

Dec. 11, 1951

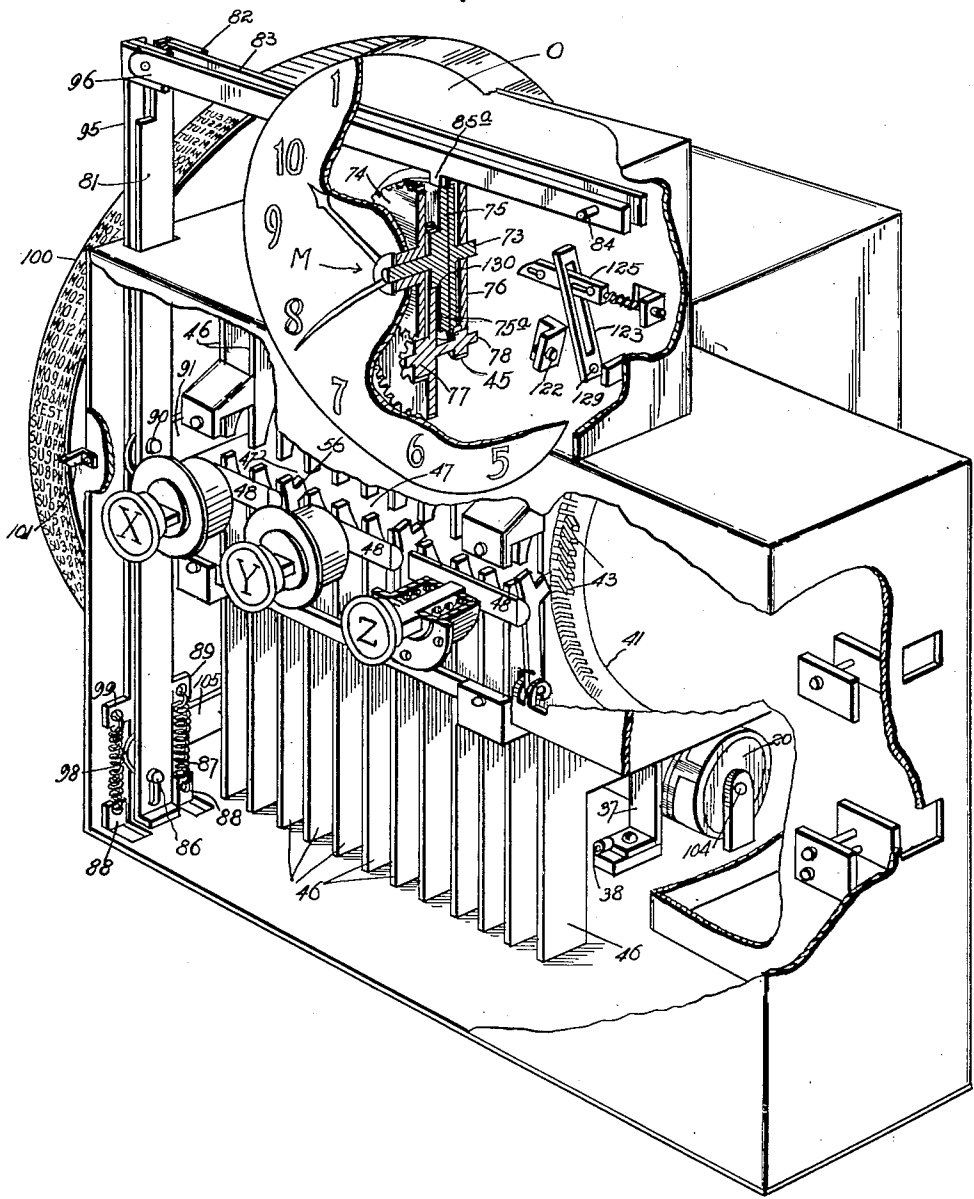
T. G. BURRICHTER
ELECTRICAL SWITCH MEANS

2,578,503

Filed Oct. 3, 1945

6 Sheets-Sheet 1

Fig. 1.



Inventor:
THOMAS G. BURRICHTER

by John F. Brezina
Attorney.

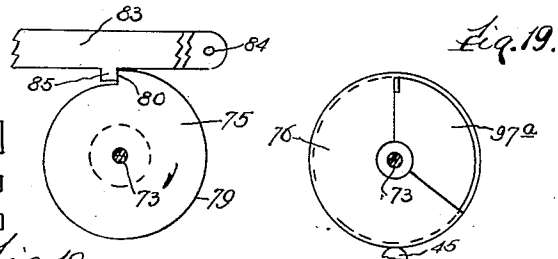
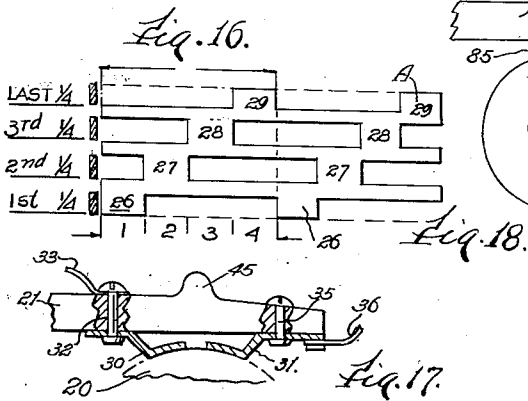
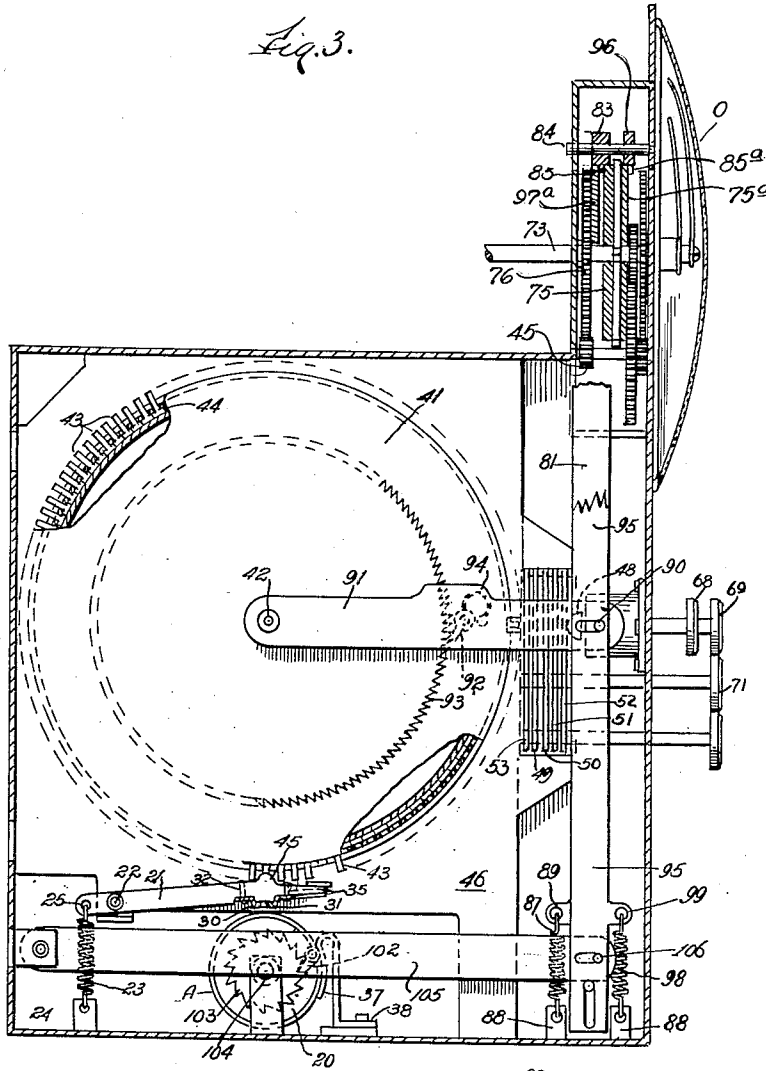
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Inventor:
THOMAS G. BURRICHTER
by John F. Brezina
Attorney.

