Aug. 22, 1950 A. A. MILLER 2,519,686

AUTOMATIC RADIO PROGRAM SELECTOR

Filed May 11, 1946 3 Sheets-Sheet 1

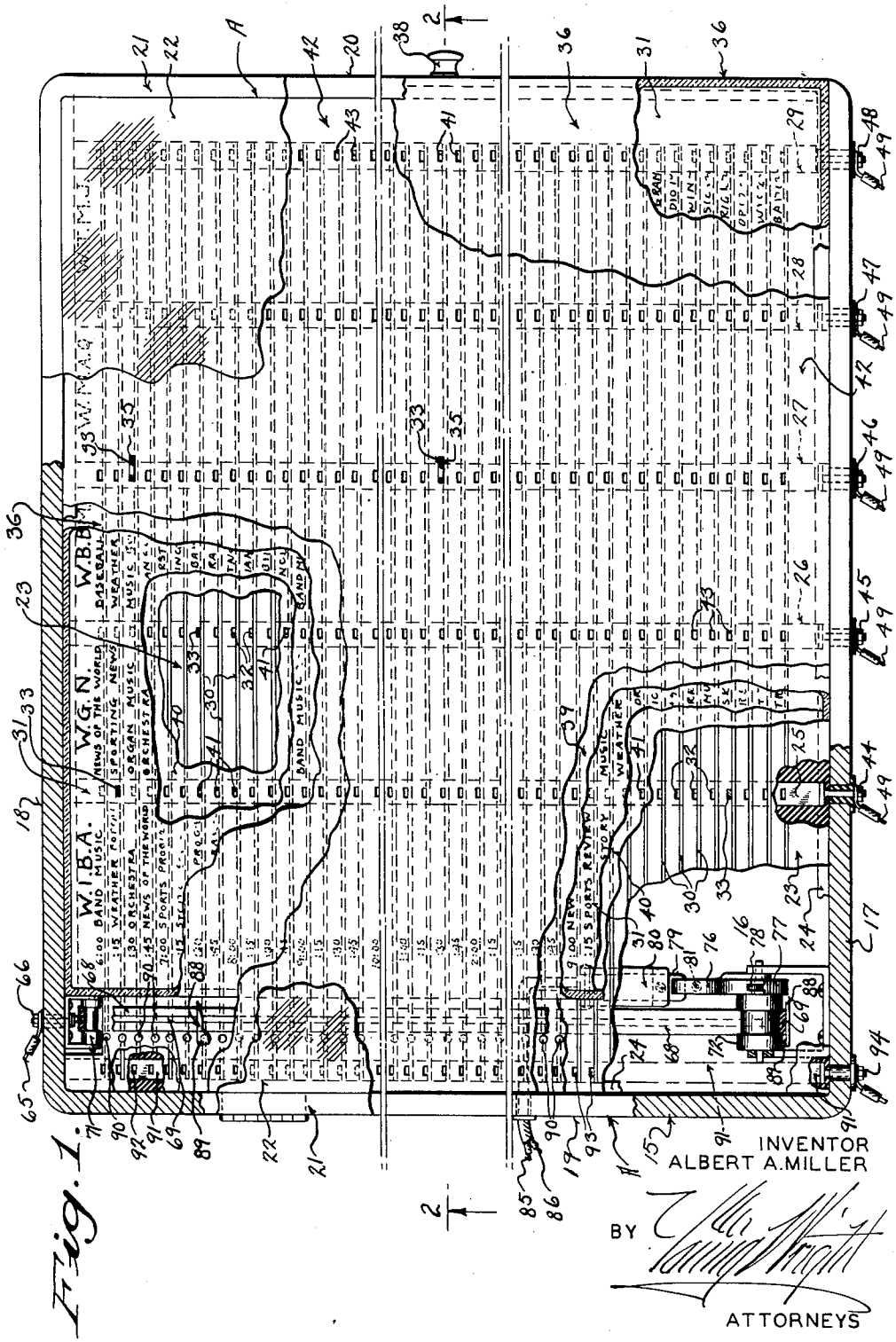


Fig. 1.

Aug. 22, 1950 A. A. MILLER 2,519,686

AUTOMATIC RADIO PROGRAM SELECTOR

Filed May 11, 1946 3 Sheets-Sheet 2

Fig. 2.

