Sept. 12, 1939. E. H. PITNEY 2,172,623

AUTOMATIC STATION SELECTOR FOR RADIO RECEIVERS

Filed Oct. 4, 1937 3 Sheets-Sheet 1

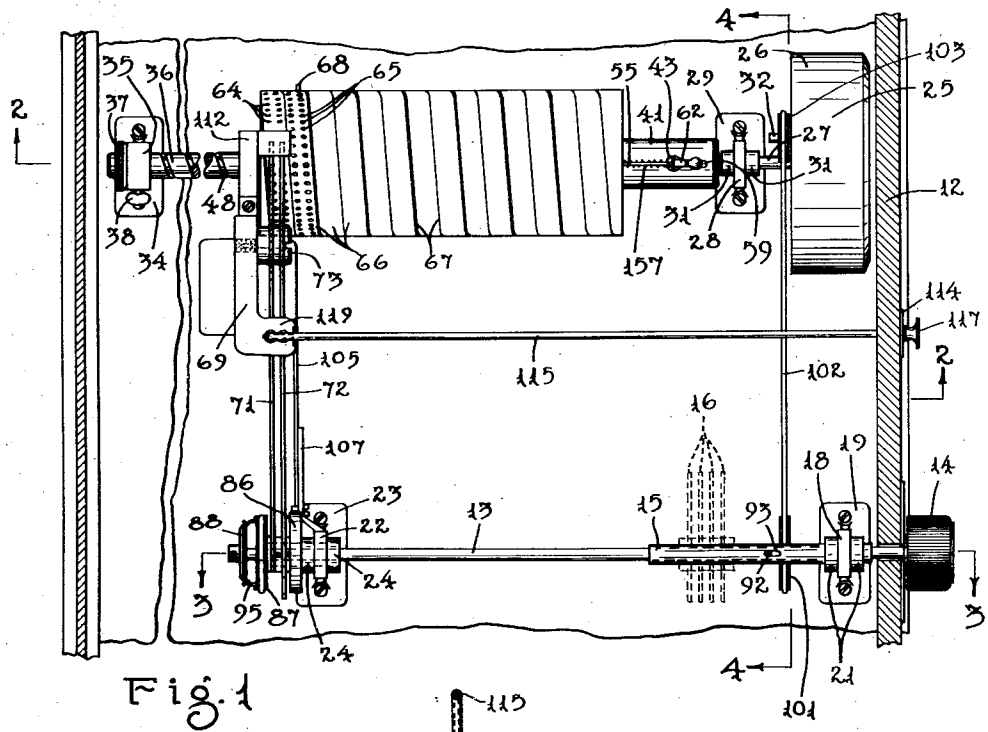


Fig. 1

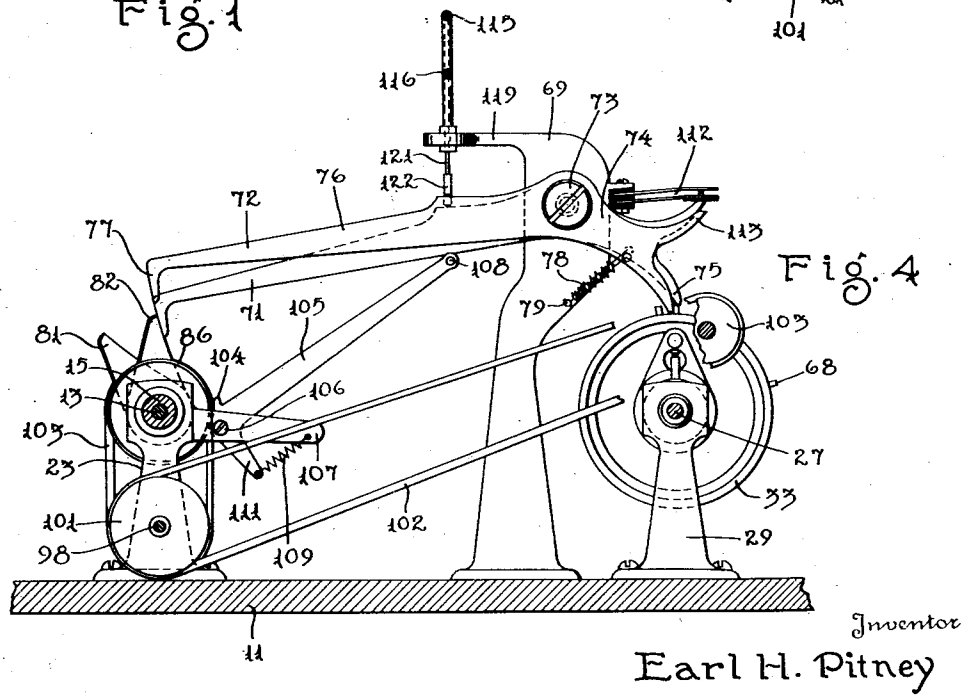


