Oct. 30, 1951 L. BIAMONTE 2,572,976

RADIO STATION SELECTOR

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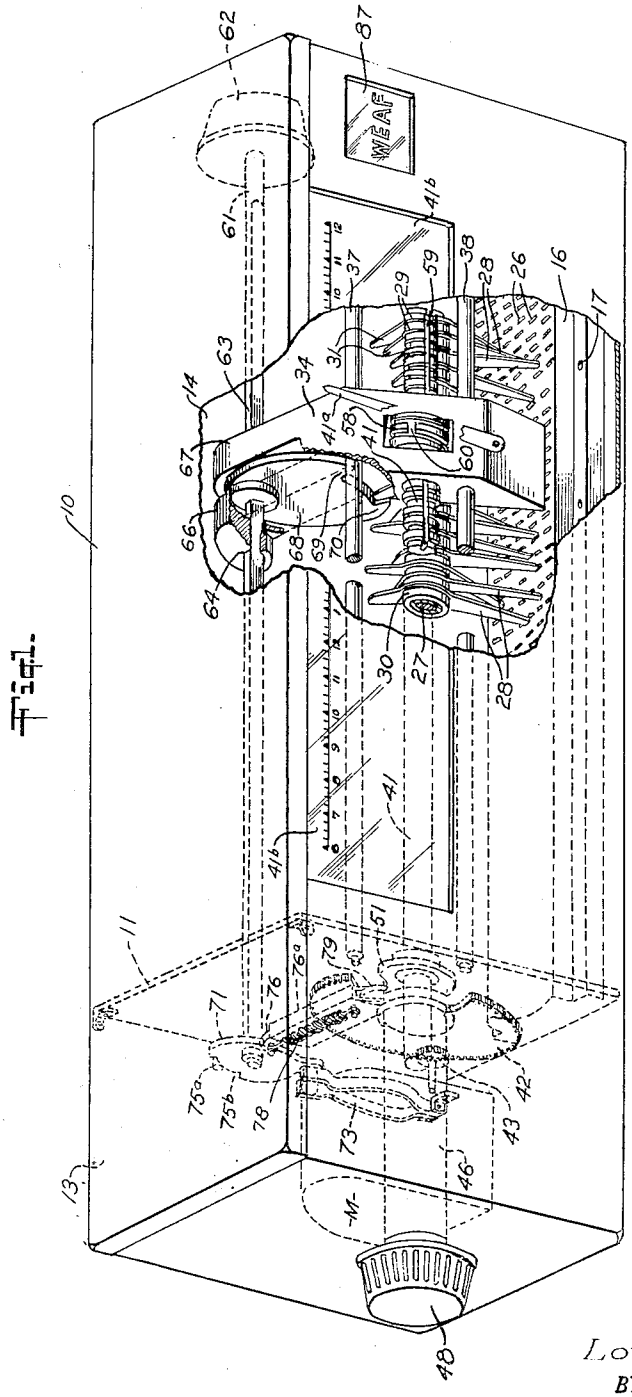



Fig. 1.

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Fig. 1.

