

July 5, 1938.

C. F. PETERS

2,122,779

AUTOMATIC TIME AND PROGRAM SELECTOR

Filed April 3, 1936

2 Sheets-Sheet 1

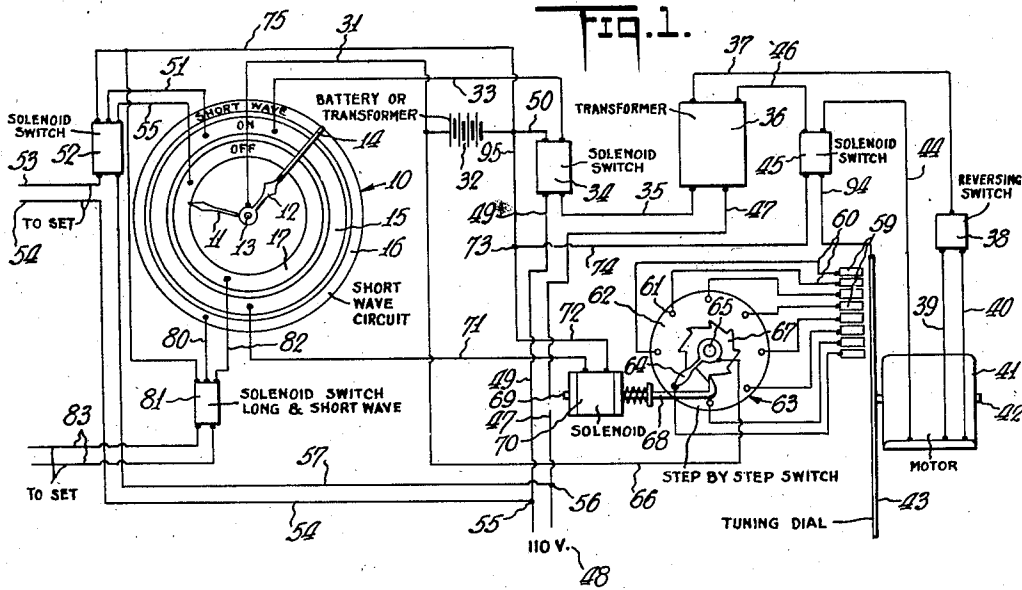


Fig. 2.

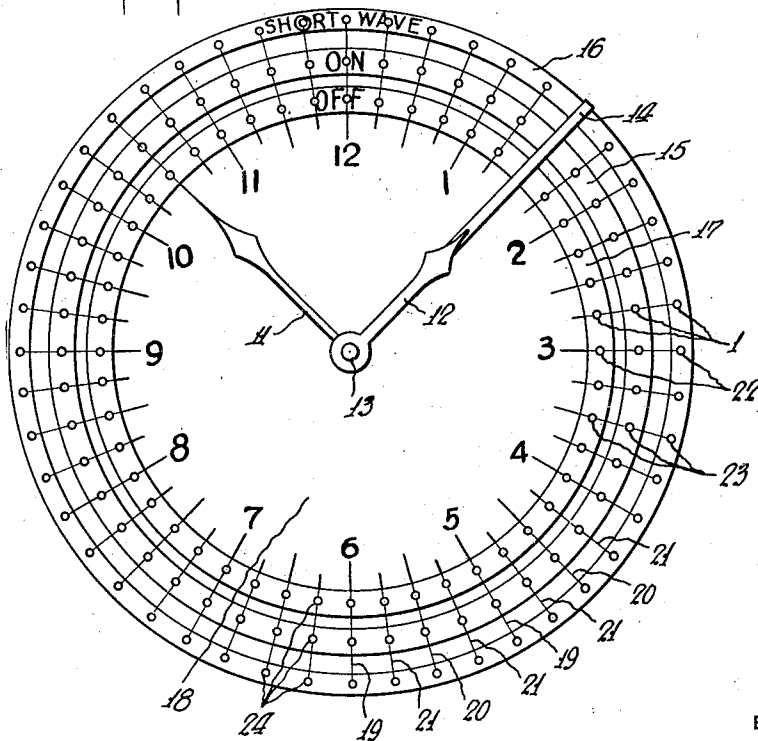
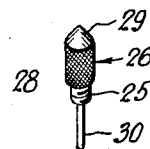


Fig. 3.