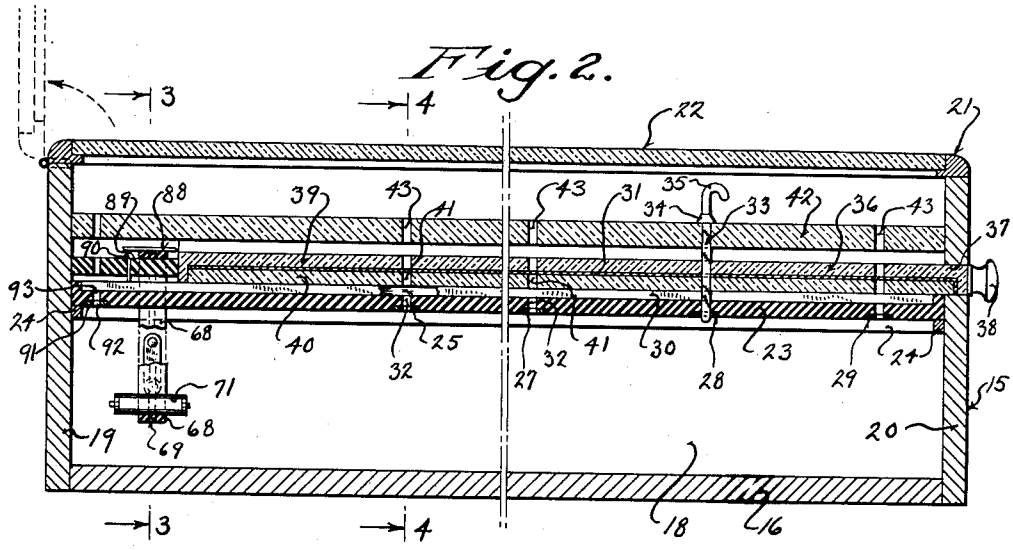


Fig. 3.

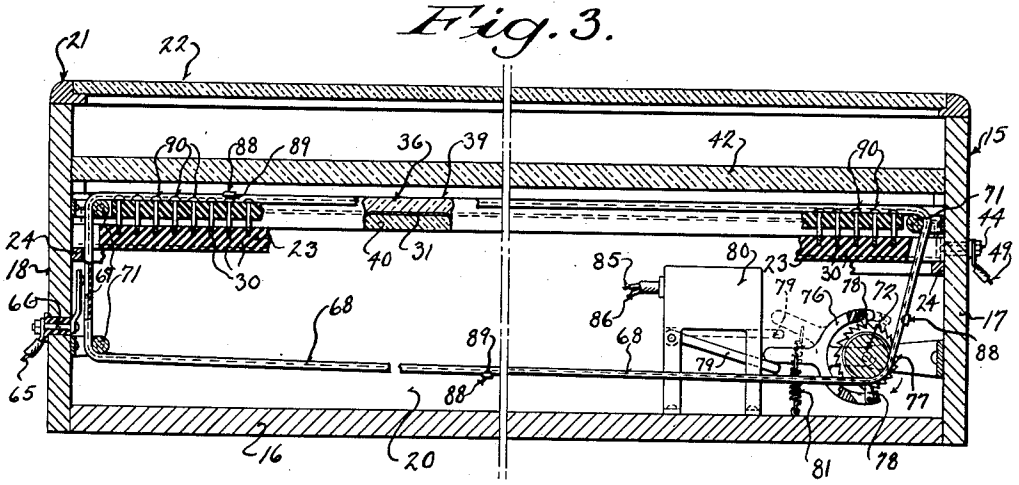


Fig. 5.

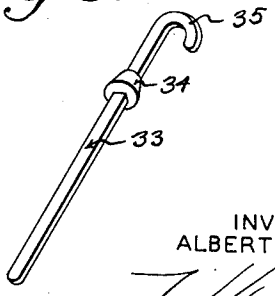
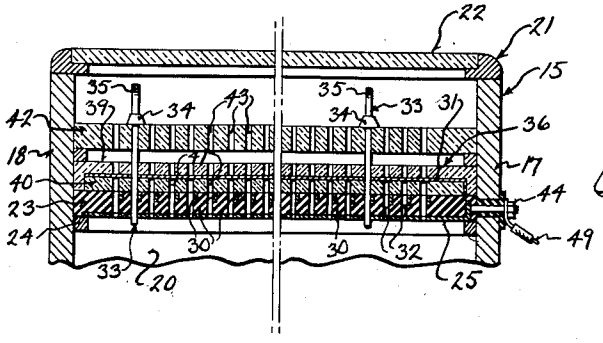


Fig. 4.



