals 40, each of which have electrical connection $40^a$ with twenty four contacts $40^b$ on the clock 47 (see Fig. 10) and each positioned with respect to the dial of the clock so that the hour hand 48 thereof will electrically engage successively the contact $40^b$ when in the hour and half hour positions thereof. The clock is also provided with contacts 49 and 50, which are electrically connected by the conductor 51 and positioned to be engaged by the minute hand 52 of the clock on the hour and half hour positions thereof respectively.

The motor 30 as well as the time controlled automatic device is supplied with electrical energy from any suitable source, not shown, through a circuit which may be traced as follows:

From conductor 53 through conductor 53' to motor 30; conductor 54 to contact bar 21 through a selective contact member 23, 24, 25 or 26 and their corresponding conductor leads 23', 24', 25' and 26' to buss bars 42, 43, 44 or 45, through the appropriate switch 39 and terminal 40 and its respective conductor $40^a$ to the contacts $40^b$, clock hands 48 and 52 to either contact 49 and 50; conductor 56, switch 57 and return conductor 58.

It thus will be seen that the operation of the time controlled automatic selector is as follows:

After the contacts 24, 25 and 26 have been adjusted in the slot 59 to the position on the station selector or finder 12 for selecting the desired stations selected for automatic tuning in, and the nuts 60 tightened to render the contacts stationary on the selector 12, and after the stop contact 23 has been properly positioned out of the range of the detecting field of the selector 12, then, by suitable adjustment of the keys 38 with respect to the station scale 61 and the time scale 62, the pre-selected station may be automatically tuned in or cut off at the times set when the switch 57 is closed.

Now assuming that it is desired to tune in on station WRC at one o'clock, to cut off station WRC at one thirty o'clock, then tune in on station WJZ at one thirty o'clock and that at two o'clock to cut off WJZ and permit the receiving set to remain silent until two thirty o'clock when it is desired to have WJZ continuous; but at three o'clock it is desired to tune in on station KGY, which program you desire until four o'clock. In such a desired situation, the first six keys 38 in slots *a* and *b* and corresponding to the time above mentioned, will be moved from neutral position to the position shown in Fig. 1 and the circuits shown in Fig. 10 may be traced. When the clock hands 48 and 52 are in one o'clock position, the circuit will be completed through conductor 53, motor 30, conductor 54, contact bar 21, contact 26, conductor 26', buss bar 42, selector switch 39 through its respective conductor $40^a$ to the corresponding clock contacts $40^b$ and 49, through conductor 56, switch 57 and conductor 58, in which case the motor will be energized and actuate the selector 12 until the contact 26 has been brought opposite the cut-off or insulated point 63 in the contact bar 21, at which time the circuit through the motor will be interrupted or broken and the motor will discontinue operation leaving the selector 12 at the pre-selected position. The movement of the selector 12 will correspondingly adjust or move the condensers 16 so as to tune in station WRC, the cut-out or insulated point 63 being positioned to correspond with the position of the index pointer $12^b$ in the movement of the tuning instrumentalities. It is obvious, of course, that if the selector was already in the position just described at the time the one o'clock key 38 was adjusted for station WRC, there would be no operation of the motor because the selector would be in tuned-in position on WRC as soon as the switch 57 of the time controlling circuits is closed.

Now, assuming that the hands of the clock 47 have moved to one thirty o'clock position and engage their respective contacts $40^b$ and 50, the circuit will be established from conductor 53 through the motor, the contact bar 21, contact 25 and its respective lead 25'; buss bar 43, selector switch 39 through the clock to the conductor 58, whereupon a similar operation of the selector 12 will take place bringing the contact 25 opposite the cut-out 63, at which time the motor ceases operation and leaves the selector and the condensers in tuned position to pick up station WJZ.