Fig. 4

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AUTOMATIC STATION SELECTOR FOR RADIO RECEIVERS

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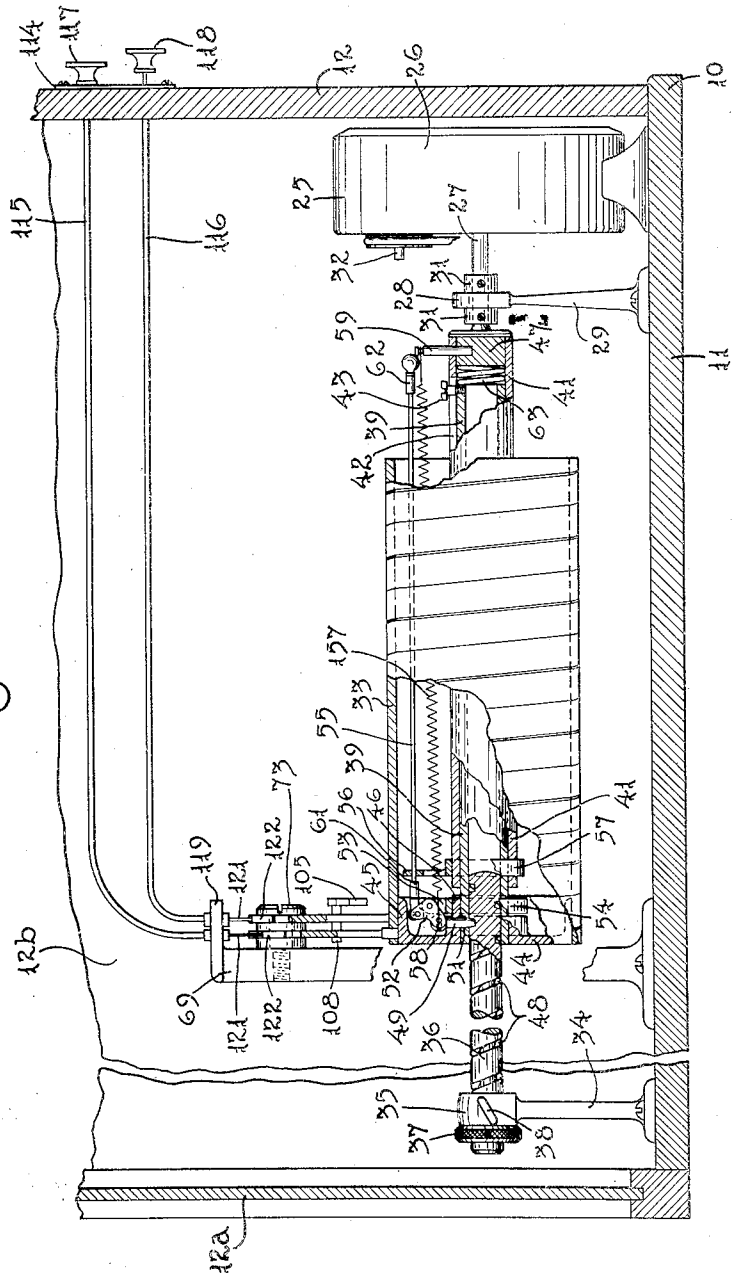