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Fig. 4.

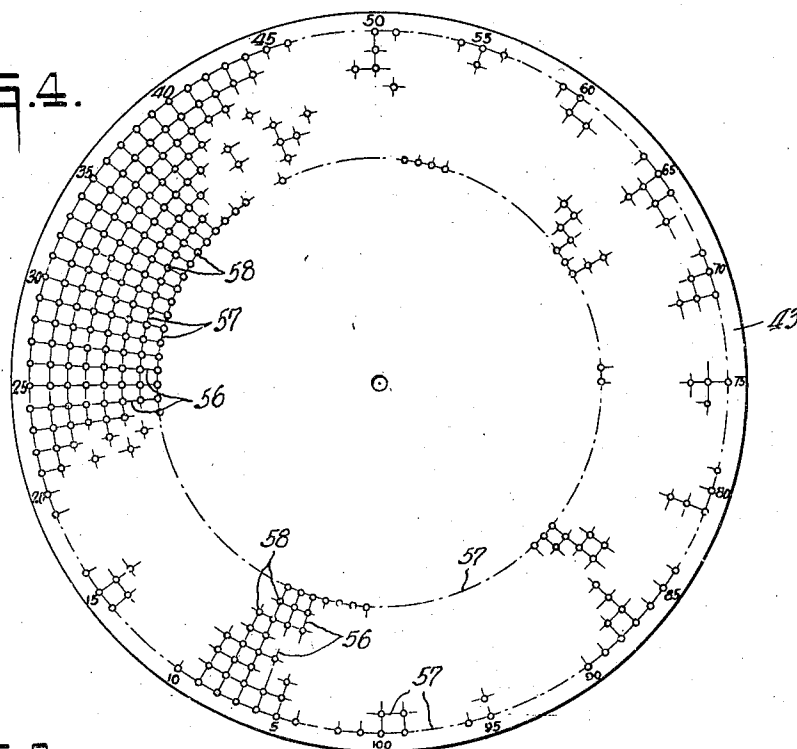


Fig. 6.

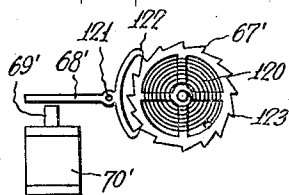
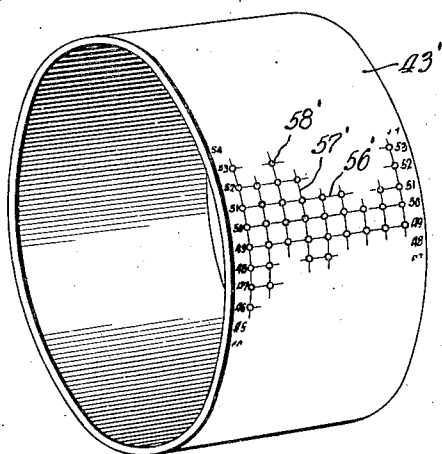


Fig. 5.



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AUTOMATIC TIME AND PROGRAM
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15 Claims. (Cl. 250—20)

The present invention is particularly directed to an automatic clock switch and station selector, particularly adapted for home radio receiving sets, but also broadly applicable in many aspects to many other purposes, where electric circuits are controlled to actuate apparatus in accordance with the passage of time.

The invention will be illustratively described in connection with its application to a home radio set, to which it is by no means restricted.

It is frequently desirable that the radio set over a period of hours automatically tune in different stations with different programs without making it necessary for the householder or owner of the set manually to turn off the program at its termination and then tune in the new program at each change of program.

Among the objects of the present invention are to provide a simple, durable, inexpensive and automatic selector system for a home radio station which will automatically turn on and off the radio set at predetermined intervals and which will automatically tune in desired programs for periods of hours in accordance with the desires of the owner of the set, all without the necessity of using complicated and intricate control mechanisms and circuits readily subject to derangement.

Other objects will be obvious and well apparent during the course of the following specifications.

In accomplishing the above objects, it has been found satisfactory to provide a spring or electrically driven clock construction, the hour hand of which may carry a movable contact arm.