Now assuming that when the hands of the clock have moved to two o'clock position, the circuit from the motor can be traced through the stop contact 23, stop buss bar 45 through the corresponding clock contacts $40^b$ and 49 to the conductor 58, causing a similar operation moving the selector 12 and condensers 16 beyond the field of radio selection of the set. This movement of the selector 12 will bring the abutment 65 to engage the throw-off switch 66 to open the radio receiving circuit, thereby rendering the radio receiving set dead and inoperative, the abutment 65 remaining in contact with the switch until the next operation of the selector, either by the motor 40 or manually through the opening $12^a$ in the panel 11. Thus, the radio receiver will remain silent until two thirty o'clock when, in accordance with the setting of its key 38, the motor circuit is closed and the selector actuated to again tune in station WJZ. At three o'clock, in accordance with the adjustment of its key 38 as shown in Figs. 1 and 10, the current will be closed from the motor through the contact bar 21, slidable contact 24 and buss bar 44, selector switch 39 through the clock to the conductor 58, thus establishing a circuit through the motor causing operation of the selector 12 to bring the contact 24 opposite the cut-out point 63 to ad-

justed position, whereby the condensers have been moved to tune in station KGY.

When the hands of the clock 47 assume the three thirty o'clock position, the corresponding key 38 being in neutral position, no circuit will be established through the motor, and consequently, no adjustment of the selector and condensers, hence the program will continue from station KGY until four o'clock, when, according to the adjustment shown, station WRC will again be tuned in. The positions of the remaining keys shown in Fig. 1 will automatically effect the tuning in and cutting off of the stations indicated. To effect a continuous program from any one station, the keys can be adjusted in alignment for that station, or succeeding keys can be set at neutral. The neutral position is also desirable to effect an entire electrical cut-off of the respective selector switches 39.

It is found desirable in many instances to have a permanently adjusted volume control which will be automatically brought into operation for supplying sufficient current to bring in the respective automatically controlled pre-selected stations, and to this end a stationary resistance 67 is interposed in a circuit of the radio receiver which may be traced through conductor 76, resistance 67, contacts 68 and conductor 77. Contacts 68 (see Figs. 9 and 10) are to engage the resistance 67 and are adjustable with respect to the resistance so that the required volume of current can be obtained for each of the automatically controlled pre-selected stations. In Fig. 9 one form of the resistance is shown, which consists of a stationary coil supported by an arm 69 projecting from the contact bar support 22 through the opening 19' in the side wall 19 of the selector so as to lie outside of the selector, each contact 68 being threaded on a rod 70 extending parallel to the resistance 67 in order that the contact 68 may be adjusted longitudinally of the resistance. A thumb lock nut 71 is provided on the threaded rod 70 for locking the contact 68 in position. The rods 70 are slidably adjustable in an arcuate slot 78 in the side wall 19 of the selector 12 for the purpose of permitting the contacts 68 to be positioned to engage with the resistance 67 when their respective contact members 24, 25 and 26 lie opposite the cut-out portion 63 in the contact bar 55, in which position the pre-selected stations have been tuned in.

These contacts 68 are more or less permanently set when the radio receiver is installed for a particular user so that the conditions under which the receiver will be used may be taken into consideration for obtaining the best results when the adjustment is made. The circuit of the resistance 67 may be connected to the usual manual volume control so that the current input may be supplemented by the manual volume control to increase or diminish the input according to existing temporary conditions, or the circuit may be independent of the usual manual volume control, or regulated in any other manner.

Obviously, when it is desired to render the motor 30 inoperative, the switch 57 may be opened but when it is desired to render the motor ineffective so that the selector 12 may be manually operated through the opening 12a in the panel 11, the throw-off clutch 31 is actuated. This clutch consists of a shiftable collar or clutch member 31 keyed on a shaft 80 upon which the gear 32 is mounted. A spring 81 normally urges the clutch member 31 into engagement with the clutch member 82 fast on the shaft 80. The clutch members are here shown as having opposed interengaging ratchet tooth surfaces but may be of any other desired construction.

The clutch member 31 may be disengaged from the clutch member 82 by a bell-crank lever 83 pivoted at 84 to any suitable stationary part of the apparatus and having its other end connected to a push-rod 85 extending through the panel 11 of the cabinet and provided with a suitable knob or handle member 86. The bell-crank lever 83 is so positioned that when the handle member 86 is pulled outwardly, the fulcrum points are past dead center which maintains the clutch member 31 in disengaging position. By merely pushing the handle member 86 inwardly, the spring 81 will return the clutch member 79 to engaging position with the clutch member 82.

Thus it will be seen that when the clutch members are in disengaged position, the selector dial 12 may be manually operated to bring in any of the stations within the selective field of the set. While the clutch member above described and the operating handle 86 have been shown for the purpose mentioned, it is within the scope of the invention to provide any other suitable throw-off means for accomplishing the same result.