Fig. 2

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AUTOMATIC STATION SELECTOR FOR RADIO RECEIVERS

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Fig. 3

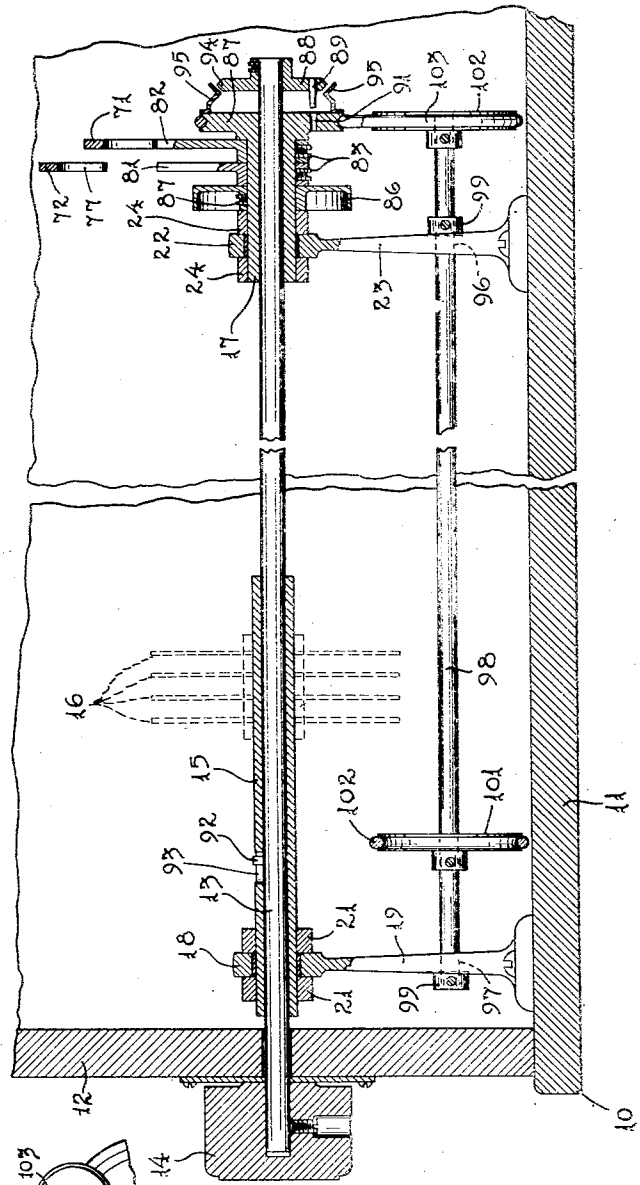
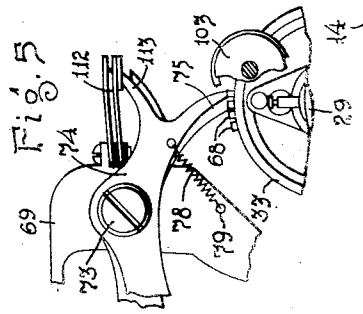


Fig. 5



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Patented Sept. 12, 1939

2,172,623

UNITED STATES PATENT OFFICE

2,172,623

AUTOMATIC STATION SELECTOR FOR RADIO RECEIVERS

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Application October 4, 1937, Serial No. 167,182

15 Claims. (Cl. 250—40)

My invention relates to automatic station selectors for radio receivers and has for an object to provide a device of such a character whereby programs may be selected and arranged throughout twenty four hours a day for an entire week and automatically tuned in on the radio at the appropriate times.

Another object of the invention resides in providing a station selector in which the entire mechanism is reset at the end of the week so that the same arrangement of programs is presented each week.

Still another object of the invention resides in providing a device which is extremely simple and practical in construction and will not readily get out of order.

A further object of the invention resides in providing a device which can be used manually in the customary manner without interfering with the program arrangement or which can be set for a certain station and caused to operate continuously at such setting without interfering with the program arrangement.

Another object of the invention resides in providing a device by means of which sharp tuning of the radio receiver can be procured.

Other objects of the invention reside in the novel combination and arrangement of parts and in the details of construction hereinafter illustrated and/or described.

In the drawings:

Fig. 1 is a plan sectional view of a portion of a radio receiver and an automatic station selector illustrating an embodiment of my invention.

Fig. 2 is an elevational sectional view taken on line 2—2 of Fig. 1.

Fig. 3 is an elevational sectional view taken on line 3—3 of Fig. 1.

Fig. 4 is an elevational sectional view taken on line 4—4 of Fig. 1.

Fig. 5 is a fragmentary view similar to Fig. 4 showing a different arrangement of pegs.

My invention may be used in conjunction with any type of radio receiver. For this reason the radio proper has not been shown in detail in this application and only so much thereof as pertains to the present invention has been illustrated.

