

May 1, 1951

P. G. COUPLAND ET AL

2,550,784

RADIO CLOCK

Filed March 25, 1947

3 Sheets-Sheet 1

FIG. 1.

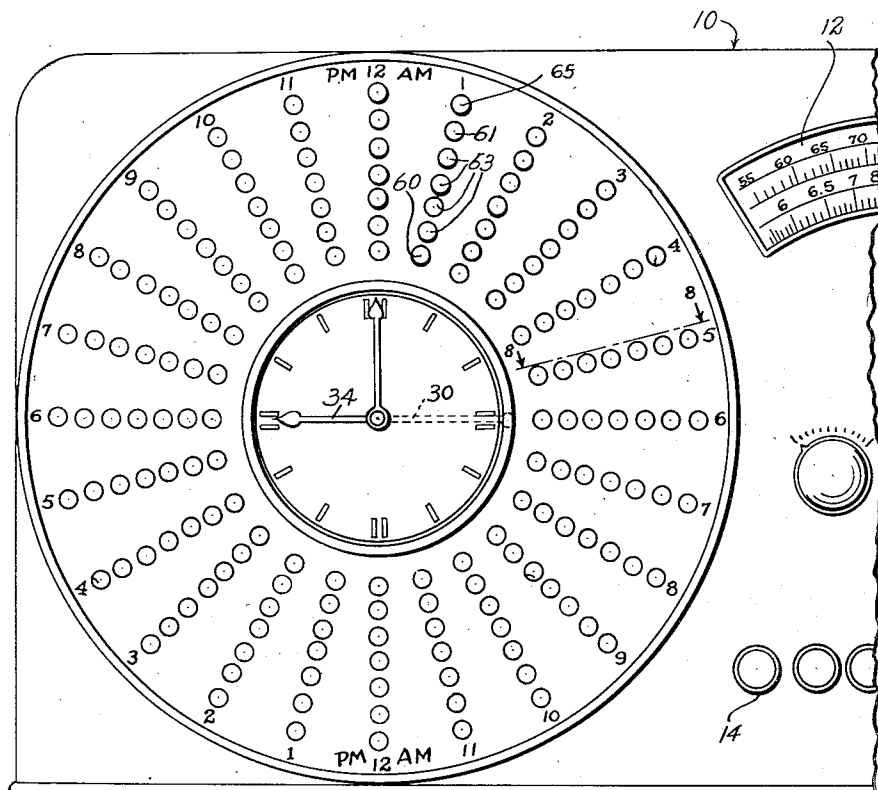
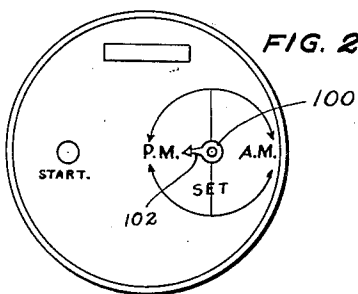


FIG. 2.