The input conductors to the machine can be further controlled by a switch 57 which will silence the entire receiving set and render it inoperative.

In some refinements of the invention the knobs or keys 38 may not be on the panel 10 but may be an auxiliary means, particularly when it is desired to have remote control of the device. However, in order to present the invention in its simplest terms, such auxiliary devices are not shown.

In this specification and the annexed drawings, the invention is disclosed in the form in which it is considered to be the best, but the invention is not limited to such form because it is capable of being embodied in other forms; and it is to be understood that in and by the claims following the description herein it is intended to cover the invention in whatever form it may embody within the scope hereof.

The terms dial, selector, station setter and station selector all refer to the element 12 and associated parts, and the term selector has been more generally used for the purposes of clarity. The motor 11 may be any suitable source of motive power and the term motor as used in the claims comprehends any prime mover which can be used in the combination therein defined. Likewise the term "selector" or element 12 may be any element which performs the function thereof whether rotary, reciprocal or otherwise, as the showing in the drawings is merely by way of example.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. In a radio receiving set, the combination of a movable tuning means, a motor for actuating said tuning means, an electric circuit for causing the motor to operate, a station selector element actuated by the motor synchronously with the said tuning means and having contacts thereon and movable therewith included in said circuit, a time-control means in said circuit for rendering said motor effective for actuating said tuning means, and means in said circuit and with which said contacts cooperate to close said circuit and having an electrical gap therein over which one of said contacts may pass to break the

circuit closed by the time-control means, for arresting the operation of the tuning means at predetermined points in its movement, whereby preselected stations are tuned in and out.

2. The combination with a radio receiving set having a movable tuning means, of a chronometer, a key board, a plurality of operable keys each having electrical connection with said chronometer for a predetermined time position and manually shiftable on said keyboard to predetermined station wave length positions to close a circuit, an oscillatory station selector movable with the tuning means of the radio set to predetermined wave length positions, adjustable electrical contacts on said oscillatory selector, one for each selected wave length position, a conductor with which said contacts engage while out of tuned position, means for actuating said selector and tuning means, and electric circuits connecting said chronometer, actuating means, said contacts and said conductor of said selector and the wave length and time positions of said keys of said keyboard, whereby selected predetermined stations may be automatically tuned in at a pre-selected time and for desired duration of time.

3. In combination with a radio receiving set, including its tuning means, an automatically actuated selecting mechanism for actuating the tuning means to predetermined wave length positions, whereby pre-selected stations may be tuned in, said selecting mechanism including a stationary circular conductor, a plurality of adjustable contacts carried on a rotatable member of said selecting means, and maintaining said contacts in engagement with said circular conductor, a selective time control means, and electrical circuit connections between said control means and said selecting mechanism including said contacts and conductor thereof for causing a selective operation of said selecting mechanism at a plurality of different times for a selected predetermined station.

4. In combination with a radio receiving set, including its tuning means, an automatically actuated selecting mechanism for actuating the tuning means to predetermined wave length position, whereby pre-selected stations may be tuned in, said selecting mechanism including a stationary circular conductor, a plurality of adjustable contacts carried on a rotatable member of said selecting means, and maintaining said contacts in engagement with said circular conductor, a manually selective time control means, and electrical circuit connections between said control means and said selecting mechanism including said contacts and conductor thereof for causing a selective operation of said selecting mechanism at a plurality of different times for a selected predetermined station, and a stop means selectively controlled by said time control means for rendering the radio receiving set silent until the next selective time controlled operation of said selecting mechanism whereby said selecting mechanism may be automatically actuated at selected times for selected durations of time, according to the setting of said time control means.

5. In combination with a radio receiving set including its tuning means, of an automatic selecting mechanism for actuating said tuning means to a predetermined wave length position, whereby a pre-selected station may be tuned in, a selective time control means for causing said selective operation of said selecting mechanism at a selected time, whereby said selecting mechanism may be automatically actuated at selected times according to the setting of said time control means, a plurality of pre-adjusted volume control contacts carried by the selecting mechanism, one for each predetermined wave length position of said selecting mechanism, and a resistance element with which said contacts respectively engage when in a selected wave length position, said resistance being in circuit with the receiving set.