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6 Sheets-Sheet 4

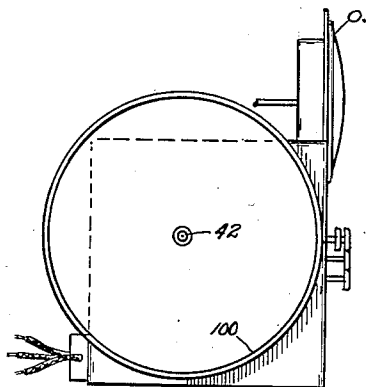


Fig. 4.

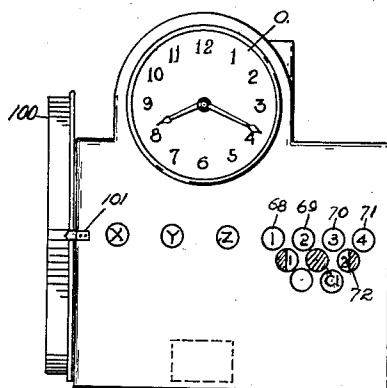


Fig. 5.

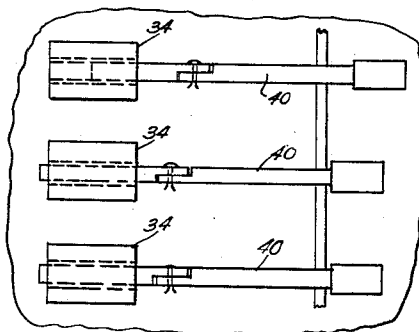
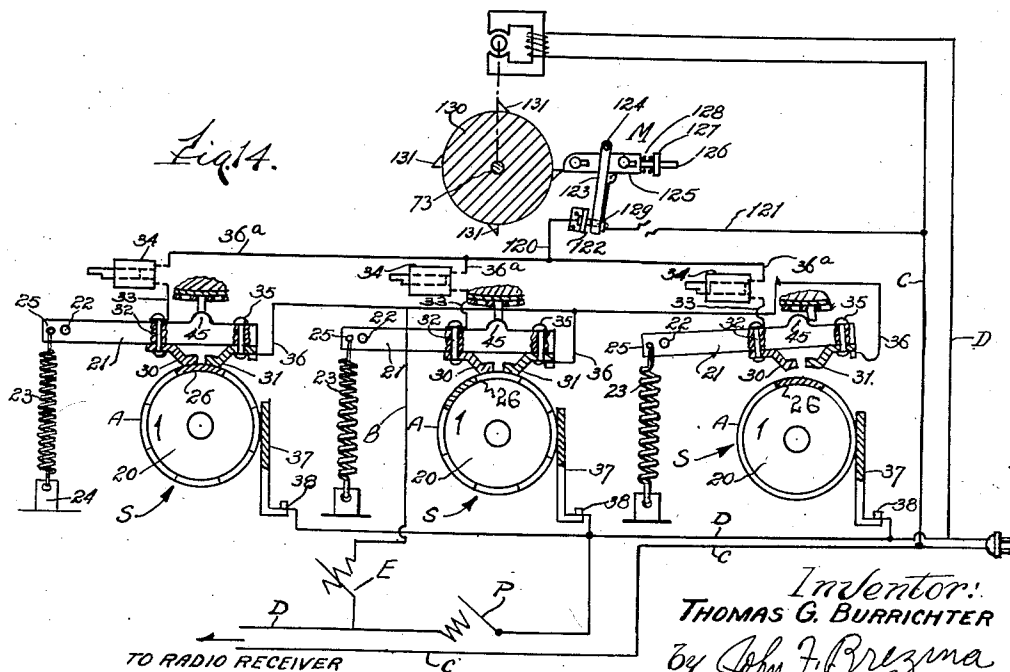


Fig. 15.



Inventor:
THOMAS G. BURRICHTER
by John F. Brezina
Attorney.