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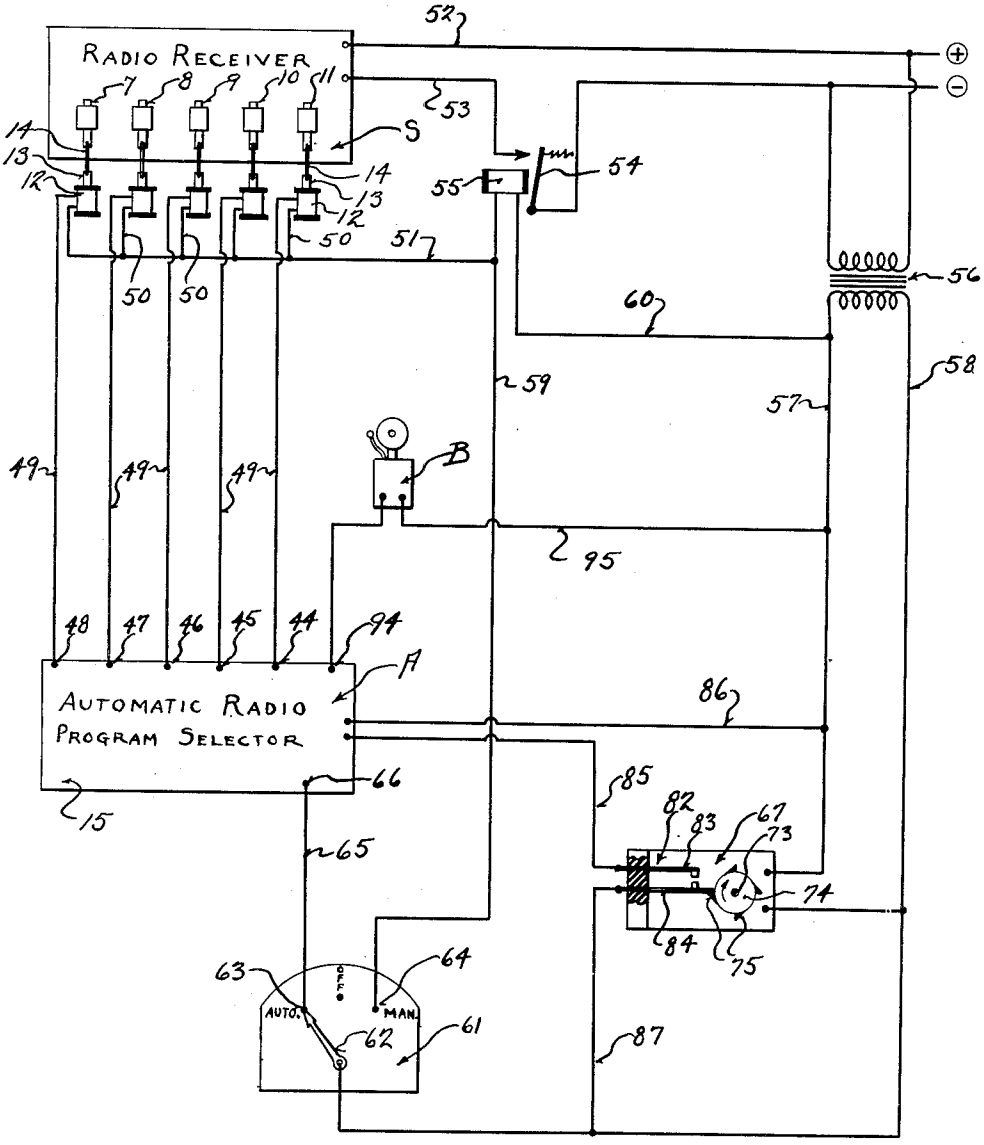
ATTORNEYS

Aug. 22, 1950 A. A. MILLER 2,519,686

AUTOMATIC RADIO PROGRAM SELECTOR

Filed May 11, 1946 3 Sheets-Sheet 3

Fig. 6.