The radio receiver which I have shown in conjunction with my improved automatic station selector comprises a cabinet 10 having a base 11, a front panel 12 and other walls 12a and 12b. Extending through the panel 12 is a shaft 13 to which is attached upon the exterior of the panel a knob 14. Knob 14 is used for manually tuning the radio receiver in the customary manner. The shaft 13 has mounted upon it a sleeve 15 which has secured to it condenser plates indicated diagrammatically at 16. These plates constitute the tuning element of the radio receiver and cooperate with other stationary plates in a well known manner. The shaft further has mounted upon it a sleeve 17 which may rotate relative thereto. The sleeve 15 is rotatably supported in a bearing 18 which is mounted on a standard 19 secured to the base 11. Collars 21 secured to the sleeve 15 and engaging the bearing 18 restrain longitudinal movement of the sleeve 15 with reference to the said bearing. The sleeve 17 is similarly journaled in a bearing 22 which is formed on a standard 23 secured to base 11. Sleeve 17 is similarly held from endwise movement relative to the bearing 22 by means of collars 24.

For procuring timed operation of the invention, an electric clock 25, illustrated in Figs. 1 and 2, is employed. This clock may be of any suitable type and is constructed with a case 26 in which the electric motor and reduction gearing are contained. The clock further includes an hour hand shaft 27 which projects outwardly therefrom and which is journaled in a bearing 28. Bearing 28 is mounted on a standard 29 secured to base 11. The shaft 27 is held from endwise movement relative to the bearing 28 by means of collars 31. The clock 25 also includes another shaft 32 which travels at a reduced rate of speed but at a considerably greater rate of speed than the hour hand shaft 27. This shaft is used for procuring power for operating the station finding mechanism of the invention as will be hereinafter more fully described.

The invention, for the purpose of selecting stations, utilizes a drum 33 which is supported for rotation and axial movement and driven by shaft 27 in the following manner. Attached to the base 10 is an upright 34 which carries a support 35 in the form of a bearing and which rotatably receives the end of a stationary spindle 36. Spindle 36 may be rotated within said support 35 by means of a hand wheel 37 secured to the end of the same. A set screw 38 threaded into the support 35 holds the spindle 36 in fixed position relative thereto. The spindle 36, is, at all times, disposed in axial alignment with the shaft 27. Slidably and rotatably mounted on the spindle 36 is a sleeve 39. This sleeve is slidably received within another sleeve 41. Sleeve 41 is constructed with a longitudinally extending slot 42 in which is disposed a key 43 which is threaded and screwed into sleeve 39. This key effects

a drive for the sleeve 39 from the sleeve 41 and at the same time permits of axial movement of the sleeve 39 with reference to the sleeve 41. The drum 33 is constructed with an end wall 44 which is formed with an outwardly extending flange 45 to which said drum is attached. The end wall 44 is further constructed with an inwardly extending boss 46 in which the sleeve 39 extends. Sleeve 39 is securely mounted within the boss 46 and is attached thereto either by a force fit or in any other suitable manner so that rotation of sleeve 39 procures rotation of the drum 33. The sleeve 41 is attached to a head 47 which in turn is secured to the end of shaft 27. Rotation of shaft 27 procures rotation of sleeve 41 and at the same time sleeve 39 and drum 33 are rotated through the key 43 acting in slot 42. It will be readily comprehended that as drum 33 rotates, the same may also move axially.

The spindle 36 is constructed with spiralling threads 48 which extend substantially throughout the length thereof. A pin 49 slidably mounted in a bore 51 formed in the sleeve 39 and hub 46 of end wall 44 is adapted to engage the threads 48 and to follow along the same as the drum 33 rotates. By means of this construction the drum is caused to advance along the spindle 36 as said drum is rotated by clock 25. The pin 49 is pivotally secured to a bell crank 52 which is pivoted to a lug 53 issuing from a collar 54 fast on the hub 46. This bell crank has pivoted to it a link 55 which is guided for movement in a guide 56 issuing from another collar 57 which in turn is secured to the sleeve 41. A long tension coil spring 157 is attached to the pivot 58 between the pin 49 and bell crank 52 and is further attached to a finger 59 extending outwardly from the sleeve 41. The link 55 has formed on it at its inner end a collar 61 and at its outer end a similar collar 62. These collars are adapted to alternately engage the guide 56 and as axial movement of the drum 33 continues after engagement of either of these collars with said guide the bell crank 52 is swung in one direction or the other to withdraw the pin 49 from engagement with the threads 48 or to move the same into engagement therewith. The pivot 58 to which spring 57 is attached is so disposed that the same swings past the center of the pivot of bell crank 52 whereby the spring serves to hold the pin 49 positively in either engaged or disengaged position. The spring 157, in addition to operating the bell crank 52, returns the drum 33 to normal position after the pin 49 has been disengaged by means of the collar 62. When such action occurs, the drum is rapidly returned and to prevent injury to the apparatus a buffer spring 63 is employed which is disposed within the sleeve 41 and which acts between the end of the sleeve 39 and the head 47. As the drum 33 is rotated the same is advanced along the spindle 36 until the same becomes disengaged through the action of the collar 62 cooperating with the guide 56. This disengages pin 49 and spring 57 immediately returns the drum to normal position. As the drum approaches normal position collar 61 engages guide 56 and again brings the pin 49 into engagement with the threads 48. Drum 33 then continues to operate as previously described.