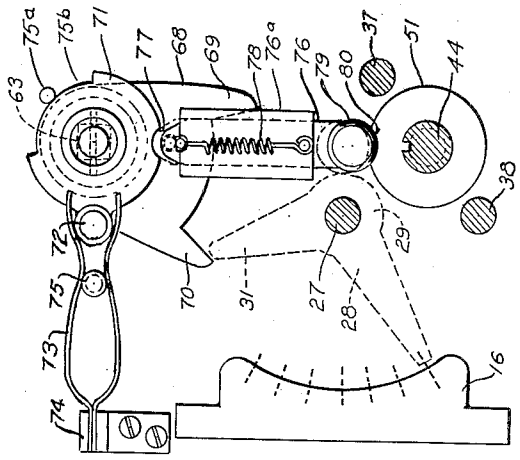
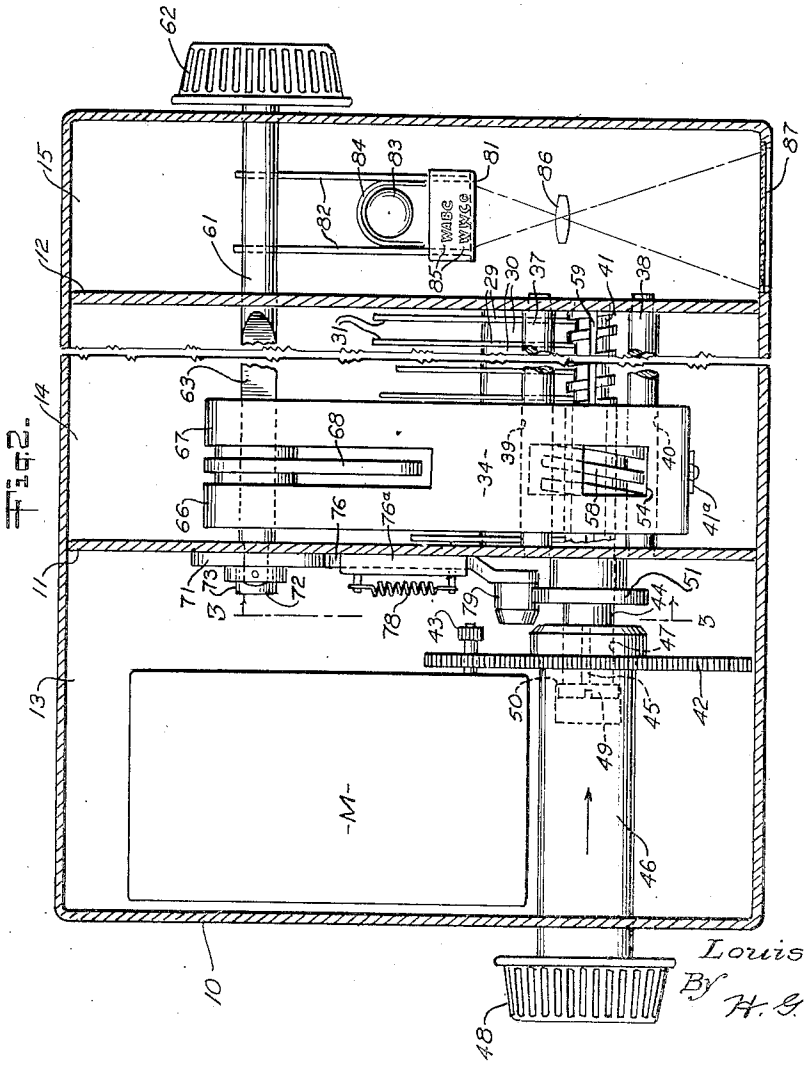



Fig. 2.




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Fig. 4.

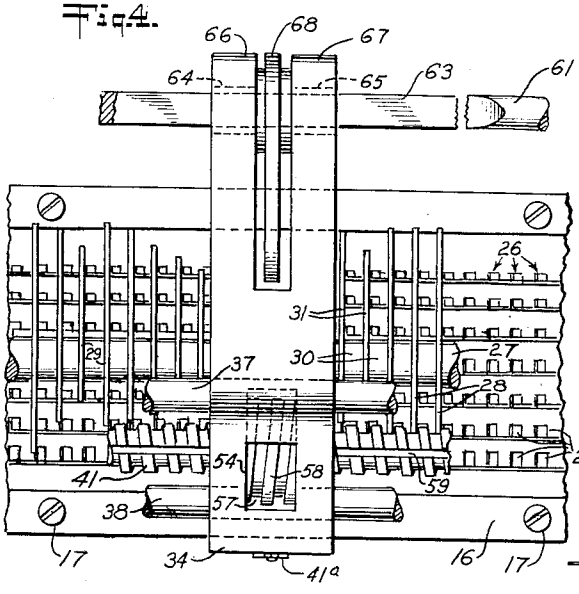



Fig. 5.