The clock may be conveniently provided with one or more contact rings, having recesses into which contact plugs may be selectively inserted at quarter, half hour or other time intervals.

The contact of the arm with a contact plug on the on circle causes the radio set to be turned on and the tuning circuits are then set to a desired station. Subsequently the contact arm in contacting with a contact plug on the off circle turns off the radio set.

To control the tuning of the set a motor driven tuning dial may be provided with a series of recesses, into which recesses contact plugs may be selectively inserted depending upon the succession of programs which it is desired to obtain.

In the preferred arrangement the tuning dial has radial graduations corresponding to the stations or frequencies, and circumferential gradu-

ations corresponding to the succession of programs which it is indicated to obtain.

Ordinarily this tuning dial is associated with a series of spring fingers, one for each circumferential graduation. These fingers are successively connected in the circuit by an automatic selector switch, so that for each successive action of an on circle contact, the next spring finger and circular graduation on the tuning dial are connected into the motor cut-off circuit.

Ordinarily the on circuit established by the clock contact arm will operate the motor to turn the tuning dial to the desired station, determined by contact of a selected spring finger and a contact plug causing establishment of another circuit to stop the motor and prevent further movement of the tuning dial.

The tuning dial then will remain fixed until the next on circuit is established where upon it will be actuated to tune in the new station and bring in the new program.

The arrangement may also be provided with an alternative on circle for optional short wave reception which will actuate a short wave switch leading to the set.

In one construction, the motor is reversed after each movement of the tuning dial so that the movement of the dial each time will be opposite to that of the movement of the last time. This reverse arrangement will accommodate the usual type of radio dial in which the dial is not completely rotatable but must be swung backwardly and forwardly.

In the drawings: Fig. 1 is a schematic layout of the system showing the control clock, the tuning dial, the step-by-step switch and the various connections between these elements.

Fig. 2 is a plan view of the clock on an enlarged scale illustrating the recesses for the contact plugs.

Fig. 3 is a prospective view of a contact plug upon an enlarged scale which may be inserted in the clock of Fig. 2 and in the dials of Figs. 4 and 5.

Fig. 4 is an enlarged plan view of the tuning dial.

Fig. 5 is an alternative form of tuning dial which may be employed, and,

Fig. 6 illustrates an escapement control for the step-by-step switch.

Referring to Fig. 1 the clock 10 is provided with a minute hand 11 and an hour hand 12, hands which are driven in the usual manner through shafts at 13.

The hour hand 12 is provided with a contact

extension 14, which swings over the on circles 15 for normal wave lengths and 16 for short wave lengths, and the off circle 17.

These circles 15, 16 and 17 which are shown in greater detail in Fig. 2 consist of metallic rings, placed if desired upon transparent panels 18, of an insulating material which may be of a transparent resin or glass.

The clock 10 is provided with the hourly graduations 19, the half-hour graduations 20 and the quarter-hour graduations 21. At these graduations on each contact ring or metallic circle 15, 16 and 17 are placed the recesses 22, 23 and 24 respectively, which recesses may be tapped, if desired, to receive the threaded shanks 25 of the plugs 26.

The plugs 26 have knurled finger grip portions 28, peaked contact portions 29 and extensions 30, which latter also may serve as contact elements.

The extension 14, in swinging over the dials 15, 16 and 17 will contact with the contact points 29, where the threaded shanks 25 are threaded into the openings 22, 23 and 24.

This will establish a circuit through the lead-in wire 31 connected to the shafts 13, from the battery or transformer 32, the on circle 15, the lead 33, the solenoid switch 34, and the lead 50 to the other side of the battery 32.

The solenoid switch 34 thus energized will close the circuit including 110 volt source 48, and the leads 35, 47 and 49 feeding the transformer 36. The transformer 36 will energize the motor circuit including the leads 37, 39, 40 and 46, the reversing switch 38 and the solenoid switch 45.

The shaft 42 of the motor 41 is connected through a reducing gear arrangement (not shown) to rotate the tuning dial 43.

The contact of the arm 14 with a plug 26 on the on circle 15 will also establish a circuit through the leads 51 and 75, and through the solenoid switch 52 causing a closure of the circuit 48, 53, 54, 55, 56 and 57 to the radio set.