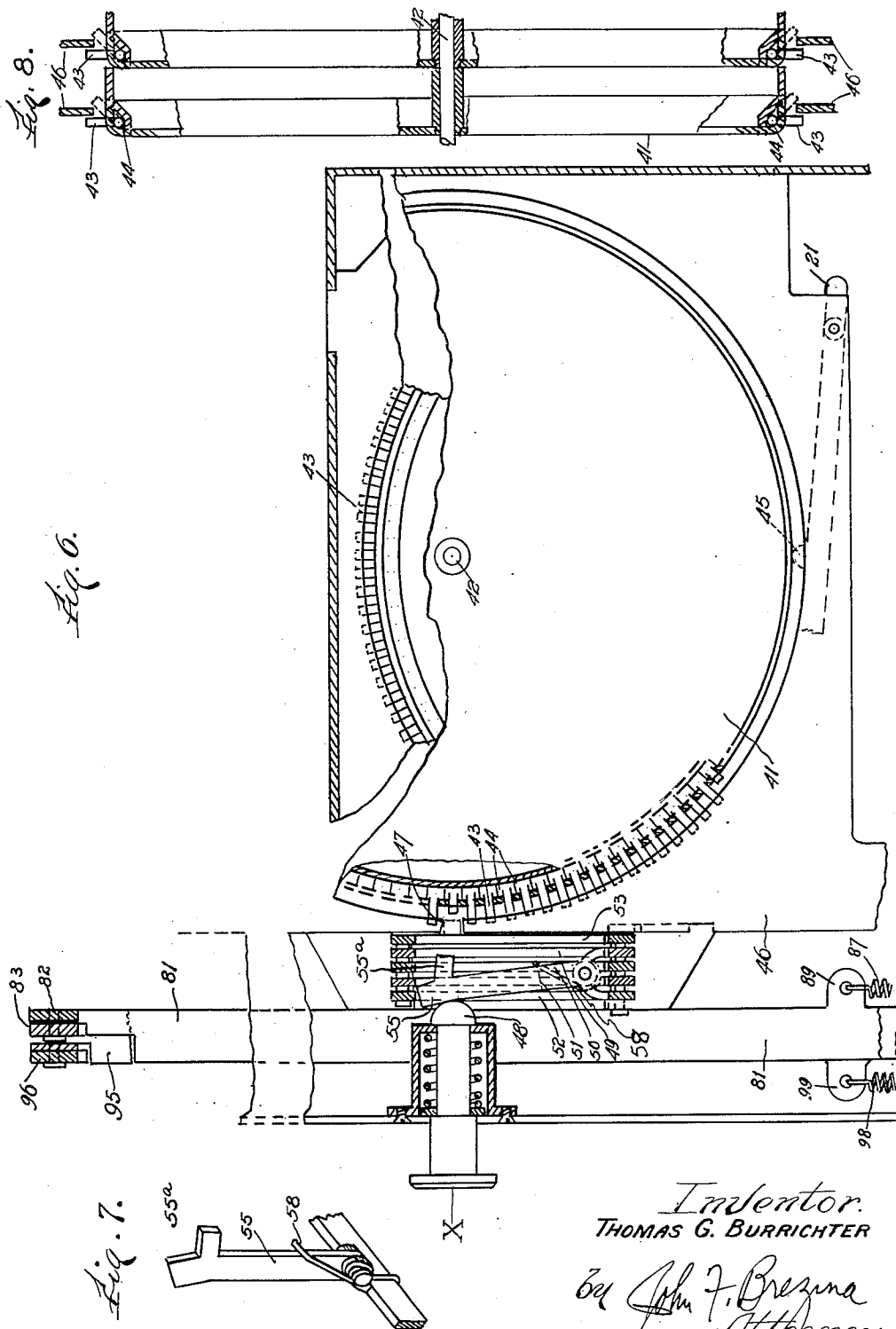
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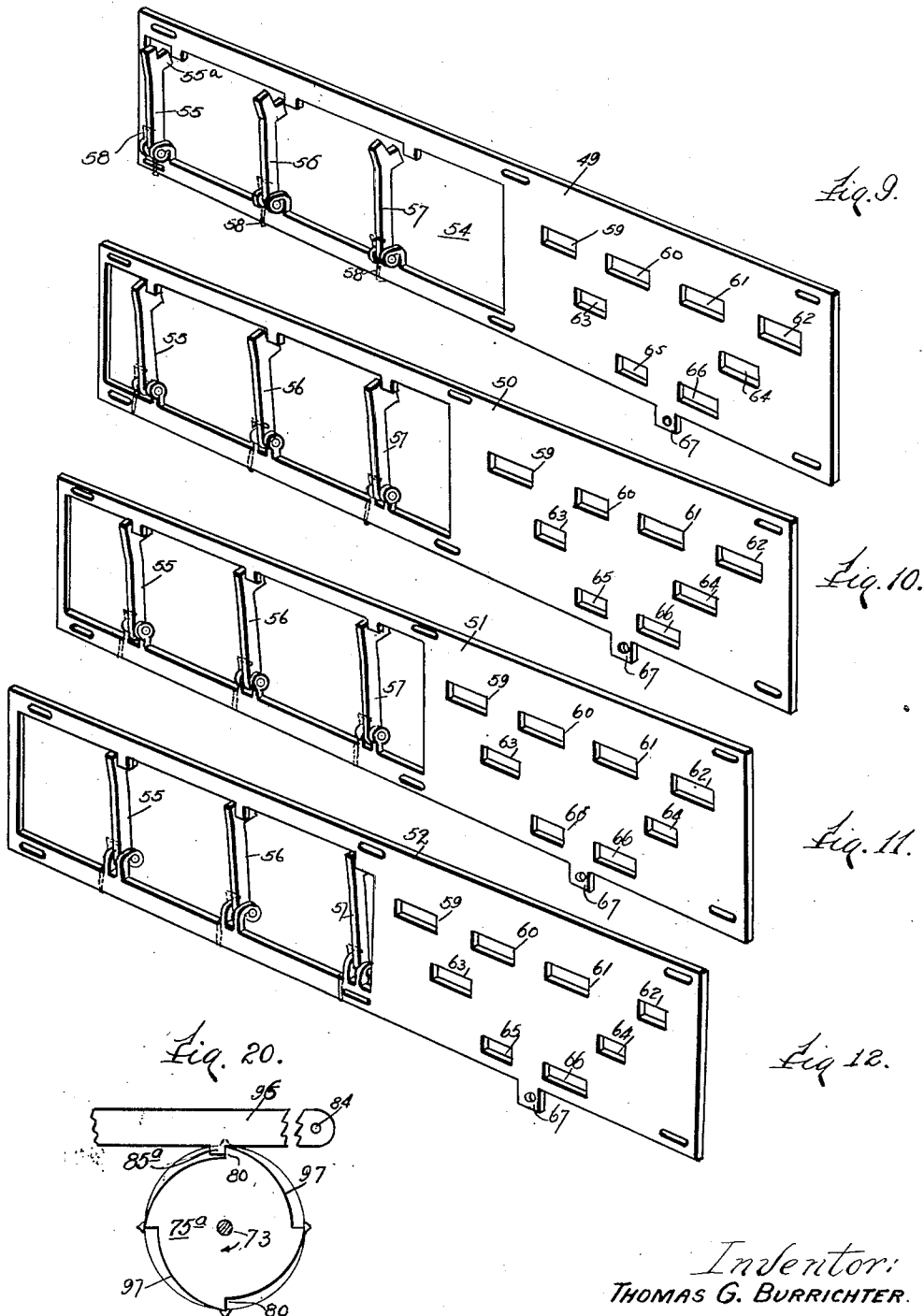
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6 Sheets-Sheet 6



Inventor:
THOMAS G. BURRICHTER.

by John F. Brezina
Attorney.

UNITED STATES PATENT OFFICE

2,578,503

ELECTRICAL SWITCH MEANS

Thomas G. Burrichter, Chicago, Ill.

Application October 3, 1945, Serial No. 619,983

15 Claims. (Cl. 250—20)

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The present invention relates to electrical switch means and more particularly to means which may be preset for closing electrical circuits at later times.

Such presettable switches are desirable in connection with the operation of radio receiving sets, cooking, and other uses.

The present invention has been illustrated and will be explained in connection with electrical switch means for presetting radio receiving sets to bring in desired programs at predetermined times.

This invention more particularly relates to timing devices and especially to devices that automatically tune in radio programs at predetermined times. It has among its objects and advantages the provision of improved push-button means for setting the stations and selecting the time for pre-selected tuning, and also, in the means of solenoids, provision for adaptability of use in those radio sets which, in their manufacture, have precluded previous similar tuning devices.