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AUTOMATIC RADIO PROGRAM SELECTOR

Albert A. Miller, Madison, Wis.

Application May 11, 1946, Serial No. 669,194

2 Claims. (Cl. 161—1)

1

My invention appertains to radio receiving sets and more particularly to an automatic program selector for such receiving sets.

The main object of my invention is to provide means for detachably associating a daily radio program chart, as found printed in the newspapers, with the automatic radio programs selector, whereby to effectively aid the user of the radio receiving set in his selection of the desired programs for the day and to facilitate the "plugging in" of the desired stations and programs, so that the user of the set will not have to look up the stations or the times, either on the time or station indicator, unless so desired, by merely plugging directly into the favored programs on the chart, thereby eliminating waste of time, errors, confusion, etc.

One of the primary objects of my invention is to provide a novel attachment for radio receiving sets, whereby selected radio broadcasting stations can be automatically received and cut out at predetermined times and at the will of the user of the set.

Another salient object of my invention is to provide an automatic program selector for radio receiving sets in which the desired programs or stations can be selected by the user of the set for the entire day and at one time, so that the receiving set or attachment will need no attention from the user of the set for the rest of the day.

A further important object of my invention is to provide an automatic program selector for radio receiving sets which embodies spaced conductor strips for different periods of time during the day and spaced conductor strips for the various radio broadcasting stations, with means, under control of the user of the set, for electrically connecting the selected station strips with time strips at the desired time intervals, continuously operated means being provided for automatically cutting the correct time strips in the electric control circuits at the correct time of day.

A further important object of my invention is to provide means for arranging the time strips and the station selector strips in the attachment relative to printed radio programs, whereby, when such printed programs are correctly associated with the attachment, the user of the receiving set can quickly and readily "plug in" his selected broadcasting stations for the day.

A still further object of my invention is to provide means associated with the continuously operated time strip control mechanism for indicating to the user of the set the time of the day and the time strip which is in circuit.

2

A still further important object of my invention is to provide means whereby electric appliances and the like can be automatically cut in an electric circuit at any selected time interval during the day.

A still further object of my invention is to provide an automatic program selector attachment for radio receiving sets which will be durable and efficient in use, one that will be simple and easy to manufacture and one which can be readily operated by a layman with little or no knowledge of electrical apparatus.

With these and other objects in view, the invention consists in the novel construction, arrangement and formation of parts, as will be hereinafter more specifically described, claimed, and illustrated in the accompanying drawings, in which drawings:

Fig. 1 is a top plan view of my novel control unit for radio program selectors, various parts of the figure being shown broken away and in section to illustrate structural detail.

Fig. 2 is a longitudinal sectional view through the control unit taken on the line 2—2 of Fig. 1 looking in the direction of the arrows, the view showing the removable drawer or slide for receiving a printed radio program.

Fig. 3 is a transverse sectional view through the control unit taken on the line 3—3 of Fig. 2 looking in the direction of the arrows, illustrating the automatically and continuously operated belt for cutting in the correct conductor time strips at predetermined time intervals.

Fig. 4 is a transverse sectional view taken on the line 4—4 of Fig. 2 looking in the direction of the arrows.

Fig. 5 is a detail perspective view of one of the conductor plugs, the view being on a larger scale than Figs. 1 to 4 inclusive; and

Fig. 6 is a diagrammatic view illustrating the various circuits for the device.

Referring to the drawings in detail wherein similar reference characters designate corresponding parts throughout the several views, the letter A generally indicates my novel radio program selector for a radio receiving set S.

The radio receiving set S forms no part of the present invention, other than the means of electrically connecting the program selector with certain parts thereof as will be later set forth. The receiving set is of the push button selector type and these push buttons have been indicated by the reference characters 7, 8, 9, 10, and 11.

In order to automatically actuate these buttons, I provide a solenoid 12 for each button. Each solenoid includes a sliding core 13, which is operatively connected to the button by means of a connector link 14, or any other suitable mechanism. The solenoids are preferably placed in the cabinet of the receiving set S in back of the push buttons and when a selected solenoid is energized, its core will be drawn in and selected push button will be pulled into the set to bring about the selection of a certain radio broadcasting station.