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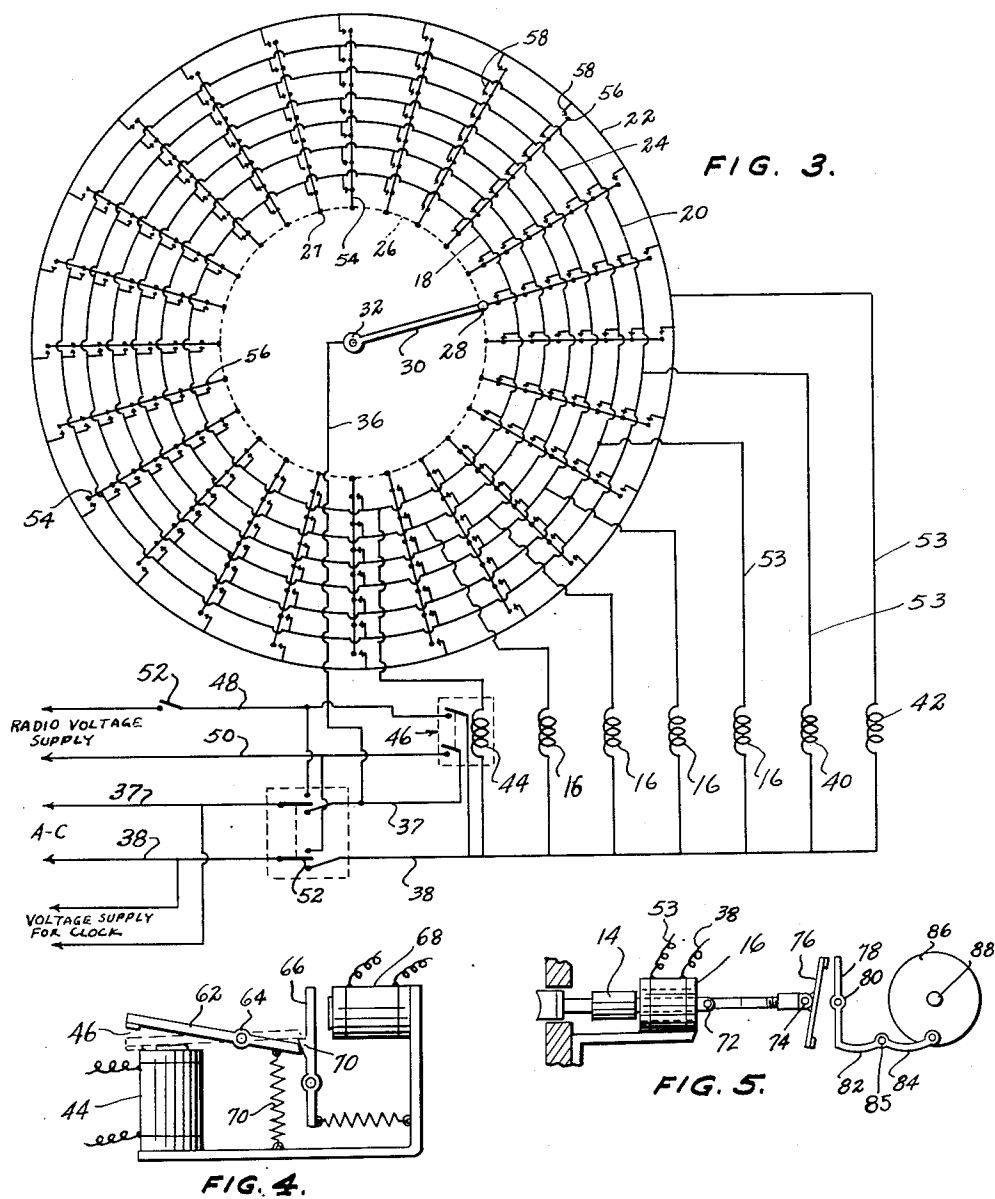
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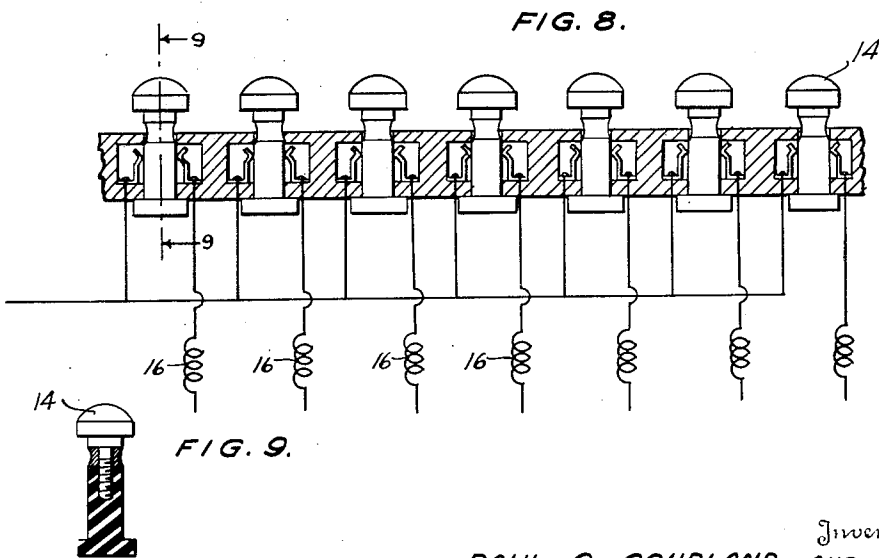
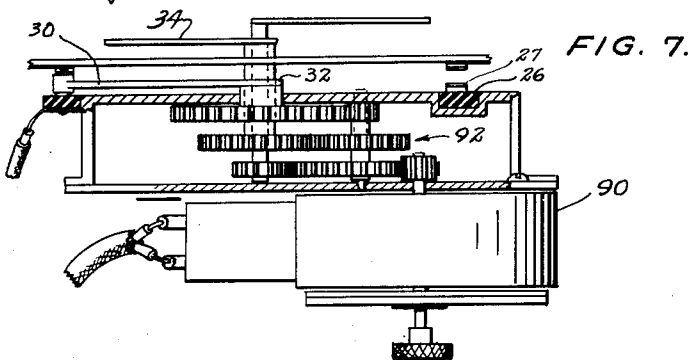
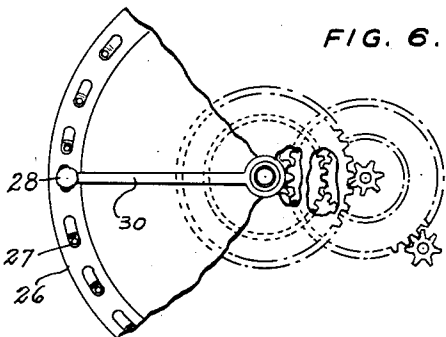
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P. G. COUPLAND ET AL
RADIO CLOCK