As the hour hand 12 continues to move clockwise the contact arm 14 will meet and pass over a plug 26 on the off circle and this will close the circuit through the leads 55 and 75 to the solenoid switch 52, which will turn off the radio set at the end of the program.

The tuning dial 43 is provided with a plurality of radial graduations 56 and circumferential graduations 57.

At the intersections between the radial graduations and the circumferential graduations are positioned the tapped openings or sleeves to receive the plugs 26, and these are arranged so either the top portions 29 or the bottom portions 30 may establish a contact with the selector fingers 59, which as indicated in Fig. 1, are separated from each other and each connected to a different circuit 60 leading to the contact points 61 on the dial 62 of the step-by-step switch 63.

In the normal operation, the plugs 26 will be set successively from the outer circles inwardly, or from the inner circles outwardly according to the succession of the programs which it is desired to obtain. The step-by-step switch 63 will successively place the contact blades 59 in the active circuit cutting off the other blades so that they will not be effective to establish a circuit upon contact with the plugs 26 in the other circular graduations 57.

The spring fingers 59 are of such a character that the contact elements of Fig. 3 may readily

pass or snap under them, without difficulty and without loosening the plugs 26.

The step-by-step switch 63 is actuated successively to cause the contact hand 64 to contact with one after another of the contact points 61 on the dial 62. This will establish a circuit through the shaft 65 and the leads 60, 66, 74, 94 and 95 to the battery 32 and through the solenoid of the normally closed switch 45, opening said switch.

When the plug 26 in the proper circle 57 contacts the leaf 59, connected in the circuit by the step-by-step switch 63, therefore the motor will be switched off by the solenoid switch 45. The reversing switch 38 will be thrown over so as to turn the motor in the reverse direction when the dial has completed its movement in any one direction.

The reversing switch 38 may be operated by a lug (not shown) on the shaft 42 or dial 43.

If desired, the reversing switch may readily be eliminated and the dial 43 may be arranged so as to be capable of continuous rotation in either direction.

The step-by-step switch 63 is turned by means of the ratchet 67, and the pawl 68. The pawl 68 is carried by the spring return armature 69, said armature 69 being received in the solenoid 70. The solenoid 70 has one lead 71 leading to the on circle 15 and is provided with a second lead 72 connected to the battery 32.

The escapement of Fig. 6 may also be employed to turn the switch 63, similarly functioning parts being indicated by the same numerals primed.

Each time the on circle is actuated the solenoid switch 52 will be actuated to turn on the radio set, the switch 34 will be actuated to start the motor 41 to turn the dial 43 and the solenoid 70 will be energized to move the ratchet 71 one contact 61 placing another finger in the circuit.

Since the contact across the extension 14 will be maintained for a considerable length of time, the motor 41 will have the opportunity to move the dial until the proper plug 26 contacts with selected finger 59 which has been connected into the circuit by the step-by-step switch 63.

When the contact is made between the proper plug 26 and finger 59, the motor 41 will be stopped by the throwing out of the switch 45.

Instead of a ratchet drive for the step-by-step switch 63, it is possible also to be utilized an escapement operated by a spring as shown in Fig. 6, or a step-by-step bar drop type breaking contact.

In Fig. 6, is shown an escapement control for the step-by-step switch 63 with a coil spring 120 biasing said toothed escapement wheel 67' to turn it a complete revolution in one direction.

The lever 68' of the reciprocating yoke 122 will swing on the pivot 121 with successive energizations of the solenoid 70' and its core 69', which occur with each circuit closure by the clock extension 14 touching a contact plug 26.

Each such reciprocation will move the wheel 67' one tooth 123. Each tooth 123 corresponds to a contact point 61 in the dial 62 and each such movement will place the arm 64 in contact with the next contact point 61.

In the case of both the ratchet arrangement of Fig. 1 and the escapement arrangement of Fig. 6, the shaft of the arrangement permits a sliding movement of the toothed wheels against a spring by a handle (not shown) permitting them to be disengaged from the actuating pawls. Upon such disengagement the toothed wheels and attached

dial may be turned back to zero position, permitting the device to be reset to starting position. This will rewind the spring of the escapement in connection with the device of Fig. 6.