The drum 33 is employed for the purpose of starting and stopping the radio receiver at the desired times and in accordance with any desired program arrangement. Toward this end a plurality of radial holes are employed which are arranged in the surface of drum 33 as shown in Fig. 1. These holes are disposed helically with reference to the drum. The invention may be used to operate the radio receiver in conjunction with any desired number of stations but in order to simplify the drawings the present invention has been shown as capable of use in conjunction with two stations which for the purpose of illustration will be referred to as stations A and B. The holes referred to are arranged in two groups and are indicated as 64 and 65, the holes 64 controlling the operation of the radio receiver when tuned in on station A, and the holes 65 controlling the operation of the radio receiver when tuned in on station B. These holes are spaced circumferentially a distance corresponding to 15 minute intervals so that the programs of the radio receiver may be changed at 15 minute intervals if desired. The holes 64 and 65 are arranged in zones such as designated by reference numerals 66 which are defined by spiralling lines 67 formed on the exterior of the drum. Also the zones 66 are divided up into sections indicating night and day and suitable indicia placed along the marginal periphery of the drum 33 to indicate the various times of the day. Cooperating with the holes 64 and 65 are a number of pegs 68 which may be manually inserted into the same. These pegs are slightly tapered and form a tight fit in the holes and are thus held in position.

The pegs 68 on drum 33 are adapted to operate two levers 71 and 72. These pegs serve as actuating members and said pegs and levers form parts of actuating devices for procuring operation of the invention. These levers are both pivoted on a pintle 73 which is mounted on a standard 69 secured to base 11. Levers 71 and 72 are identical in construction and are constructed with arms 74 arranged in proximity to the drum 33. These arms are formed with fingers 75 adapted to be engaged by the peg 68 whereby the levers are swung on the pintle 73. Levers 71 and 72 are further constructed with arms 76 which extend in the opposite direction from the arms 74 and toward the sleeve 17. These arms have fingers 77 at the outer ends thereof which serve a purpose to be presently more fully described. Fingers 75 are normally maintained in engagement with the surface of the drum 33 by means of tension coil springs 78 which are secured at one end to the arms 74 and the other ends to a pin 79 extending outwardly from the standard 69.

Mounted on the sleeve 17 are two stops 81 and 82 which are secured thereto by means of set screws 83. Adjacent the stop 81 is a brake drum 86 which is provided with a set screw 87 by means of which the same may be properly secured to the sleeve. The stops 81 and 82 are adapted to be engaged by the fingers 77 of levers 71 and 72 and when so engaged terminate rotation of the sleeve 17. The sleeve 17 is provided at its end with a pulley 87 by means of which the same may be rotated. Secured to the end of shaft 13 is a clutch disk 88 which is provided with a clutch pin 89 adapted to engage a socket 91 in the pulley 87. When shaft 13 is pulled outwardly through knob 14, pin 89 is brought into engagement with socket 91 and effects a drive between the pulley 87 and shaft 13. Issuing outwardly from shaft 13 is a pin 92 which may slide axially in a slot 93 formed in sleeve 15. This pin forms a drive between shaft 13 and

the condenser plates 16 whereby tuning of the radio receiver may be procured. Slot 93 at the same time permits engagement or disengagement of clutch pin 89 with the socket 91. For the purpose of holding the clutch pin 89 into or out of engagement with the socket 91, the peripheral edge of the disc 89 is constructed V-shaped as indicated at 94. This edge is adapted to engage two or more spring clips 95 attached to pulley 87 which serve to hold the disk in either of its two extreme positions.