My automatic radio program selector energizes a selected solenoid 12 at a certain selected time automatically and through means which will now be described. The program selector preferably includes a cabinet 15 which can be ornamented or finished to present a pleasing and attractive appearance to the purchasing public. As illustrated, the cabinet 15 includes a bottom wall 16, upstanding front and rear walls 17 and 18, and end walls 19 and 20. The top of the cabinet can be closed by a hinged cover 21 and this cover can carry a transparent panel 22, whereby the user of the set can look into the cabinet.

Arranged within the cabinet is a main partition plate 23. This partition plate is disposed in a horizontal plane and is preferably formed from insulating material. This partition plate 23 can be secured in place in the cabinet in any desired way, such as by the use of supporting strips 24 rigidly carried by the walls of the cabinet. Secured to the lower face of the plate 23 are spaced transversely extending conductor strips 25, 26, 27, 28 and 29. These strips correspond to the number of push buttons on the radio receiving set and, consequently, I have shown five of these conductor strips and the same will be hereinafter referred to as station conductor strips. Imbedded in the upper face of the plate 23 are a plurality of equidistantly spaced conductor strips 30 and these strips 30 are utilized in conjunction with a continuously operated time mechanism for bringing one strip at a time, at fifteen minute time intervals, into an electric circuit, as will be hereinafter referred to as time conductor strips. The time conductor strips 30 are arranged at right angles to the station conductor strips 25, 26, 27, 28 and 29 and these strips are carefully arranged and located relative to one another and to a certain type of printed radio program, which is printed daily in certain newspapers. Such printed radio program is indicated by the reference character 31 and it is to be noted that the programs to be broadcast by certain stations are arranged in vertical columns and that the time is arranged alongside of the programs being broadcast and that such time is arranged in fifteen minute intervals. Consequently, there is a time conductor strip for each fifteen minute interval of the day from 6:00 o'clock in the morning to midnight at night, but, obviously the selection of programs could continue on after midnight if such should be desirable, without departing from the spirit of this invention.

The plate 23 is provided with transverse rows of openings 32 therein and there is a row of openings for each broadcasting station and these openings extend through the station conductor strips and alongside of the time conductor strips 30. By inserting a plug 33, of electrical conducting material, in a selected opening in the rows of openings, a certain station conductor strip can be connected with a certain time conductor strip. Obviously there are a plurality of these conductor plugs and each plug can be provided with a shoulder 34 for limiting the downward inserting movement thereof in the plate. Each plug can be provided with a finger piece 35 to facilitate the handling thereof and the plugs can take the appearance of miniature canes so that the same will have a distinctive appearance.

Cooperating with the plate 23 is a slide or drawer 36 which carries the printed program sheet 31. The slide 36 is pulled out of the cabinet through a slot 37 formed in one end wall 20 and the same can be provided with a suitable manipulating handle 38. This slide is preferably constructed from a top section 39 and a bottom removable section 40 which fits within the upper section. The upper section is formed from transparent material and the printed radio program is clamped between the top and bottom sections and these sections can be held tight against one another against accidental displacement by clips, if so desired (not shown). This slide is provided with equidistantly spaced transverse rows of openings 41 which correspond exactly to the rows of openings 32 in the main partition plate 23 and when the drawer or slide is in its fully inserted position in the cabinet, the openings 41 register with the openings 32. Care is taken by the user of the set to see that the printed program is arranged neatly in the slide with the openings 41 in proper position between the radio broadcasting station indications and the vertical columns of the programs to be broadcast.

Arranged above the drawer or slide 36 is a second partition plate 42 and this plate is also formed of transparent material and is arranged in a horizontal plane in the cabinet. This transparent partition plate 42 is held against movement rigidly in the cabinet in any preferred manner and is also provided with a plurality of equidistantly spaced transverse rows of openings 43, and these openings correspond exactly to the openings 32 in the main partition plate 23 and register with such openings and with the openings 41 in the slide, when the slide is in its fully inserted position. This plate forms a protection for the slide 31 and for certain other parts located within the cabinet. The plugs 33, which are not being used, can be laid in the cabinet on top of this partition plate. Obviously these plugs are held against loss by the pivoted cover 21.