In previous devices, whether deft manipulation and tedious hand sorting of the many small, removable interior members is required or whether exterior manually operated push-button or dial means are provided to set these many interior members from "on" or "off" tuning position, a maximum of manipulation is required by the users of these devices to effect pre-selected tuning operation. A maximum of manipulation is required because any and all of these previous devices employ and represent each of their removable, interior setting members as a quarter of the hour or fifteen minutes, the smallest unit of tuning time, so that in selecting to tune in, whether for a full hour, three-quarters of an hour or for a half hour, whether by hand sorting or by mechanical means, it is necessary to manipulate the setting means as often as there are quarter hours in the duration of the program selected.

An important object of this invention is to provide a device which offers improved, efficient and positive means for setting the many, removable interior members from "on" or "off" position with a minimum of manipulation. Common to all the stations tuneable on this device are a plurality of push-buttons, one for the full hour, one for each half of the hour and one for each quarter of the hour, besides respective push-buttons for stations to be selected. For example, in setting a station to be tuned for a full hour reception, only one "time" push-button is employed, the hour button, instead, as in previous devices, of manipulating the setting means four separate

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and successive times to effect an hour reception.

Previous devices, especially those whose range includes seven separate, daily tuning operations in weekly sequence, have limited their use and applicability to only those radio sets in which these devices have been included as part of the structure in the manufacture of these sets, because such tuning devices of necessity depend upon a direct contact of enmeshment with the condenser which is an internal member of the radio. These tuning devices, therefore, are not readily adaptable for use in those radio sets which in their manufacture have precluded such devices. The installation of one of these devices in an ordinary radio set would entail drastic structural changes in the set itself because the interior of most radios, being naturally compact, would not ordinarily permit the addition of such tuning devices to the condenser of a radio. And too, the considerable bulk of such device would require displacement of more space than is available in most radio sets. A tuning device to be most effective should provide ready adaptability for use in any radio set yet to be manufactured or already in use. Some previous devices do provide adaptability to radio sets that employ either electrical or mechanical push-button means for direct station tuning or dialing, but these devices limit their pre-selected tuning operations to either a twelve hour or twenty-four hour period, requiring renewed settings after each period to accommodate for the variations in programs that ensue in the course of a week.

Another object of this invention is the provision of a device that will tune in any number of stations not only for twelve hours or twenty-four hours, but also for all the normally tuneable hours in a week, one that provides positive, efficient, improved push-buttons in its setting means, and one that provides ready adaptability for use in any radio that employs electrical or mechanical push-button station tuning means.

A further object of the present invention is to provide electrical switch means which may be set for closing electric circuits in the future.

Another object of the invention has to do with an electrical switch means for closing circuits in the future, and also with means for limiting the duration of time such circuits are electrically closed.

A further object of the invention has to do with electrical switch means including normally open contact members and a rotatable disc or drum having pins pivoted along its periphery movable from radial or on position to oblique or off position so that when a pin in the on position is

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moved against one of the contact members of the switch this member is closed against the other contact member.

The invention has for a further object the provision of switch mechanism just described in which the drum and one of the switch contact members are moved in time relation.

A still further object of the present invention has to do with a novel electrical switch mechanism which may be preset to close a plurality of switches in the future and with means for limiting the duration of electrical closure of such circuits.

The above, other and further objects of the present invention will be apparent from the following description and appended drawings.

An embodiment of the present invention is illustrated in the accompanying drawings and the views thereof are as follows:

Fig. 1 is an isometric view of the mechanism of the present invention showing some parts in elevation and some in section, of a device for selectively closing circuits to a radio, there being three station push buttons illustrated.

Fig. 2 is a top plan view, with the cover plate removed, of the arrangement of mechanism of Fig. 1. Shown in full lines are four switch mechanisms to be selectively controlled by the first push button. Shown in plan, and partially in section, are the selectively operable means for presetting switches and for releasing the drum mechanism from set position.

Fig. 3 is an end view, with parts in elevation and parts in section, of portions of the mechanism of Fig. 1, the view being taken just inside the left hand end wall of Fig. 1.

Fig. 4 is an end view of the present invention.

Fig. 5 is a front face view of the same.

Fig. 6 is a view partially in elevation and partially in section, and somewhat diagrammatic in form, of certain features of the invention.

Fig. 7 is an isometric view of one of the fingers utilized in setting up the peripheral pins on the rotatable drums.

Fig. 8 is a sectional view through two drum discs showing in full lines the pins in radial or on positions, and in dotted lines the pins in oblique or off position and also shows means for preventing a pin in either position from being accidentally moved to the other position.

Figs. 9, 10, 11 and 12 are isometric views of four endwise movable carriers utilized to set up the drum pins for any selected station and time.

Fig. 13 is a plan view of an endwise movable carrier utilized to move the drum pins from on position to off position.

Fig. 14 is a somewhat schematic view of the illustrated form of electrical switch showing various parts in different positions and illustrating the electrical circuits controlled by such switch.

Fig. 15 is a schematic view showing how the solenoids of the present invention may be connected to the push pull buttons of a radio set for cutting in any station in accordance with the presetting of the switches of the present invention.

Fig. 16 is a developed view of a portion of the contact plate of the rotatable switch member of the present invention, showing areas in staggered relation which are arranged to be engaged by any one of four of the movable contacts of the switch for establishing circuit through such switch members. The plate has the areas staggered axially and circumferentially with all the areas electrically connected together.

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Fig. 17 is a fragmental view of a movable switch member against its mating member.

Fig. 18 is an elevational view of a cam mechanism utilized in operation of the driving mechanism.

Fig. 19 is a side elevational view of another cam used in the timing mechanism.

Fig. 20 is a side elevation of another cam for switch control.

To illustrate the invention the drawings show time switch mechanism adapted for controlling the operation of periodically operable apparatus, such as radio receivers, and other devices of the sort susceptible of control by adjustment thereof and by control of operating power supplied thereto. As shown the device embodies clock driven mechanism, including one or more duplicate mechanism sets, for controlling the supply of operating power, to the apparatus to be controlled, and for adjusting said apparatus at desired intervals. To these ends the device may comprise one or more rotary switches S adapted to control the supply of power to the controlled apparatus and, by energising solenoids 34, to adjust or tune the controlled apparatus, in desired fashion, the operation of the switches S, in turn, being controlled by the corresponding clock mechanism sets, so that the rotary switches S may affect the controlled apparatus, or not, as permitted by the clock driven mechanism.

In Fig. 14, power for operating the controlled apparatus may be supplied through line conductors C and D under the control of a switch P, in the conductor D. This switch P may be the usual manually operable power switch ordinarily supplied for controlling apparatus of the sort herein contemplated, including radio receivers; and the control device of the present invention provides power supply control switch means adapted to be connected in parallel relation with the switch P and to be closed at intervals to supply operating power to the apparatus being controlled regardless of the condition of the switch P.