The sleeve 17 is driven in the following manner. Formed in the standards 19 and 23 are bores 96 and 97 which serve as bearings for a countershaft 98. Collars 99 attached to the shaft 98 and disposed adjacent the bearings 96 and 97 restrain longitudinal movement of the shaft within its bearings. The shaft 98 has attached to it at one end a pulley 101. A belt 102 passes over this pulley and over another pulley 103 secured to shaft 32 of clock 25. By means of this construction the countershaft 98 is driven. Shaft 98 has secured to the other end thereof another pulley 102a. A belt 103 passes over this pulley and the pulley 87 on sleeve 17. This belt effects a drive for the sleeve 17 from the countershaft 98. One of the belts 102 or 103 is sufficiently loose so that when the rotation of the sleeve 17 is arrested this belt slips and does not stop the clock 25.

Operating in conjunction with the brake drum 86 is a brake shoe 104 best shown in Fig. 4. This shoe is attached to a lever 105 which is pivoted on a pintle 106 secured to a bracket 107 extending outwardly from the standard 23. Lever 105 is provided at its extreme end with a pin 108 which is adapted to be engaged by either of the arms 76 of levers 71 and 72. When either of these levers is in the position of lever 71 in Fig. 4 the brake shoe 104 is free from the brake drum 86 and sleeve 17 may rotate freely. The lever 105 is normally urged toward the lever 71 and 72 by a tension coil spring 109 which is attached at one end to the bracket 107 and its other end to an arm 111 formed on lever 105. This spring also urges the shoe 104 into engagement with the brake drum 86 and arrests movement of the sleeve 17 when lever 105 is not depressed by either lever 71 or 72.

The operation of the invention is as follows. In the adjustment of the device the two stops 81 and 82 are positioned so that movement of the shaft 13 is terminated when the condenser plates 16 are at the proper position to tune in the stations desired. Adjustment of these stops is procured by loosening set screws 83 and tightening the same after the proper positions are found. Pegs 68 are now inserted in the proper holes 64 and 65 to procure operation of the radio receiver at the desired times. Normally the clock 25 is running and one of the belts 102 or 103 slipping and the sleeve 17 stationary. As the drum 33 rotates the first peg opposite the fingers 75 of lever 71 and 72 will engage said finger and depress the finger 77. As soon as this finger commences to move pin 108 is depressed which releases the brake shoe 104. This frees the brake drum 86 and sleeve 17 and shaft 13 commences to rotate. As soon as finger 77 is sufficiently depressed the same comes into engagement with the particular stop 81 or 82 with which it cooperates and the sleeve 17 and shaft 13 are arrested. This is the position in which the radio receiver is tuned for the desired station. Due to the adjustment of the stops 81 and 82 and to the mechanism for arresting movement thereof sharp tuning of the radio receiver can be procured. Furthermore once these stops have been set, the radio condenser can be repeatedly stopped accurately at the same places so that repeated operation can be procured without variation.

Attached to standard 69 is an electric switch 112 which is normally open and which is adapted to be closed by either of two fingers 113 one on each of the levers 71 and 72. This switch is connected in the radio circuit and serves to start and stop the radio receiver. When either of the levers 71 and 72 are depressed and engages the corresponding stop 81 and 82 the switch 112 is closed and the radio receiver operates. Each of the pegs 68 is of a circumferential extent great enough to cause the radio receiver to operate for 15 minutes. If the radio receiver is to operate continuously it becomes necessary to arrange a number of pegs 68 in succession which maintain the finger 75 elevated and the sleeve 17 arrested. As soon as the finger 75 reaches the last peg 68 the corresponding lever is moved by its spring 78 to disengage finger 77 from stop 81 or 82 and free the sleeve 17. This also sets brake 105 which stops the drum 86. One of the belts 102 or 103 again slips and the clock continues to operate until one or the other of two levers 71 or 72 is released by additional pegs 68 attached to the drum 33. It will readily be comprehended that programs may be arranged in advance for every hour of the day and for every day of the week so that once the device is set it will repeat itself every week. This is possible by reason of the fact that the drum 33 makes 14 revolutions before the same is returned, each revolution representing 12 hours.