6. In combination with a radio receiving set including its tuning means, of an automatically actuated mechanism for actuating said tuning means to a plurality of predetermined wave length positions, whereby pre-selected stations may be tuned in, selective time control mechanism, selecting circuits between said time control mechanism and actuating mechanism, and one for each predetermined wave length position, a switch means operated by said actuating mechanism including an adjustable element movable to a plurality of positions for opening and closing said circuits for causing selective operation of said actuating mechanism to a desired wave length position, whereby said actuating mechanism may be automatically operated at selected times according to the setting of said time control means, and a pre-adjusted volume control for each predetermined wave length position, said volume control including a stationary resistance and a plurality of contacts on said movable switch for cooperating with said resistance, each of said contacts being adjustable to a desired volume position for its respective pre-determined wave length, a circuit from the receiver in which said resistance is disposed, said volume control being automatically actuated by said selecting mechanism to the predetermined wave length positions thereof.

7. In a radio receiving set, the combination with the movable tuning means thereof, of a movable member and a relatively stationary member, the movable member being movable synchronously with said tuning means, a motor for actuating said tuning means and movable member, electrical connections including a plurality of contacts on the movable member and shiftable to positions corresponding to desired station positions of the tuning means, said electrical connections having an electrical break providing the index point of station position of said tuning means, time-control mechanism including a chronometer and a manually operable time selective switch, a plurality of circuits between said switch and said chronometer to be opened and closed by said switch and the time indicating means of said chronometer, said circuits leading to said motor and through said contacts on said movable member, each of said contacts having a separate electrical connection with said switch in certain selected positions of said switch, whereby the motor circuit may be closed by the chronometer at a selected time and said tuning means actuated until the selected circuit is opened at the break point in said conductor, thus the operation of said motor is discontinued and a pre-selected station is tuned in.

8. In a radio receiving set, the combination with the movable tuning means thereof, of a movable member and a relatively stationary member, the movable member being movable synchronously with said tuning means, a motor for actuating said tuning means and movable member, an electrical connecting means carried by said members including a plurality of contacts on the movable member and shiftable to positions corresponding

to desired station positions of the tuning means, said electric connecting means having an electrical break therein providing the index point of station position of the tuning means, time control mechanism including a chronometer and a plurality of manually operable keys each for a selected time on the chronometer and movable to a plurality of positions for pre-determined stations for which said contacts may be adjusted, circuits between said keys and said chronometer to be opened and closed by said keys and the time indicating means of said chronometer, said circuits leading to said motor and through said contacts, each of which having independent electrical connection to one of the station positions of said keys for electrical contact therewith when a key is in such position, whereby the motor circuit may be closed by the chronometer at a selected time and the tuning means actuated until the selected circuit is opened at said break point, thus the operation of the motor is discontinued and a selected pre-determined station is tuned in.

9. In a radio receiving set, the combination with the movable tuning means thereof, of a member movable synchronously with said tuning means, a motor for actuating said tuning means and member, a plurality of contacts on said member shiftable to selected positions thereon, an electrical conductor positioned to electrically engage said contacts during the movement of said member and having an electrical break point therein, time-control mechanism including a chronometer and a plurality of manually operable keys each for a selected time on the chronometer and movable to a plurality of positions for pre-determined stations for which said contacts may be adjusted, circuits between said keys and said chronometer to be opened and closed by said keys and the time indicating means of said chronometer, said circuits leading to said motor and through said conductor and contacts on said movable member, each of said contacts having independent electrical connection to one of the station positions of said keys, respectively, for electrical contact therewith when a key is in such position, whereby the motor circuit may be closed by the chronometer at a selected time and said tuning means actuated until the selected circuit is opened at the break point in said conductor, thus the operation of said motor is discontinued and a pre-selected station is tuned in.

10. In a radio receiving set as set forth in claim 7, the same being further characterized by a stop contact in the electrical connections and in circuit with said chronometer, motor and selective switch, whereby the tuning means may be automatically moved to a non-tuning position until the next selective time control operation.

11. In a radio receiving set as set forth in claim 7, the same being further characterized by a stop contact in the electrical connections and in circuit with said chronometer, motor and selective switch, whereby the tuning means may be automatically moved to a non-tuning position until the next selective time control operation, an input circuit to the receiving set, a switch normally urged to closed position in said circuit and actuated by the movement of said movable member, when the stop circuit has been energized, to open said switch while said movable member is in stopped position.