Referring to Figs. 14, 16 and 17, each of the switches S is exemplified as comprising a rotatable cylinder 20 and a swinging arm 21 hinged at 22 to a suitable support. A spring 23 is hooked at one end to a stop or anchor 24 and at the other end through a hole 25 in the arm 21 to normally tilt the arm so that the electrical contact thereon is raised from the cylinder 20, as is shown at the right end of Fig. 14. On the surface of the cylinder 20 is a conductor plate which, for want of a better term, is herein designated as grill A, and which is fashioned with a plurality of spaced areas 26 arranged in circumferentially spaced relation with respect to one another. In the grill A as illustrated in Fig. 16 there are four rows of such areas, those in the second row being designated as 27, those in the third row as 28 and those in the fourth row as 29. These areas 26, 27, 28 and 29 are staggered circumferentially of the cylinder and constitute a series. The grill, as herein described, is provided with four such series for the cylindrical surface of the cylinder 20. A separate arm 21 and spring 23 may be provided for each of the areas 26, 27, 28 and 29, as shown more particularly in Fig. 2. All of these several areas are electrically connected one to another so that when a hinged arm 21 is against the cylinder it will engage the areas in a row as the cylinder is rotated, in a manner herein-after described.

Each arm 21 has two contact members 30 and

31 arranged in face to face relation as shown in Fig. 14, with the under surfaces of the ends arcuate so as to make surface engagement with the underlying areas of the conductor grill A when an arm is against the cylinder. The contact element 30 is fastened in place by a conducting pin 32 to which is secured wire 33; and leading, in the present instance, to one terminal of a solenoid 34, the other terminal of which is connected through a conductor 33a, a snap switch M and a conductor 121 to one side C of a power supply line. The contact element 31 is fastened on the lever 21 by a pin 35 which also connects a conductor 36 to said contact element. This conductor is connected with the side D of the power supply line through the conductor B and the starting switch E. A contactor strip 37, suitably secured at 32 to the frame work supporting the switch, bears against some part of the grill A so that irrespective of the angular position of the areas of the grill, the grill will be electrically connected to the other side D of the power supply line.

If desired, transformer means may be connected in the line wires to reduce the line current of the solenoid to a proper amount. The left hand showing of switch S, in Fig. 14, shows an area 26 of the grill A in electrical contact with the contacts 30 and 31 of the swinging arm 21 so that circuits are established from the line wire D, on the power source side of the switch P, thence through the contact 37, to the grill A. One of said circuits proceeds from the grill, through the contact member 31 and the conductor 36 to the common or bus conductor B which is connected through a preferably manually operable switch E to the switch P, on the power supply source remote side thereof. This circuit serves to supply energy to the controlled apparatus when the switch E is closed and contact 31 engages the grill A, even though switch P may be open. The other circuit proceeds from the grill A through the contact 30, the connected solenoid 34 and the bus conductor 36a, thence through the snap switch M and the conductor 121 to the side C of the power supply line. Accordingly this circuit will serve to energise the solenoid 34 upon operation of the snap switch when the contact 30 is in engagement with the grill A. Means to be hereinafter described are provided for rotating the cylinder 20 to limit the duration of electrical conduction between the areas 26 of the grill and the contacts of the swinging arm 21 so that even though the arm 21 still rests against the cylinder 20 as the latter is rotated and the area 26 has been moved out from underneath contacts of the arm, the circuit to the solenoid 34 will be broken.

Fig. 14 shows three duplicate switch mechanisms S interconnected in parallel between the line D and the common conductors 36 and 121, and it should be understood that as many mechanisms S and associated solenoids 34 may be provided as may be needed for the adjustment of the controlled apparatus, such adjustment being accomplished in the manner hereinafter described, in response to the selective operation of the solenoids 34.

Utilization of the described switch mechanism for operating the solenoids is made to operate push pull buttons of a radio receiver so that a selected station will be operated when the timing device, to be later described, functions to close the connection between a swinging arm and its rotatable cylinder.

Fig. 15 illustrates diagrammatically three solenoids 34, the cores of which are connected to the push pull tuning buttons 40 of a radio set.

Referring to Fig. 2, there is disclosed a selector conditionable to operate, after expiration of a desired time interval to adjust or tune a radio receiver to a selected setting for broadcast reception.

X designates a push button of the present switch mechanism which, when pushed, will cause the setting up of certain instrumentalities to later depress one or more of the hinged arms 21 of a switch set S as shown in this figure. There are shown four such arms which constitute a gang arrangement for operating one station of a radio receiver in 15 minute intervals. The left hand hinged arm 21 is for the first 15 minutes of an hour, the next for the second 15 minutes, the third arm for the third 15 minutes and the fourth arm for the fourth 15 minutes of an hour. It is to be understood, of course, that the switch may be adapted for actuation of mechanisms other than radios, in which event the gang arrangement of the switch elements will be made to correspond to the mechanism to be energized.

In order to select and depress a selected arm 21, at the desired time, a clock driven drum mechanism is provided. This drum mechanism may comprise sections, one for each station to be tuned, and each section may comprise four circular discs 41, as shown diagrammatically in Fig. 2. These discs are all carried by a shaft 42 suitably journaled in the end walls of the casing. Figs. 3 and 6 illustrate elevational aspects of a disc. Referring to Fig. 3, a disc 41 has its periphery equipped with a plurality of pins 43 which are pivoted at 44 to a disc and these pins are swingable from radial or on position to oblique or off position, as illustrated in Fig. 8. The pivotal mounting of the pins is such to hold a pin in either on or off position as a disc is rotated. The normal position of the pins on the disc is the oblique or off position.

The four discs of a drum are so arranged that the pin carrying peripheral portion of the same aligns with the lengths of the several arms 21 of the switch. When a pin 43 is in on position and its disc is rotated to bring a pin against a swinging arm 21 in its normal position, the pin engages a hump 45 on the arm to swing the contacts 30 and 31 against the cylinder 20. The parts are so arranged that an arm 21 is held against its cylinder for at least 15 minutes.

In order to prevent pins 43 in either of the off or on position from accidentally moving to the other position, a partition member 46 is arranged adjacent the periphery of a disc, there being as many partition members as there are discs. Fig. 8 illustrates the partition member 46 as being so disposed as to have its margin between the position of a pin in off position and of a pin in the on position, as illustrated in Fig. 8. Thus, as the discs are rotated it is impossible for any pin to move from off to on position or vice versa position.

As before stated, Fig. 2 illustrates a gang of four hinged arms 21. Consequently there will be four discs in the drum which cooperate with these arms to selectively depress any one that may be determined by presetting of the device.

Referring to Fig. 1, the partitions 46 are readily apparent. A disc 41 is shown with the pins 43 thereof in oblique or off position.