5 The dial 43 may also be hand controlled without disturbing the plugs 26. This may be done by adding a hand knob to the dial 43.

10 The recesses 22, 23 and 24 of the clock dial 10 and 58 and 58' of the tuning dials 43 and 43' may be formed of metallic socket members in an insulating base and suitably joined by wires.

15 A slotted guide may be conveniently arranged to guide the outer end of the extension 14 to hold it in position and prevent it bending outwardly or inwardly and thus assure a firm contact of the extension 14 with peaks 23.

The dial of Fig. 4 may also be arranged so that graduations extend only part way, instead of all the way around it.

20 It will thus be seen that there is herein described apparatus in which the several features of this invention are embodied, and which apparatus in its action attains the various objects of the invention and is well suited to meet the requirements of practical use.

25 As many changes could be made in the above construction, and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

35 1. An automatic time clock, switch and station selector adapted for radio receiving sets comprising a time clock, a tuning dial, a motor to drive said dial, circuit closing means on both said clock and dial to close circuits at predetermined times and stations or wave lengths respectively and a set switch operated by one of said circuits to turn on the set, said motor being started by one of said circuits established by the clock and being stopped by a circuit established by said dial, said circuit closing means on said clock and dial including recesses on the clock and dial and plugs to be received therein, each of said plugs being provided with a thin extension to be inserted in one of said recesses and with an enlarged head and contact fingers carried by said clock and positioned adjacent said dial to contact said plugs and close the desired circuits, the recesses of said dial being arranged in rows, each of said rows receiving one plug at a position corresponding to a certain station to be tuned in and means to connect a plug in a different row in the circuit each time a circuit is established by the circuit closing means on the clock.

40 2. An automatic time clock, switch and station selector adapted for radio receiving sets comprising a time clock, a tuning dial, a motor to drive said dial, circuit closer means on both said clock and dial to close circuits at predetermined times and stations or wave lengths respectively and a set switch operated by one of said circuits to turn on the set, said motor being started by one of said circuits established by the clock and being stopped by a circuit established by said dial, said clock being provided with three metallic rings mounted on an insulating base, one to turn the set and motor on, one to turn the set off and one to turn the set on to short wave lengths, when the circuits are closed respectively therethrough.

75 3. An automatic time clock, switch and station selector adapted for home radio sets comprising

a time clock, a tuning dial, a motor to drive said dial, circuit closer means on both said clock and dial to close circuits at predetermined times and stations or wave lengths respectively and a set switch operated by one of said circuits to turn on the set, said motor being started by one of said circuits established by the clock and being stopped by a circuit established by said dial, said clock comprising a dial with an insulating base and three metallic rings carrying recesses, contact plugs to be received in said recesses and an arm extension to contact said plugs.

4. An automatic time clock, switch and station selector adapted for home radio sets comprising a time clock, a tuning dial, a motor to drive said dial, circuit closer means on both said clock and dial to close circuits at predetermined times and stations or wave lengths respectively and a set switch operated by one of said circuits to turn on the set, said motor being started by one of said circuits established by the clock and being stopped by a circuit established by said dial, said tuning dial including rows of radial and circumferential graduations, recesses on said circumferential graduations, contact fingers one for each row of circular graduations and contact plugs to be inserted in said circumferential graduations.

5. An automatic time clock, switch and station selector adapted for home radio sets comprising a time clock, a tuning dial, a motor to drive said dial, circuit closer means on both said clock and dial to close circuits at predetermined times and stations or wave lengths respectively and a set switch operated by one of said circuits to turn on the set, said motor being started by one of said circuits established by the clock and being stopped by a circuit established by said dial, said tuning dial including rows of radial and circumferential graduations, recesses on said circumferential graduations, contact fingers one for each row of circular graduations and contact plugs to be inserted in said circumferential graduations, said dial being flat.

6. An automatic time clock, switch and station selector adapted for home radio sets comprising a time clock, a tuning dial, a motor to drive said dial, circuit closer means on both said clock and dial to close circuits at predetermined times and stations or wave lengths respectively and a set switch operated by one of said circuits to turn on the set, said motor being started by one of said circuits established by the clock and being stopped by a circuit established by said dial, said tuning dial including rows of circumferential graduations, recesses on said circumferential graduations, contact fingers one for each row of circular graduations and contact plugs to be inserted in said circumferential graduations, said dial being cylindrical.