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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RADIO CLOCK

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Application March 25, 1947, Serial No. 737,169

2 Claims. (Cl. 161-1)

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This invention relates to devices for turning a radio set on and off and for selecting radio programs.

An object of the invention is to provide a device having a clockwork mechanism, and adapted for turning a radio set on and off automatically over a period of twenty-four hours of the day, whenever desired.

Another object of the invention is to provide a device which is adapted to automatically turn the radio set to receive various preselected radio programs from a number of stations, at various hours of the day.

A further object of the invention is to provide a device adapted for actuating the tuning push buttons of a radio in such manner throughout the day, that any selected radio program may be tuned in automatically, in accordance with a preselected pattern, the device including a plurality of solenoids for actuating the push buttons, and switch means actuated by clockwork mechanism for actuating the preselected solenoids.

Still another object of the invention is to provide an automatic clock-radio device which is simple in design, inexpensive to manufacture, continuous in its operation, and which may be adapted to any type of radio set.

Other objects and advantages of the invention will become apparent from the following description of a preferred embodiment thereof as illustrated in the accompanying drawings, and in which:

Figure 1 is a face view of a radio set with our radio clock installed therein, and showing an external appearance of the devices.

Figure 2 is a rear elevational view of our radio clock.

Figure 3 is a schematic diagram of the electrical connections of the radio clock shown in Figure 1.

Figure 4 is a detail view showing the connections to the "on" and "off" relays in the circuit.

Figure 5 is a detail view of the combination manual and electrical pushbutton control.

Figure 6 is a broken out fragmentary face view of the clockwork mechanism for actuating the contact arm of the radio clock.

Figure 7 is a sectional view of the radio clock taken at right angles to the plane of the view of Figure 6, and illustrating the clock gearing arrangement.

Figure 8 is a sectional view of the station selector push buttons, and

Figure 9 is a sectional view taken on line 9-9 in Figure 8.

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In order to understand clearly the nature of the invention and the best means for carrying it out, reference may now be had to the drawings in which like numerals denote similar parts throughout the several views.

As shown, there is a radio receiver generally indicated at 10, and which is of any usual type, such as one having both a visual station selector dial 12 turned by a hand operated knob, not shown, and also having a number of push buttons 14 arranged in a row, there being one button for each station desired to be selected in that manner.

To tune the radio receiver to a desired station, it is only necessary to push the button pertaining to that station inwardly, as shown in Figure 1, that is, downwardly as shown in Figure 8, so that, by switching means or otherwise, the circuits of the radio set are brought into tune with the frequency upon which the desired station broadcasts, the station being thus automatically tuned in.

The radio set 10 is provided with a radio-clock switch which may be cut out, and the receiver controlled from the conventional dial 12 on the front of the radio when desired.

When the radio-clock is turned on, tuning is accomplished by electrically operating the conventional tuning push buttons 14 by means of a solenoid 16 around each push button shaft, or by having a solenoid plunger arranged to actuate the push button. As shown best in Figure 3, there are a number of concentric selector rings. The inner ring 18 is the "on" selector ring, the two outer rings 20 and 22 are the "off" and "alarm" selector rings respectively. The four intermediate rings 24 are the station selector rings, while the innermost ring 26 is the contact ring having a number of contact points 27 insulated therefrom with which the outer end 28 of the contact arm 30 engages as the control arm sweeps past the circle defined by the ring 26, the control arm making contact, not with the ring 26, but with each successive contact point 27.