In order to move a pin from off or on position, or vice versa, it is necessary that the pin

pass a partition. To this end the partitions are slotted as shown at 47 in Fig. 1, the slots in all of the partitions being in the same horizontal relationship. The button X of the selector device has a crosshead 48 extending horizontally across the edges of the four discs forming the drum for the X station.

To move a pin of any of the four discs of a drum, for any one station, a plurality of carrier bars are provided. These bars, 49, 50, 51, and 52 are illustrated in Figs. 2, 6, 9, 10, 11 and 12, and these bars are utilized to move the pins from the off to the on position. A carrier bar 53 illustrated in Fig. 13, is used to move pins from on to off position.

The carriers 49 through 52 inclusive are arranged in face to face relation one behind another with the carrier 52 nearest the crosshead 48 of the push button.

The carriers are each formed with an elongated opening 54 in which are mounted three tiltable fingers 55, 56 and 57, which are pivoted at their lower ends to the lower margin of the opening 54 and which are constrained to retracted position by springs 58 so that normally the fingers stand into position shown in Fig. 9. The fingers of the several carriers are so positioned thereon in relatively offset relation that when the carriers are mounted one behind the other the fingers of all of the carriers are in spaced side by side alinement with each finger opposite the edge of a corresponding pin disc 41. Each carrier is provided with a plurality of elongated openings 59, 60, 61 and 62 in the same horizontal row, two openings 63 and 64 in a row below the first, and two other openings 65 and 66 below the second row. A lug 67 extends downwardly from the margin of the carrier.

The fingers 55, 56 and 57 of the several carriers are arranged to set up pins on the discs for the three station selectors X, Y and Z, for successive first 15 minute periods of station operation. The fingers of carrier 49 set up the pins for the first quarter hour of operation for each station while the carriers 50, 51 and 52 respectively control the pins for succeeding quarter hour periods. The fingers 55 are operable by the crosshead 48 of the station button X, the fingers 56 are operable by the crosshead of the button Y, while the fingers 57 are operable by the crosshead of the button Z.

Referring to Fig. 2, it will be observed that there are a plurality of push buttons 68, 69, 70 and 71 having stems which extend respectively through the elongated openings 59 to 62 of the carrier 49 and similar openings in the other carriers. The openings 59 of the carriers 50, 51 and 52, the openings 60 of the carriers 49, 51 and 52, the openings 61 of the carriers 49, 50 and 52, and the openings 62 of the carriers 49, 50 and 51 are sized to freely receive the stems of the members 68, 69, 70, and 71 which accordingly may be pushed longitudinally through said openings without moving said carriers laterally of said stems. The openings 59, 60, 61 and 62 respectively of the carriers 49, 50, 51 and 52 are of smaller size, and the stems of the push buttons 68, 69, 70 and 71 respectively have wedge portions 62 so related with the said smaller openings in the carriers 49, 50, 51 and 52 will be shifted transversely of said stems, toward the left viewing Fig. 2, respectively upon operation of the buttons 68, 69, 70 and 71.

To set up a pin for the first 15 minutes of an hour of the X station, the button X is pushed

which swings the fingers 55 to the right, as viewed in Fig. 6. Such movement places the tongue 55a alongside an oblique pin on the disc, in register with the slot 47 of its partition. Then the push button 68 is pushed, the carrier 49 is moved to the left thus causing the tongue 55a to move the pin through the slot to on position, the buttons X and 68 are then released, leaving the pin in on position and returning the fingers and bar 49 to normal position.

To set up a pin for the second 15 minute period, the button X is pushed and then the button 69 is pushed moving the carrier 50 to the left to set the pin of the drum disc for the second 15 minute period.

It is to be understood that the button pressure of both the station button and carrier button is momentary, the carrier button being actuated after the station button is pushed.

It will thus be understood that the manner of setting up a pin applies to all of the drum discs there are, there being discs for three stations illustrated.

Should it be desired to move pins from the on to the off position, a button 72 is pushed which moves the carrier 53 to the right whereupon the carrier engages a pin to move it from on to off position through a proper slot 47 in a partition adjacent its particular drum disc. To this end the button 72 has a stem similar to the stems of the buttons 68, 69, 70 and 71. Said stem of button 72 extends in the openings 66 of the carriers 49, 50, 51 and 52, and is adapted to move longitudinally through said openings freely and without camming engagement with said carriers. The carrier 53 however has an opening in which the stem of the button 72 extends which opening is of a size and disposition such that when the button 72 is pressed, an edge of said opening will be cammingly engaged by a wedge shoulder on said stem, similar to the wedge shoulders 62 of the stems of the buttons 68, 69, 70 and 71, but facing in the opposite direction. Accordingly the carrier 53 will be moved toward the right, viewing Fig. 2, upon operation of the button 72 to shift pins to their off position.

As before stated, the device is herein illustrated as adapted to operate three radio station selectors. If more than three are to be operated, of course, the structure would be enlarged, the drum lengthened along its axis to provide a sufficient number of discs, four per station, to satisfy the need.

The drum shaft 42 is driven by electric clock mechanism designated generally at O in Fig. 1. The mechanism shaft 73 carries keyed to it a gear and cam arrangement including a gear 74 and a double cam having a rear cam surface 75 and a front cam surface 75a. A second gear 76 is rotatable on shaft 73 and meshes with pinion 45. A pinion 77 on shaft 78 meshes with gear 74.

The cam surface 75 has a spiral face 79 terminating in an abrupt shoulder 80 as shown in Fig. 18. The shaft 73 rotates in clockwise direction as viewed in the drawings.

Referring to Fig. 1, a vertically disposed bar 81 is disposed inwardly of one end wall of the casing. The upper end of the bar 81 is pivoted at 82 to one end of a horizontal bar 83 while the other end of it is supported by a pin 84 secured in the casing. A lug 85 extends downwardly from the lower margin of the bar 83 and rides on the face 79 of cam surface 75. The lower end of the bar

81 is guided by a pin 86 fastened in the adjacent side wall. The bar is normally held against upward vertical movement by a spring 87 fastened to stop 88 on the bottom of the casing and a lug 89 on the bar 81. Pivoted at 90 to the bar 81 is a lever 91 having its other end held by shaft 42. A pawl 92 is pivoted to the lever 91 to engage ratchet 93 which is keyed to the drum shaft 42. A spring 94 carried by the lever 91 normally urges the pawl into engagement with a tooth of the ratchet. It must be observed that as the clock shaft 73 is rotated, the bar 83 with its lug 85 on the cam face 79 of the cam surface 75 will oscillate about the pin 84 raising the bar 81 once for every revolution of the clock shaft 73 (see Figs. 3 and 18). Consequently the ratchet 93 is advanced one tooth every time the cam rear surface 75 is rotated.