7. An automatic time clock, switch and station selector adapted for home radio sets comprising a time clock, a tuning dial, a motor to drive said dial, circuit closer means on both said clock and dial to close circuits at predetermined times and stations or wave lengths respectively and a set switch operated by one of said circuits to turn on the set, said motor being started by one of said circuits established by the clock and being stopped by a circuit established by said dial, said tuning dial including rows of radial and circumferential graduations, recesses on said circumferential graduations, contact fingers one for each row of circular graduations and contact plugs to be inserted in said circumferential graduations, and step-by-step switch means to successively

place one after another of said fingers in the actuating circuit.

8. An automatic time clock, switch and station selector adapted for home radio sets comprising
 5 a time clock, a tuning dial, a motor to drive said dial, circuit closer means on both said clock and dial to close circuits at predetermined times and stations or wave lengths respectively and a set
 10 switch operated by one of said circuits to turn on the set, said motor being started by one of said circuits established by the clock and being
 15 stopped by a circuit established by said dial, said tuning dial including rows of radial and circumferential graduations, recesses on said circumferential graduations, contact fingers one for each
 20 row of circular graduations, and step-by-step switch means to successively place one after another of said fingers in the actuating circuit, said switch means being operated by a solenoid-ratchet arrangement.

9. An automatic time clock, switch and station selector adapted for home radio sets comprising
 25 a time clock, a tuning dial, a motor to drive said dial, circuit closer means on both said clock and dial to close circuits at predetermined times and stations or wave lengths respectively and a set
 30 switch operated by one of said circuits to turn on the set, said motor being started by one of said circuits established by the clock and being
 35 stopped by a circuit established by said dial, said tuning dial including rows of radial and circumferential graduations, recesses on said circumferential graduations, contact fingers one for each
 40 row of circular graduations, and contact plugs to be inserted in said circumferential graduations,
 45 and step-by-step switch means to successively place one after another of said fingers in the actuating circuit, said switch means being operated by a spring-escapement arrangement.

10. In a time scheduled radio receiving system,
 40 a radio set, a set switch for said radio set, a tuning dial, a motor connected to drive said tuning dial, a motor switch for actuating said
 45 motor, a clock, a plurality of switch elements associated with said clock, circuits extending from said switch elements to said set and motor
 50 switches associated with said clock, means to enable adjustment of said switch elements so as to cause closure of said circuits at predetermined
 55 times and thereby to cause closure of said motor and set switches, said tuning dial also being provided with a plurality of contact devices and circuits extending between said contact devices
 60 and said motor switch, additional closing means associated with said last-mentioned circuits, to close only one of said circuits at a time, said
 65 additional closing means including a step by step switch and being actuated by said clock, and said last-mentioned circuits being also subject
 70 to closure at said contact devices, said contact devices closing the one of said last circuits closed by said additional closing means and opening
 75 said motor switch when said set has been tuned to the desired station, and a reversing switch actuated by said motor to reverse said motor when said motor has turned said tuning dial to its extreme position in either direction.

11. In a time scheduled radio receiving system,
 70 a radio set, a set switch for said radio set, a tuning dial, a motor connected to drive said tuning dial, a motor switch for actuating said motor,
 75 a clock, a plurality of switch elements associated with said clock, circuits extending from said switch elements to said set and motor switches
 80 associated with said clock, means to enable ad-

justment of said switch elements so as to cause closure of said circuits at predetermined times and thereby to cause closure of said motor and set switches, said tuning dial also being provided with a plurality of contact devices and circuits
 5 extending between said contact devices and said motor switch, additional closing means associated with said last-mentioned circuits, to close only one of said circuits at a time, said additional
 10 closing means including a step by step switch and being actuated by said clock, and said last-mentioned circuits being also subject to closure at said contact devices, said contact devices closing the one of said last circuits closed by said
 15 additional closing means and opening said motor switch when said set has been tuned to the desired station, said tuning dial being provided with a plurality of circles side by side to receive said contact devices and a circuit arrangement
 20 to successively place the contact devices upon the next circle in the circuit when the next program is to be received.