To permit of selectively tuning the radio receiver to either of stations A or B and operating the same independently of the drum 33 and without interfering with the program arrangement procured by the pegs on drum 33, a mechanism is employed which is bet shown in Fig. 2. Attached to the panel 12 of case 10 is an escutcheon plate 114. To this plate is secured two flexible tubes 115 and 116 which are also secured to an ear 119 formed on upright 69. Within these tubes are spring steel wires 121 which have attached to their outer end knobs 117 and 118 by means of which the same may be slid longitudinally along the tubes 115 and 116. The other ends of the wires 121 have secured to them buttons 122 which are adapted to engage the levers 71 and 72 and to depress the same. It will readily be comprehended that the shaft 13 may be held from movement by forcing the knobs 117 and 118 inward y which holds the fingers 77 of either of the levers 71 or 72 in engagement with its corresponding stop 81 or 82. This closes the regular radio switch and causes the radio receiver to perform without interruption or change of station. When so operated the radio receiver is no longer shut off at the end of each chosen period but continues to operate with the station selected through knobs 117 and 118 regardless of the setting of the pegs 68 on drum 33.

If it is desired to operate the radio receiver manually and without interfering with the program arrangement, this may be accomplished by forcing the knob 14 inwardly as shown in Fig. 3. Shaft 13 is then disengaged from sleeve 17 and may be manually rotated.

The advantages of my invention are manifest. An extremely simple and practical construction

is provided whereby radio programs may be arranged a week in advance and the radio receiver be automatically started and tuned in at the proper times. The device permits of tuning the radio receiver to any station without interfering with the arrangement of the programs. With my invention the radio receiver can be manually operated in the customary manner without interfering with the program arrangement. At the end of the week the entire device becomes automatically reset and the performance is repeated each succeeding week. Pegs may be positioned while the drum is disposed within the radio receiver to permit of program arrangement. The device is positive in action and will not readily get out of order.

Changes in the specific form of my invention, as herein disclosed, may be made within the scope of what is claimed without departing from the spirit of my invention.

Having described my invention, what I claim as new and desire to protect by Letters Patent is:

1. In combination with the tuning element of a radio receiver, a chronometrically rotated shaft, a second shaft splined relative to said first shaft and rotatable therewith, a drum carried by said second shaft, a fixed screw cooperating with said second shaft to move said drum axially upon rotation thereof and means controlled by said drum for operating said tuning element.

2. In combination, a chronometrically rotated shaft, a second shaft splined relative to said first shaft and rotatable therewith, a drum carried by said second shaft, a fixed screw, a member carried by said drum and movable to engage or disengage the threads of said screw for moving the drum longitudinally upon rotation of said second named shaft, means for engaging said movable member when the drum is at one position relative to the screw and means for disengaging the movable member when the drum is at another position relative to the screw.

3. In combination, a chronometrically rotated shaft, a second shaft splined relative to said first shaft and rotatable therewith, a drum carried by said second shaft, a fixed screw, a movable member carried by said drum and adapted to engage or disengage the threads of said screw and adapted to advance said drum along said screw in one direction, means for bringing said movable member into engagement with the screw at the one extreme position of said drum, means for disengaging said movabe member from said screw at the other extreme position of said drum and a resilient member for returning said drum to its first named position.

4. In combination, a chronometrically rotated shaft, a second shaft splined relative to said first shaft and rotatable therewith, a drum carried by said second shaft, a fixed screw, a movable member carried by said drum and adapted to engage or disengage the threads of said screw and adapted to advance said drum along said screw in one direction, a bell crank to which said member is pivoted, means for pivoting said bell crank to said drum, a link connected to said bell crank and extending longitudinally within said drum, a guide carried by said rotatable shaft along which said link travels and shoulders on said link adapted to engage said guide to move said bell crank in opposite directions to effect engagement and disengagement of said movable member with said screw.

5. In combination, a chronometrically rotated shaft, a second shaft splined relative to said first shaft and rotatable therewith, a drum carried by said second shaft, a support, a screw mounted for rotary adjustment in said support and concentrically arranged with respect to said second named shaft, means for normally holding said screw from adjustive rotation with reference to said support, and means carried by said drum for engagement with said screw to procure movement of said drum longitudinally of said screw responsive to rotation of said drum.

6. In combination, a chronometrically rotated tubular shaft having a longitudinally extending slot therein, a tubular shaft within said first named shaft, a spline attached to said second named tubular shaft and slidable along said slot, a drum secured to said second named tubular shaft, a fixed screw disposed within said second named tubular shaft, and means carried by said drum for engagement with the threads of said screw.

7. In combination, a revoluble member for rotating the tuning shaft of a radio receiver, yieldable means tending to rotate said member, a stop on said member, a lever having a finger adapted to engage said stop, a chronometrically rotated drum, means on said drum for moving said lever to bring said finger into engagement with said stop and brake means operated by said lever for arresting the movement of said revoluble member when said finger is disengaged from said stop.