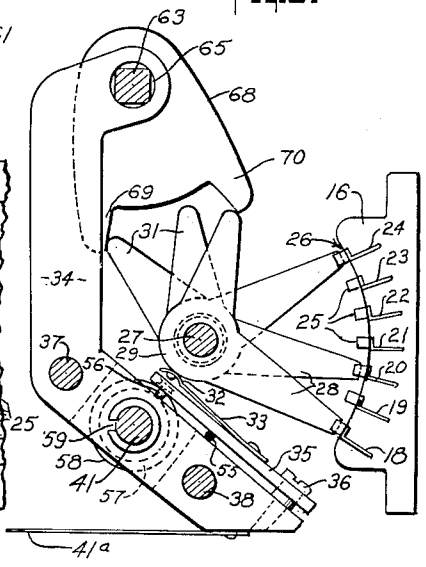



Fig. 6.

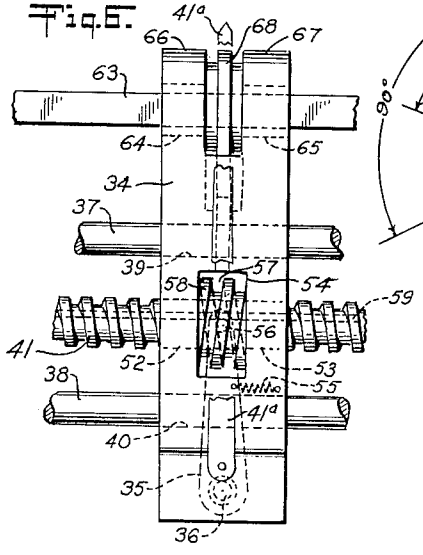



Fig. 7.

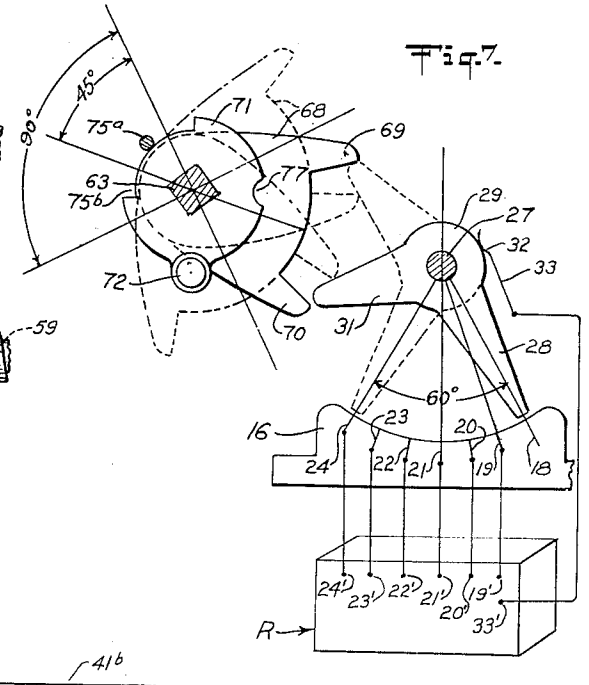
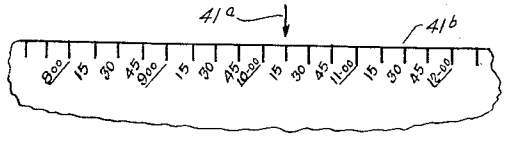



Fig. 8.




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# UNITED STATES PATENT OFFICE

2,572,976

## RADIO STATION SELECTOR

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Application September 2, 1947, Serial No. 771,613

12 Claims. (Cl. 200—37)

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This invention relates to radio timers, and more particularly to a device for automatically controlling a radio receiving set as to both the stations to be heard and the time of operation.

One object of this invention is to provide a device of the above nature which includes a series of independently adjustable contact selector fingers, which will control the operation of the radio receiver during successive periods of the day.

Another object is to provide a device of the above nature in which each of the selector fingers may be manually adjusted to selectively render any one of a plurality of pretuned radio circuits operative, or to render all of said circuits inoperative.

Another object is to provide a device of the above nature in which the operating radio circuit will be advanced successively from one contact finger to the next by a time controlled mechanism, whereby each finger will control the radio receiver during a definite period of the day.