12. In a time scheduled radio receiving system,
 25 a radio set, a set switch for said radio set, a tuning dial, a motor connected to drive said tuning dial, a motor switch for actuating said motor, a clock, a plurality of adjustable contact elements on said clock, a rotating wiper element
 30 actuated by said clock to successively contact said contact elements, circuits extending from said wiper and contact elements to said set and motor switches, means to enable adjustment of
 35 said contact elements so as to cause closure of said circuits at pre-determined times by contact with said wiper element and thereby to cause closure of said motor and set switches, said tuning
 40 dial also being provided with a plurality of adjustable contact elements and wiper elements arranged in cooperating pairs, circuits extending between said last mentioned pairs and said motor
 45 switch, and a solenoid operated switch means to place only one of said last mentioned pairs at a time in the motor circuit, said last mentioned pairs when in circuit causing opening of
 50 said motor switch when said set has been tuned to the desired station and means automatically actuated by circuits closed by said wiper and contact elements at said clock to actuate said
 55 solenoid operated switch means.

13. In a time scheduled radio receiving system,
 60 a radio set, a set switch for said radio set, a tuning dial, a motor connected to drive said tuning dial, a motor switch for actuating said motor, a clock, a plurality of adjustable contact elements on said clock, a rotating wiper element
 65 actuated by said clock to successively contact said contacts, primary circuits extending from said elements to said set and motor switches, means to enable adjustment of said clock contact
 70 elements so as to cause closure of said circuits at predetermined times by contact with said wiper element and thereby to cause closure of said motor and set switches, said tuning dial also being provided with a plurality of adjustable
 75 contact elements and wiper elements arranged in cooperating pairs, secondary circuits extending between said last mentioned pairs of elements and said motor switch, and a solenoid operated switch means to place only one of said last mentioned pairs at a time in the motor
 80 circuit, said last mentioned pairs closing one of said secondary circuits and causing opening of said motor switch when said set has been tuned to the desired station and means automatically actuated by primary circuits closed at
 85

said clock to actuate said solenoid operated switch means, said solenoid switch means including a step by step switch.

14. In a time scheduled radio receiving system, a radio set, a set switch for said radio set, a tuning dial, a motor connected to drive said tuning dial, a motor switch for actuating said motor, a clock, a plurality of adjustable contact elements on said clock, a rotating wiper element actuated by said clock to successively contact said contacts, circuits extending from said elements to said set and motor switches, means to enable adjustment of said contact elements so as to cause closure of said circuits at predetermined times by contact with said wiper element and thereby to cause closure of said motor and set switches, said tuning dial also being provided with a plurality of adjustable contact elements and wiper elements arranged in cooperating pairs, circuits extending between said last mentioned elements and said motor switch, and a solenoid operated switch means to place only one of said last mentioned wiper elements at a time in the motor circuit, said last mentioned contact elements closing one of said last mentioned circuits and opening said motor switch when said set has been tuned to the desired station and means automatically actuated by circuits closed by the elements on said clock to actuate said solenoid operated switch means, said means including a

step by step switch having a pawl and ratchet.

15. In a time scheduled radio receiving system, a radio set, a set switch for said radio set, a tuning dial, a motor connected to drive said tuning dial, a motor switch for actuating said motor, a clock, a plurality of adjustable contact elements on said clock, a rotating wiper element actuated by said clock to successively contact said contacts, circuits extending from said elements to said set and motor switches, means to enable adjustment of said contact elements so as to cause closure of said circuits at predetermined times by contact with said wiper element and thereby to cause closure of said motor and set switches, said tuning dial also being provided with a plurality of adjustable contact elements and wiper elements arranged in cooperating pairs, circuits extending between said last mentioned elements and said motor switch, and a solenoid operated switch means to place only one of said last mentioned wiper elements at a time in the motor circuit, said last mentioned contact elements closing one of said last mentioned circuits and opening said motor switch when said set has been tuned to the desired station and means automatically actuated by circuits closed by the elements on said clock to actuate said solenoid operated switch means, said solenoid switch means having an escapement arrangement.

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