From the description so far, it can be seen that when a plug 33 is inserted in a selected opening of the rows of openings, the same will go through the top partition plate 42, the slide 31 and the main partition plate 23 and will puncture the printed radio program sheet. It is to be noted that the cabinet 15 has its front wall provided with a plurality of conductor terminals 44, 45, 46, 47 and 48. The terminals 44, 45, 46, 47 and 48 are electrically connected respectively to the station strips 25, 26, 27, 28 and 29. As heretobefore stated, there is a station conductor strip for each push button of the radio receiving set S and that there is a solenoid 12 for each button. One terminal of each solenoid 12 is electrically connected by means of a wire 49 with the corresponding station conductor strip in the cabinet and the other terminals of all of the solenoids are electrically connected, by

means of bridge wires 50, to a common conductor wire 51.

The radio receiver itself is provided with the usual lead and return wires 52 and 53 and these wires are adapted to be electrically connected with the house current or to any other suitable source of supply. It is to be noted, however, that the wire 53 has incorporated therein a switch 54, which is operated by an electro-magnet 55. It is preferred to have the current flowing to and from the automatic radio program selector A of a low voltage and, consequently, a transformer 56 can be employed. One coil of the transformer has its opposite terminals electrically connected respectively to the lead and return wires 52 and 53 and the other coil of the transformer has electrically connected to its terminals the wires 57 and 58. The magnet 55 is energized at certain times, as will be later set forth, and it is to be noted at this time that the opposite terminals of the magnet has electrically connected thereto wires 59 and 60. The wire 60 is electrically connected with the wire 57 and the wire 59 has electrically connected thereto the wire 51 leading from the solenoids 12.

In conjunction with the automatic radio program selector, I utilize a manually operated switch 61 and this switch can be connected with the cabinet 15, if such should be desired. The switch includes a throw lever 62 movable to either a contact 63 labeled "automatic," or to a contact 64 labeled "manual." The lever 62 can be moved to an intermediate position between the contacts 63 and 64 to a neutral "off" position. The wire 58, from the transformer, is electrically connected to the throw lever 62. The wire 59, from the magnet 55, is electrically connected to the contact 64 of the switch. The contact 63, from the switch, has electrically connected therewith a wire 65, which is electrically connected to a terminal 66 carried by the cabinet 15. This terminal is utilized for conducting the current into the cabinet and through a time conductor strip 30 at the proper time of the day. These conductor time strips 30 are brought into play, at the proper time, through the use of an electric clock or chronometer 67 and an endless conductor belt 68. The belt 68 preferably is made from a relatively wide strip of nonconducting material carrying an endless conductor strip 69. This endless conductor strip 69 wipes past the conductor terminal 66 and, consequently, the conductor strip 69 is in constant electrical engagement with the terminal 66. The belt 68 is trained over suitable idle guide rollers 71 and a feed or drive roller 72 which is actuated by a mechanism controlled by the electric chronometer 67. The belt 68 is located within the cabinet 15 and the electric clock can also be housed therein if so desired.

As the clock is of the type now found in the open market, the same will not be described in detail and has merely been shown diagrammatically in Fig. 6, but it is to be noted that the clock includes an hour hand shaft 73. This shaft has secured thereto, for rotation therewith, a ratchet wheel 74. The ratchet wheel includes four ratchet teeth 75 located at quarters around the wheel for a purpose which will be later set forth. It is to be noted that the clock has its terminals electrically connected with the wires 57 and 58 leading from the transformer and, hence, this clock is continuously operated at all times as long as current is supplied thereto.

The mechanism for advancing the belt in a step by step movement every fifteen minutes and to a new time strip 33 includes a ratchet lever 76 rockably mounted on the shaft of the feed roller 72, and this shaft, for the feed roller, has keyed or otherwise fastened thereto a ratchet wheel 77. The ratchet lever 76 carries spaced ratchet dogs 78 for operative engagement with the teeth of the ratchet wheel 77 so that when the ratchet lever is operated and swung a certain distance, the roller will be turned a certain distance and, consequently, the belt will be advanced a certain distance. The ratchet lever is operated by the pivoted armature 79 of an electro-magnet 80, and each time the magnet is energized, the armature 79 will operate the ratchet lever the desired distance and against the tension of a spring 81. The spring 81 functions to normally hold the ratchet lever down and in a position for actuation by the armature. Obviously the dogs 78 merely ratchet over the ratchet wheel 77 when the ratchet lever moves back to its normal inoperative position. The electro-magnet 80 is energized through a circuit controlled by a switch 82 and this switch 82 is automatically operated by the electric clock or chronometer 67. The switch 82 includes a relatively short stationary contact arm 83 and a relatively long contact arm 84. The contacts carried by the arms are normally separated by the inherent resiliency of the arm 84. This arm 84 is arranged in the path of the teeth 75 on the clock operated ratchet wheel 74 and, consequently, the arms 83 and 84 will be moved into electrical contact momentarily once every fifteen minutes. The arm 83 is electrically connected to a wire 85 which is electrically connected to one terminal of the magnet 80, and the other terminal of the magnet 80 has electrically connected thereto a conductor wire 86, which, in turn, leads to and is electrically connected with the wire 57 leading from the transformer. The long arm 84 of the circuit closure 82 is electrically connected with the wire 58 by a conductor 87.