Referring to Fig. 20, the front cam surface 75a has four spiral like surfaces 97 terminating in abrupt shoulders 80 arranged 90 degrees apart and upon which surfaces 97 the lug 85a on the bar 96 rides (see also Fig. 1). The shaft 73 rotates in clockwise direction as viewed in this figure. The bar 95 connected to one end of the bar 96, as shown in Fig. 3, is held in its lowermost position by a spring 98 connected between a stop 88 and a lug 99 on the bar.

The cam surface 75 makes one revolution per hour thereby advancing the ratchet 93 one tooth per hour. The advancement of the ratchet 93 drives the drum shaft 42 accordingly thus imparting rotation to the various drum discs on the shaft.

The illustrated device is arranged to make one revolution of the drum shaft 42 per week so that every time the ratchet wheel 93 has advanced, a pin 43 on any one of the drum disks will be moved from one hour position to the next hour position. The drum discs carry 119 pins, the balance of the peripheries of the drum discs being pinless. As thus arranged the drum will provide 119 pins for actuating the switch at hourly intervals for a week, the portions of the drum discs which are pinless represent the period of rest when the switch would be open. The rest period is for eight hours which is a duration of time the segment 97a of the gear 76 (see Fig. 19) is in engagement with the lug 85 on its bar 83, it being understood that the lug 85 is during this period in engagement with both the rear cam surface 75 as well as the segment 97 (see Fig. 3). This stops rotation of the shaft 42 for eight hours.

Outwardly at one end of the casing and attached to the drum shaft 42 is a hand wheel 100 having indicia on its periphery denoting the days of the week in hourly intervals and the time of the day and the hours such as Monday 7:00 a. m. and Monday 8:00 a. m. etc. The divisions represent full hours.

Suppose an operator desires on Friday afternoon sometime to set the device to cut in his radio at 8:00 a. m. Monday to operate his radio for fifteen minutes on station X. The hand wheel 100 would be rotated until the indicia of Monday 8:00 a. m. were in register with the pointer 101. Movement of the hand wheel in this manner brings the pins 43 for the Monday 8:00 a. m. switch in line with the recesses 47 in the portion 46. The push button X is depressed and held, which moves the finger 55 to position their tongues 55a in line with the pins adjacent the slots 48. Then the button 63 is pushed, moving the carrier bar 49 to the left so that the

tongues 55a will swing the pin through the slot to "on" position. The hand wheel is then rotated until the indicia thereon representing the Friday afternoon time is opposite the pointer 101.

Thereafter the device continues in operation and Monday at 8:00 a. m. will automatically close the radio circuit to the solenoid 34 which is connected to the push button of the radio set for the X station.

In the same manner any station for any time may be preset and the selective station tuned in at such time.

The cylinder 20, Fig. 3, of the switch arrangement is given rotating movement by means of a pawl 102 engaging a ratchet wheel 103 on the shaft 104 which mounts all of the cylinders for the several switches. The pawl 102 is carried by a rocking bar 105 which is pin connected at 106 to upright bar 95. The ratchet 103 has as many teeth as there are 15 minute period divisions in the contact grill A of the cylinder 20. There are 16 such divisions circumferentially of the cylinder. The cam surface 75a makes one revolution every hour, and by reason of its four spiral surfaces 97 and spaced shoulders 80, the bar 96 is actuated four times during each revolution and each time actuates the upright bar 95, whereby the ratchet 103 is advanced one tooth every 15 minutes. This arrangement maintains an area 26, 27, 28 or 29 of the grill A in engagement with its meeting hinged arm contact for a period of 15 minutes. Even though the arm may be held against the cylinder 20 for a longer period of time, the contacted area A moves out from underneath the contact on the hinged bar after a 15 minute engagement period.

The apparatus of the present invention is readily applicable to push button type of radio sets to tune in any station for any length of time at some future date.

For every push button of the radio there is connected a solenoid, the armatures of the solenoids being joined to the radio push buttons to move one in circuit closing position when any solenoids are energized. An electric circuit for the solenoid includes four switches which are capable of being closed sequentially. The first switch closes the solenoid circuit for a first period of 15 minutes, the second switch closes the circuit for a second period of 15 minutes. The third switch closes the solenoid circuit for a third 15 minute period while the fourth 15 minute period is closed by a fourth switch. Utilizing such switch it is possible to preset a device so that any station in the range of the radio set may be tuned in at a later date for any particular time.

To operate the four switches, per station, the four drum discs heretofore described are utilized. A mechanism as illustrated is arranged to make one rotation of the drum shaft and its drum in one week, the dwells are of one hour duration. The cylindrical rotatable switch member makes one rotation in four hours with a dwell of 15 minutes. Because of the continued engagement of an arm 21 against the cylindrical switch member 20 and the arrangement of the spaced contact areas the electric connection between any area and its remaining conductor member of the hinged arm is limited to 15 minutes. In other words, the cylinder is rotated a distance, per step, to carry a contact area out from under its mating contact. There being four area spaces per hour for these four switches. One station may be tuned in to reproduce for a whole hour, half

hour, quarter or three-fourths of an hour by suitable manipulation of the push buttons which move the carrier bars 49, 50, 51 and 52.

The hand wheel 100 is provided with indicia showing the days of the week, the days divided into hourly periods so that the mechanism may be preset to tune in a radio station any time within a week after presetting.

Referring to Fig. 14 a conductor 120 is connected to the return wires 36a of the several solenoids, and leads to one contact 122 of a snap switch M. The switch includes a slotted bar 123 pivoted at 124 to the casing. A slide 125 projects through the slot in the bar and has an end 126 working in a guide 127. A spring 128 surrounds the end between the guide 127 and the slide to urge the slide to the left to swing the bar 123, which carries a contact 129 on its lower end, away from the contact 122, thus normally keeping open the return circuits from the solenoids to the line C. The conductor 121 is connected to the contact 129. A cam 130 on the shaft 73 has four points 131 arranged 90 degrees apart with the points in line with the slide 125. Whenever a point 131 engages the slide the slide is moved to the right, as viewed in Fig. 14, momentarily closing the return circuits of the solenoids. The cam 130 is timed so that the slide is actuated whenever the circuit is closed to a solenoid by the switch of Fig. 14. Even though the conductor 30 of arm 21 remains against an area of the grill A, no current will pass to a solenoid. This action snaps one of the radio push buttons 40 to circuit closing position in the radio set.

The invention has been described more or less as to details, yet it is to be understood that the invention is not to be limited thereby, as changes may be made in the arrangement and proportion of parts and equivalents may be substituted without departing from the spirit and scope of the invention.

I claim:

1. A mechanism of the class described comprising a plurality of station buttons, station set ups operative by said buttons, a station set up including four drum discs driven in unison, four switches operable by four discs, manual means for moving the drum to presetting position, a carrier movable parallel to the drum axis, a finger hinged to said carrier, said discs carrying pins along their peripheries and normally maintained in oblique or off position, and means for moving a carrier to cause its finger to move a pin to radial or on position.