The contact arm 30 is secured at its inner end to a driven shaft 32 which, is driven by the clockwork, and makes one complete revolution every twenty-four hours of the clock. The shaft 32 also carries the hour hand 34 of the clock. The wire 36 connects the contact arm 30 with one side 37 of the power supply lines. The other side 33 of the power supply lines is connected to one end of all of the solenoid coils 16 which are to actuate the push buttons 14. There is one solenoid 16 for each push button 14, that is, for each

station which may be tuned in thereby, and also solenoids 40 and 42 for the outer rings 20 and 22 respectively. There is also a solenoid 44 connected to ring 18 for closing a double pole single throw switch 46 through which the alternating current circuit to the radio set itself is completed through leads 48 and 50, there being a hand actuated "cut-off" switch for the radio at 52 to keep it turned "off" when desired, notwithstanding the operation of the radio clock. The other ends of the solenoids are connected to their respective rings such as 22, by wires 53.

There are twenty-four radial contact rods or wires 54, each having one fixed contact 56 for each of the rings 18, 20, 22, 24, and 26 which it traverses radially, but neither the rods 54 nor the fixed contacts 56 make any normal contact with the rings. In order to make contact between the rings and the fixed contacts 56 thereunder, each ring but the inner one 26, is provided with movable contacts 58 adapted to engage against the adjacent contacts 56, but being normally in switch open position.

On the face of the radio clock, as shown in Figure 1, there is one selector push button 60 for each "on" switch thus formed by adjacent fixed and movable contacts 56 and 58, a respective push button 61 for each "off" switch, a respective push button 63 for each time-station switch so provided, and a respective push button 65 for each alarm switch and occupying the same relative position, so that pressure on a button 60 will close the switch formed by contacts 56 and 58 therebelow. Each radial row of buttons 60, 61, 63 and 65 corresponds to a time interval, namely one hour of the twenty-four. It will be apparent that the device may be used for smaller time intervals by merely adding more radial rows of selector buttons and their associated contacts.

The user of the device thus is enabled to decide which radio station he wishes to have tuned in during each time interval and to accomplish this by depressing the corresponding "on" switch button 60 and the corresponding station selector button 63 over one of the station rings 24. This closes the underlying switches formed by the contacts 56 and 58, so that, when the contact arm 30 reaches that row, current from the power lines 36 and 38 is permitted to flow through the selected solenoid 16 actuating it so as to depress the corresponding push button 14 shown in Figure 5.

When an "on" push button 60 is depressed to close one of the switches in ring 18, allowing the contact arm 30 to complete the circuit for energizing relay solenoid 44. As seen best in Figure 4, attraction by the solenoid 44 of the armature 62 supported on pivot 64 so as to move it to horizontal dotted line position, allows the armature 66 of the "off" solenoid 68 to move counterclockwise, bringing its detent 70 into the path of the right hand end of armature 62, and holding it in switch closed position, the switch 46 remaining closed and continuously energizing the radio set.

To open switch 46, it is only necessary to depress a push button 61 over the "off" ring 20 and spaced in a clockwise direction from the actuated "on" switch, so that as the contact arm 30 sweeps past this actuated "off" switch energizes the "off" solenoid 68, retracting armature 66 and allowing spring 70 to retract its armature 62, opening radio switch 46. The arm 30 has, at that time, moved away from contact 27 in the row of the actuated "on" switch so that solenoid 44 is de-energized at the time solenoid 68 is energized. After the arm 30 has moved away from the contact point 27 in

the row containing the actuated "off" switch solenoid 68 will also be deenergized.

As shown in Figure 5, the push button 14 is adapted to be depressed by the plunger 72 of the solenoid 16 which solenoid is energized when arm 30 engages contact 27 in the row in which the actuated station selector button 63 is located. The outer end of the plunger carries an adjustable locking pivot 74 having an adjustable pivot arm 76. A pivot plate 78 which is pivotally carried at 80 has one end connected by links 82 and 84 which are pivotally interconnected at 85, to the periphery of a flat disc or plate 86 mounted upon the shaft 88 of the radio set tuning condenser. When plunger 72 is moved by energization of solenoid 16 arm 76 engages plate 78 and rotates disc 86 to turn the condenser to a predetermined tuning position.

As shown in Figures 6 and 7, the clock motor 90, acts through a train of gears 92 to turn the hour and minute hands of the clock, and also the contact arm 30 which is arranged to make a complete revolution every twenty-four hours. Whenever an "on" button 60 and a station selector button 63 in the same row are depressed, then, when the contact arm 30 reaches that particular time, current through the actuated switches energizes the associated solenoid or relay 16. When the radio clock is "off," and it is desired to turn the receiver "on" and tune in a particular station at a certain time, the "on" button 60 and the desired station button 63 must be depressed for that time. When the "on" relay 44 is momentarily energized by contact of arm 30 with a contact point 27 in a row containing an actuated "on" switch, it is mechanically locked in by the "off" relay 68, and remains in until the "off" relay is energized and releases it.