The belt 68 cooperates with the time strips 30 and the belt carries one or more pointers 32. These pointers are formed of electrical conducting material and are in electrical contact with the conductor wire 69 carried by the belt. Each pointer 32 is provided with a wiper foot 89, which successively engages contact points 90. There is a contact point for each time strip and the contact points are arranged in a transverse column parallel with the station conductor strips 25, 26, 27, 28 and 29. Hence, it can be seen that there is an electrical communication between the terminal 66, the belt 68 and a time strip 30, and that when a conductor plug 33 is in position, such plug will establish communication between a station strip and a time strip.

In operation of my automatic radio program selector it can be seen that the control switch handle 62 is either positioned on the automatic contact 63, the manual contact 64, or in an "off" neutral position.

If it is desired to operate the radio receiver manually and in the ordinary way, the switch lever 62 is moved into contact with the terminal 64 and the current flow will be as follows: From the secondary coil of the transformer 56, through wire 58, through switch lever 62, contact point or terminal 64, through wire 59, through the electro-magnet 55, to wire 57, through the wire 60. This will energize the magnet 55 and the armature 54 will be attracted thereby and the switch controlled by the armature will be closed. Cur-

rent will then flow into the receiver through the wires 52 and 53 and the user of the set manipulates the same in the ordinary way, that is, by pushing in on the buttons for tuning.

If it is desired to operate the radio receiver automatically, then the switch lever 62 is moved into electrical contact with the terminal or contact point 63 and the automatic radio program selector is ready for operation.

The user of the set, of course, cuts or tears the radio program from the newspaper and places the same in correct position over the section 40 of the slide 36, after which the section 39 of the slide is placed over the section 40 into intimate tight engagement with the printed program and the edges of the program or paper are now trimmed off and the slide is reinserted in the cabinet 15. Care is taken by the user to have the columns of programs under the station headings in proper alignment between the station conductor strips and this can be located by the user by the openings in the slide. Care is also taken that the correct time for the programs is in alignment or parallel with the time strips and this is also located by the openings in the slide.

The user now takes a series of the plugs and selects the stations that he wishes to hear during the day and the time that he wishes to hear these stations. In Fig. 1 a few examples are shown and by referring to this figure it can be seen that the user has inserted a plug for 6:15 in the morning for station WIBA, a second plug 33 has been inserted for 6:30 in the morning for station WBBM.

A third plug has been inserted for 7:30 in the morning for station WGN. A fourth plug has been inserted for 10:30 in the morning for station WBBM. Obviously any number of stations for different periods of the day can be selected and actually a different program can be selected for every fifteen minutes of the day.

Considering that it is 7:30 in the morning, it can be seen (from Fig. 1) that a plug 33 has been inserted for that time for station WGN, then the current flow will be as follows: from the secondary coil of the transformer through wire 58, switch lever 62, contact point 63, wire 65, terminal 66, belt 68, to the contact point 90 for the time strip 30 for 7:30 in the morning. The current flows from this time strip 30 to the plug 33, through station strip 26, through terminal 45, and through the wire 49 attached thereto; through the solenoid 12 for push button 10, to wire 51, through electro-magnet 55 and back to wire 57 to the transformer, through the wire 60. The switch 54 will close the circuit to the radio receiver and the current flowing through the solenoid for the push button 10 will operate this push button and tune in station WGN. This station will remain on for the selected fifteen minute interval and if it is desired to maintain this station tuned in, then additional plugs should be inserted in the openings for that station.