2. A device of the class described, in combination, a presettable electric switch mechanism including a first contact, a second contact hinged to swing against or away from the first contact, a drum disc rotatable in the plane of said second contact, said drum disc having a plurality of pins along its circumference movable from oblique or off position to radial or on position, a pin in radial or on position engaging the said second contact to move it into engagement with said first contact, means for moving a pin to radial or on position, and means for rotating the drum.

3. A device of the class described, a rotatable drum disc having a plurality of pins pivoted along its periphery and movable between radial position and oblique position, means for selecting and moving a finger to radial position, an electric switch having a movable contact member engageable by a finger in radial position to close the switch to establish an electric circuit, said switch

having another member comprising a rotatable cylinder having a conductor plate on its surface forming a contact area engageable one after another by said first movable switch member as said cylinder is rotated and arranged to open the circuit between said two switch members while both members are in contact as the cylinder is rotated to move a contact area away from the first movable member, clock mechanism for intermittently rotating said cylinder, and clock mechanism for intermittently rotating said drum to move said finger in radial or off position from said switch member after a predetermined time interval to cause separation of said two switch members.

4. A device of the class described, a rotatable drum comprising four discs, every disc carrying a plurality of pins on its periphery with the pins maintained normally in oblique or off position, a partition member between the positions of the pins in oblique and radial or on position to prevent accidental movement of a pin in either direction, said partition have a gap in it through which a pin may be moved from one position to the other when the disc is at rest in a presetting position.

5. A structure as described in claim 4 characterized by a carrier endwise movable in a direction parallel to the drum axis, said carrier supporting a finger having limited swinging movement at right angles to the drum axis, said finger having a nose to move a pin from off position through said gap to on position when the finger is tilted to presetting position, a spring normally holding said finger in retracting position, a push button for tilting said finger to pin engagement position, and push button means for moving the carrier endwise while the finger is tilted to move the pin from off to on position.

6. A structure as described in claim 4 characterized by a carrier endwise movable in a direction parallel to the drum axis, said carrier supporting a finger having limited swinging movement at right angles to the drum axis, said finger having a tongue to move a pin from off position through said gap to on position when the finger is tilted to presetting position, a spring normally holding said finger in retracting position, a push button for tilting said finger to pin engagement position, and push button means for moving the carrier endwise while the finger is tilted to move the pin from off to on position, and another carrier movable parallel to the first carrier to move the pin from on to off position when said pin is in register with the partition gap and the drum is at rest.

7. In a mechanism of the class described, a drum comprising four discs carrying pins pivoted along its periphery and normally maintained in oblique position, partition members arranged to prevent accidental movement of said pins, means for intermittently rotating said drum, said partition means having gaps in register with a pin along the drum when it is at rest, a plurality of carriers movable endwise parallel to the drum axis and carrying fingers, the first carrier having a finger adapted to engage a pin of the first disc, second carrier having a finger adapted to engage with the pin of the second disc, third carrier having a finger adapted to engage a pin of the third disc, a fourth carrier having a finger adapted to engage the pin of the fourth disc, means for tilting said fingers, a push button effective to move the first carrier endwise to move a disc finger through the gap to on position, a second push button for moving the second car-

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rier in like manner, a third push button for moving the third carrier in like manner, a fourth push button for moving the fourth carrier in like manner, a fifth push button for moving the first and second carriers together, a sixth push button for moving the third and fourth carriers together, a seventh push button for shifting all of the carriers simultaneously, and another push button for moving a fifth carrier in the opposite direction to return the pins in on position to off position.

8. A device of the class described including a drum rotatable in step by step movement and carrying a plurality of switch closing pins, means operable to set the pins selectively in operative or in inoperative position on the drum, means for moving said drum comprising a bar pivoted to the drum axis and carrying a pawl to engage a ratchet on the drum, a vertically movable bar pivoted to the said first bar, a horizontal movable bar pivoted at one end to a fixed point and pivoted at the other end to said vertical movable bar and cam acting against said horizontal bar to swing it about in timed relation and clock mechanism for driving said cam.

9. An electric switch mechanism of the class described, including a rotatable conductor carrying a drum, switch operating pins selectively adjustable on the drum to switch operating and switch inoperable positions, means for intermittently rotating said drum, said means including a ratchet on the drum, a lever pivoted at one end to a fixed support and carrying a pawl engageable with the ratchet, the other end of the lever being pivoted to an upright bar, the upright end of which is pivoted to a horizontal disposed bar with its other end swingable on a fixed pivot, cam means for raising said horizontal bar intermittently, and clock mechanism for actuating said cam means.

10. A structure as recited in claim 9 characterized by the provision of means for rendering the cam movement of the horizontal bar ineffective for a predetermined period of rest.

11. In a mechanism of the class described, a drum shaft, plurality of drum discs on the shaft, a plurality of actuating pins hinged to the periphery of the disc to normally maintain an oblique inoperative position, means for moving pins to radial operative position, pawl and ratchet means for intermittently rotating the drum axis, clock mechanism operating continuously, mechanism actuated by the clock mechanism for operating the pawl and ratchet mechanism to rotate the drum for a portion of its path of rotation, and other means actuated by the clock mechanism for disabling the actuation of the pawl and ratchet mechanism for a predetermined period of rest.

12. A mechanism of the class described, a rotatable drum, a drum comprising a plurality of similar discs, the discs carrying a plurality of pins along their peripheries, said pins being normally maintained in oblique position, means for moving the pins to on or radial position, said moving

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means comprising a plurality of endwise movable carrier bars movable parallel to the drum axis, the bars carrying a plurality of hinged fingers, the fingers having noses projectable into the path of an oblique pin, all of the fingers of the said several carrier bars being coaxially arranged, and a push button for moving a group of fingers into pin moving position.

13. A structure as described in claim 12 characterized by means for moving the pins in radial to off position, said means including an endwise movable carrier bar having projections engageable with pins in the on position, and means for moving the bar endwise in one direction to move the pins from on to off position.

14. In apparatus for the pre-selected tuning of radio receivers, the combination, with the tuning selector switches of the receiver, of an actuating solenoid operatively associated with each of said switches, whereby to actuate each selector switch when its associated solenoid is energized, a solenoid circuit for each of said solenoids, a control switch in each circuit, and having one contact in the form of a metallic plate mounted on the surface of a rotatable drum and having spaced contact and insulated areas, and the other contact being secured on a hinged arm, means for moving the hinged arm against the rotatable drum, means normally urging said hinged contact arm and its contact away from electrical contact with said plate on said drum, and time operated means for rotating the drum to limit the duration of electrical connections between said contacts.

15. A mechanism as described in claim 14 characterized by the provision of clock controlled mechanism for moving said hinged arm against the drum to establish electric connections between them, means for pre-setting said mechanism to move said arm at the expiration of a selected time interval, said means for rotating said drum comprising clock controlled mechanism.

THOMAS G. BURRICHTER.

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