12. In a radio receiving set as set forth in claim 7, the same being further characterized by a stop contact in the electrical connections and in circuit with said chronometer, motor and selective switch, whereby the tuning means may be automatically moved to a non-tuning position until the next selective time control operation, and means operable externally of the set for rendering said automatic operation of said movable member ineffective for permitting manual actuation of said tuning means.

13. In a radio receiving set as set forth in claim 7, further characterized by a pre-adjusted volume control for each pre-determined station position, said volume control including a resistance and a plurality of contacts therefor each of which being adjustable to a desired volume position for its respective predetermined station position, a circuit from the receiver in which said resistance is disposed, said volume control being automatically actuated by said movable member at the pre-determined station positions thereof.

14. In a radio receiving set, the combination with the movable tuning means of the set, of a movable station selector having operable connection with said tuning means to rotate synchronously therewith, said station selector being rotatably mounted and having connected spaced side walls, a stationary conductor disposed between said side walls and having a circuit interruption point in the length thereof, contact members adjustable on said station selector and having slidable electrical contact with said conductor in their movement with said selector, a motor having an operative connection for actuating said tuning means and said station selector, a selective switch, electrical connections between each of said contacts on said station setter and said selective switch, a chronometer having a plurality of electrical contacts to be engaged by a time indicator thereof and having electrical connections with said selective switch, an electrical connection between other contacts on the chronometer engageable by another time indicating means thereof, said motor and said stationary conductor to form a circuit.

15. In a radio receiving set, the combination with the movable tuning means of the set, of a movable station setter having operable connection with said tuning means to rotate synchronously therewith, said station setter being rotatably mounted and having connected spaced side walls, a stationary conductor disposed between said side walls and having a circuit interruption point in the length thereof, contact members adjustable on said station setter and having slidable electrical contact with said conductor in their movement with said setter, a motor having an operative connection for actuating said tuning means and said station setter, a selective switch comprising a plurality of parallel conductors and a plurality of keys shiftable transversely across said parallel conductors to selectively and electrically contact therewith, electrical connections between each of said conductors and said contacts on said station setter, a chronometer having a plurality of electrical contacts to be engaged by a time indicator thereof and having electrical connections with said keys respectively, an electrical connection between other contacts on the chronometer engageable by another time indicating means thereof, said motor and said stationary conductor to form a circuit.

16. In a radio receiving set as set forth in claim 14, further characterized by an input circuit to the receiving set, a switch normally closing said circuit and positioned to be opened in a certain rotated position of said selector member.

17. In a radio receiving set as set forth in claim 14, further characterized by a volume control cir-

cuit from the receiver, a permanently positioned resistance adjustment to said selector member and a plurality of resistance contact members adjustable on said selector member correspondingly with said first mentioned contact members thereon, said resistance contacts being independently adjustable to engage said resistance at different points thereof.

18. In combination with a radio receiving set including continuously variable tuning means, of mechanism for actuating said tuning means to a plurality of predetermined wave length positions, selective time control mechanism, selecting circuits between said time control mechanism and actuating mechanism, a switch means operated by said actuating mechanism movable to a plurality of positions for opening and closing said circuits for causing selective operation of said actuating mechanism to a desired wave length position, and a volume control including means for introducing into the circuit of said receiving set predetermined amounts of resistance responsive to the wave length position selected.

19. In combination with a radio receiving set including continuously variable tuning means, a mechanism for actuating said tuning means to a plurality of predetermined wave length positions, whereby pre-selected stations may be tuned in, selective time control mechanism, selecting circuits between said time control mechanism and actuating mechanism, and one for each predetermined wave length position, a switch means operated by said actuating mechanism including an element movable to a plurality of positions for opening and closing said circuits for causing selective operation of said actuating mechanism to a desired wave length position, whereby said actuating mechanism may be automatically operated at selected times according to the setting of said time control means, and volume control means operated by said actuating mechanism, said volume control including a resistance and a plurality of contacts for cooperating with said resistance, each of said contacts being adjustable to a desired volume position for each respective predetermined wave length, and a circuit for the receiver in which said resistance is disposed.

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