As previously brought out, the electric chronometer 67 is continuously operated and, consequently, at every fifteen minute interval of time the belt will be advanced from one contact 90 to the next adjacent contact 90. This is accomplished through the ratchet lever 76, as previously described. Hence, it can be seen that after the radio has been tuned in, say for 7:30 in the morning for station WGN, and a fifteen minute interval has expired, then the contact and pointer 88 will ride off of the contact point 90 for the time strip 30 for 7:30 in the morning and will engage the next contact point 90 for the contact strip 30 for 7:45 in the morning. If no program has been selected for that time, then no current flow will take place through the program selector, in that there is no conductor plug 33 in position for that period or interval of time in the morning.

From the foregoing description it can be seen that I have provided an exceptionally simple mechanism for permitting the playing automatically of a radio receiver over an entire day period of programs preselected by the user of the receiving set.

My apparatus can also be successfully used for operating one or more electric appliances at different periods during the day and for the purpose of illustration, I have shown an electric bell B, which is adapted to be placed in circuit at a selected time or times. It is to be understood that the electric bell B is merely illustrative and that any electrical appliance could be substituted therefor. In order to bring about the operation of the appliance, I utilize an appliance conductor strip 91. This strip is parallel to the station strips and functions in the same manner as the station strips and is carried by the main partition plate 23. The time strips 30 extend over this appliance conductor strip 91 and the appliance strip is provided with a row of openings 92 which register with a row of openings 93 in the partition plate 23, and these openings are so arranged as to be directly alongside of the time conductor strips 30. A terminal 94 carried by the cabinet is in electrical communication with the appliance conductor strip 91 and this terminal has connected therewith an electric wire 95 which leads to the main wire 57. The bell B or other electrical appliance is incorporated in the length of this wire. If a conductor plug is inserted in the openings 93 and 92, for a certain time, when that time is reached the electric circuit through the bell will be closed and the bell will be operated. For example, say that a plug 33 is inserted in the openings 92 and 93 for the time conductor strip 30 at 6:00 in the morning. This plug would electrically engage the time strip 30 for that time in the morning and would electrically engage the appliance conductor strip 91 and, hence, the current flow would be as follows: From wire 58, through switch lever 62, wire 65, terminal 66, belt 68, contact pointer 89, contact 90 and the conductor time strip for 6:00 in the morning, through appliance conductor strip 91, through terminal 94, wire 95, through the bell and to wire 57.

Changes in details may be made without departing from the spirit or the scope of my invention, but what I claim as new is:

1. In a device for automatically tuning a radio receiving set, a control unit for closing and opening circuits at selected pre-determined times comprising a cabinet, a partition plate in said cabinet, a plurality of spaced conductor station strips arranged in parallel relation on said plate, a plurality of equi-distantly spaced time conductor strips carried by said plate and arranged at right angles to the conductor station strips and insulated therefrom, each of said time conductor strips representing a certain time interval during the day, said plate having a plurality of spaced parallel rows of openings extending therethrough, an opening being arranged substantially at the point of crossing of each time conductor strip with each station conductor strip, a movable con-

ductor, automatic means for successively bringing the conductor in electrical contact with the time strips at the proper time interval, a printed radio program detachably associated with said plate and located in certain predetermined relation relative to the time and station conductor strips and the openings in said plate, and conductor plugs insertable directly through the printed radio program and selectively insertable in said openings for electrically connecting selected station strips with selected time strips.

2. In a device for automatically tuning a radio receiving set, a control unit for closing and opening circuits at selected pre-determined times comprising a cabinet, a partition plate in said cabinet, a plurality of spaced conductor station strips arranged in parallel relation on said plate, a plurality of equi-distantly spaced time conductor strips carried by said plate and arranged at right angles to the conductor station strips and insulated therefrom, each of said time conductor strips representing a certain time interval during the day, said plate having a plurality of spaced parallel rows of openings extending therethrough, an opening being arranged substantially at the point of crossing of each time conductor strip with each station conductor strip, a movable conductor, automatic means for successively

bringing about the conductor in electrical contact with the time strips at the proper time interval, a sliding drawer mounted in said cabinet over said plate having rows of openings therein corresponding to the openings in the plate, a printed radio program detachably associated with said drawer arranged in pre-determined relation relative to said openings, and conductor plugs insertable directly through the printed program and into selected openings in the drawer and plate for electrically connecting selected station strips with selected time strips.

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