8. In combination, a revoluble member for rotating the tuning shaft of a radio receiver, yieldable means for tending to rotate said member, a stop on said member, a lever having a finger adapted to engage said stop, a chronometrically rotated drum, means on said drum for moving said lever to bring said finger into engagement with said stop, a brake drum rotatable with said revoluble member, a pivoted brake shoe adapted to engage said brake drum to arrest movement of said revoluble member and means operated by said lever for disengaging said brake shoe upon movement of said finger toward said stop.

9. In combination, a fixed elongated screw, a drum rotatably and longitudinally slidably mounted on said screw, an element carried by said drum and shiftable into and out of engagement with the threads of said screw, means for maintaining said drum in rotative movement, means for shifting said element into and out of engagement with said screw at respective extreme longitudinally shifted positions of said drum on said screw, and means yieldably urging said drum toward the first of said respective positions thereof.

10. In combination, a chronometrically rotated shaft, a longitudinally movable rotatable drum rotated by said shaft, a screw, releasable thread engaging means adapted to engage the threads of said screw for moving said drum longitudinally in one direction upon rotation thereof, means operable to release said thread engaging means when the drum reaches a predetermined position in its course of longitudinal movement, said drum when said thread engaging means is released being longitudinally slidable relative to said screw for return to an initial position.

11. In combination, a fixed elongated screw, a drum rotatably and longitudinally slidably mounted on said screw, an element carried by said drum and shiftable into and out of engagement with the threads of said screw, means for maintaining said drum in rotative motion, an elongated member carried within said drum for movement longitudinally thereof, means con-

necting said member to said shiftable element to cause shifting of said element into and out of engagement with said screw responsive to movement of said member in respective directions relative to said drum, stop means on said member, and stop means immovable longitudinally of said drum for cooperation with said first-mentioned stop means to cause shifting of said element into and out of engagement with said screw at the respective extreme longitudinally shifted positions of said drum on said screw.

12. In combination with a radio receiver, a tubular tuning shaft, means for journaling said shaft and restraining axial movement thereof, a revoluble member co-axially mounted for rotation with respect to said tuning shaft, means for rotating said revoluble member, an operating shaft extending through said tubular tuning shaft and having axial movement with reference thereto, a spline between said operating shaft and said tuning shaft, a clutch between said revoluble member and operating shaft, means on the end of said operating shaft opposite to said revoluble member and disposed outwardly of said tuning shaft for shifting said operating shaft axially to connect or disconnect said operating shaft and said revoluble member.

13. In combination, a drum, means for imparting to said drum simultaneous rotative and longitudinal motions, a plurality of respective helically extending parallel series of actuating elements carried on the peripheral surface of said drum in such interposed relation with each other as to form a multiple helix the pitch of which is equal to the longitudinal distance traversed by said drum per revolution thereof, a plurality of members associated with and adapted to be operated by the actuating elements of the respective series thereof, and stationary means by which said members are supported.

14. In combination, a drum, means for imparting to said drum simultaneous rotative and longitudinal motions thereof, two series of actuating elements disposed on the peripheral surface of said drum along respective helical lines each having a pitch equal to the longitudinal distance traversed by said drum per revolution thereof, each of said actuating elements being individually removably attached to said drum, a pair of members shiftable toward and away from said drum and continually yieldingly pressed toward the same at said respective helical lines whereby an actuating element on said drum engaging one of said members will deflect the same outwardly of said drum, the dimensions of each of said members and of each of said actuating elements circumferentially of said drum being such that one of said members engaged by one of said actuating elements will be held in deflected position throughout a predetermined period of time and then released by said actuating element and an actuating element then coming into actuating relation with the other of said members will deflect the same substantially in unison with release of said first member.

15. In combination with a radio receiver, a tubular, adjustively rotatable tuning shaft for said radio receiver, means for journalling said shaft and restraining the same from axial movement, an operating shaft extending into the interior of said tubular shaft and splined thereto, a revoluble member mounted on said operating shaft and rotatable thereon, a rotating member for driving said revoluble member, and a clutch for connecting said operating shaft to said revoluble member operative responsive to longitudinal shifting of said operating shaft, and a manual operating element on said operating shaft manipulatable for rotating said shaft and shifting the same longitudinally.

EARL HUME PITNEY.