In case of power failure, when power is restored, the radio clock picks up where it left off, with the only necessity being to reset the clock to the correct time. The clock is conventional in having a twelve-hour dial. A seventh ring of buttons 22 is provided as alarm selector buttons. As can be seen in the drawings, contact with the depressed alarm button in the outer ring 22, whether the radio is "on" or "off," actuates the striker of the solenoid 42 for a chime, bell or gong, depending upon the sleeper's requirements. Or, he may desire to have the radio turned "on" to waken him, and this can be accomplished by setting the radio-clock to turn on the radio at any time with his favorite program.

On the back of the radio, in the center rear of the clock, as seen in Figure 2, are the controls for setting the clock. When the knob 100 is turned, the clock hands and at the same time, the contact arm, may be set to the correct time. Since the radio may be plugged in at any hour of the day or night, and may be stored and shipped, and since there must be some way of setting the selector buttons for definite times and stations, a further control is used. A pointer 102 on the back of the radio-clock beneath the time setting knob 100 indicates whether the contact arm 30 is in the a. m. or p. m. section of its cycle. When the knob 100 is turned to the reference section, setting the clock hands to the correct time, sets both clock and contact arm to the proper positions for accurate control. The device described herein may also be used for turning "on" and "off" many types of electric appliances besides the radio set itself.

Although we have described a preferred embodiment of our invention in specific terms, it is

to be understood that various changes may be made in size, shape, materials and arrangement without departing from the spirit and scope of the invention as claimed.

We claim:

1. Station preselecting and time predetermining means comprising an arm rotatable about an axis substantially normal thereto, means for electrically connecting said arm to one side of a two wire power line, a ring of angularly spaced apart contact points centered on the axis of rotation of said arm, a contact on said arm successively engageable with the contact points of said ring of contact points as said arm turns about said axis of rotation, a plurality of concentric conductor rings of successively increasing diameters centered on said axis of rotation and spaced apart radially of the latter, a plurality of angularly spaced apart conductor bars extending radially of said axis of rotation across but out of electric contact with said plurality of conductor rings, each of said bars being electrically connected at its inner end to a corresponding contact point of said ring of contact points, a manually actuatable selector switch between each conductor ring and each conductor bar, a first solenoid electrically connected at one side to one of said conductor rings and connected at its other side to the other side of the power line for energization of said first solenoid when said arm carried contact engages a contact point connected to a conductor bar which is electrically connected to said one conductor ring by an actuated selector switch, said first solenoid including a pivotally mounted armature movable in one direction by magnetic attraction and spring urged in the opposite direction, a relay switch closed by said armature when the latter is moved in said one direction for closing a power control switch when said relay switch is closed, a second solenoid connected at one side to said other side of the power line and having a movable armature spring urged into engagement with the armature of said first solenoid to hold said relay switch closed after said arm carried contact has left the contact point connected to said one conductor ring and until said second solenoid is energized, means connecting the other side of said second solenoid to the second conductor ring for energization of said second solenoid when said arm carried contact reaches a contact point electrically connected to said second conductor ring by an actuated selector switch to thereby free said relay switch to open, and means for connecting at least some of the remaining conductor rings to station selector means.

2. Time predetermining means comprising an

arm rotatable about an axis substantially normal thereto, means for connecting said arm to one side of a two wire power line, a ring of angularly spaced apart contact points centered on said axis of rotation, a contact carried by said arm and successively engageable with said contact points as said arm is turned about said axis of rotation, a first conductor ring centered on said axis of rotation and spaced from said ring of contact points, a second conductor ring centered on said axis of rotation and spaced from said first conductor ring and said ring of contact points, a conductor bar electrically connected to each contact point and extending therefrom across said first and second conductor rings out of electrical contact with the latter, a manually actuatable selector switch between each conductor bar and each conductor ring, a relay switch for opening and closing a power control switch and spring urged to open position, spring operated latch means connected to said relay switch to latch the latter in closed position, first electromagnetic means disposed adjacent said relay switch and connected at one side to one of said conductor rings, means for connecting the other side of said first electromagnetic means to the other side of the power line for switch closing energization of said first electromagnetic means when the arm carried contact engages a contact point electrically connected to said one conductor ring by an actuated selector switch, second electromagnetic means connected at one side to the other conductor ring and disposed adjacent said latch means for releasing said relay switch to open when said second electromagnetic means is energized, and means for connecting the other side of said second electromagnetic means to the other side of the power line for energization of said second electromagnetic means when said arm carried contact engages a succeeding contact point electrically connected to said other conductor ring by an actuated selector switch.

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