Another object is to provide a device of the above nature which will include a time-controlled mechanism for switching the operating radio circuit from one contact finger to another with a snap action, whereby there will be no substantial interruption in the operation of the radio receiver.

Another object is to provide a device of the above nature, which includes a carriage movable at a uniform time rate for advancing the operating radio circuit along the series of contact fingers—said carriage also being manually movable, and carrying adjusting means, whereby any or all of said fingers may be manually adjusted to substitute one of the pretuned circuits for another for operation at any period of the day.

Another object is to provide a device of the above nature including a time scale which will indicate the time of day while the timer is in operation, and which will indicate the time of the period being adjusted during manual adjustment of the contact selector fingers.

Another object is to provide a device of the above nature which includes a screen for visually indicating the station to which each respective contact finger is adjusted during the "'setting up" operation, in order to assist the operator in obtaining the correct station.

A further object is to provide a device of the above nature which will be simple in construction, inexpensive to manufacture, easy to install and manipulate, compact, ornamental in appearance, and very efficient and durable in use.

With these and other objects in view, there has been illustrated on the accompanying drawing one form in which the invention may conveniently be embodied in practice.

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In the drawings,

Fig. 1 is a perspective view of the improved radio selector shown partly broken away.

Fig. 2 is a plan view of the same, shown partly broken away, and with the upper wall portions in section.

Fig. 3 is an end view showing the selector shaft, the drive screw, and their interlocking mechanisms.

Fig. 4 is a fragmentary plan view of the interior mechanism.

Fig. 5 is an end view of the same.

Fig. 6 is a fragmentary front view of the interior mechanism, showing the switch arm in dotted lines.

Fig. 7 is a diagram showing the manner in which the selector fingers are moved by the adjusting plate to connect the desired circuits in a radio receiver.

Fig. 8 is a view of a portion of the time scale.

Referring now to the drawings in which like reference numerals denote corresponding parts throughout the several views, the numeral 10 indicates an elongated cabinet having transverse partitions 11, 12, which serve as supports for the working parts to be described, and which form a motor compartment 13, a switch compartment 14, and an indicator compartment 15.

The switch compartment 14 is of a length sufficient to receive an elongated concave contact panel 16 mounted on the bottom thereof, as by screws 17, said panel 16 being formed of an insulating material, such as polystyrene plastic, and having embedded therein a transverse series of spaced longitudinal bus bars 18, 19, 20, 21, 22, 23, 24 (Fig. 5). Each of the bus bars 18–24 is formed with a series of upstanding contact lugs 25 so arranged that the lugs of the respective bus bars form arcuate rows 26 extending transversely of the contact panel 16.

The panel 16 and the rows of lugs 26 are concentric with a shaft 27 which is mounted in the transverse partitions 11, 12 and which carries a series of depending swingable station selector contact fingers 28, each disposed above one of the rows 26, and adapted to contact selectively any one of the lugs 25 in said row. The contact fingers 28 include apertured circular portions 29, embracing the shaft 27 and insulated from said shaft and from each other by interposed insulating washers 30 which frictionally resist swinging of the fingers 28 on the shaft 27.

Integral with each of the contact fingers 28 is a rearwardly-extending arm 31 adapted for engagement by a finger-adjusting mechanism to be described hereinafter.

As a provision for extending the operating radio circuit through one of the fingers 28 at a time, the upper contact end 32 of an insulated spring contact finger 33 is adapted to be moved longitudinally of the series of fingers 28, whereby electrical contact will be established between said upper contact end 32 and each of the circular portions 29 of the fingers 28 in succession.

The lower end of the spring finger 33 is swingably mounted upon a travelling carriage 34 by means of an insulating switch arm 35 pivotally secured by a screw 36 at its lower end to said carriage 34.

The carriage 34 is mounted for sliding movement longitudinally of the series of contact fingers 28 by means of a horizontal upper support rod 37 and a lower support rod 38 secured at their ends to the transverse partitions 11, 12 above the forward portion of the panel 16, and slidably supporting the carriage 34 by means of parallel horizontal bores 39, 40 therein.

Means is provided to slide the carriage 34 upon the rods 37, 38 to bring the spring finger 33 successively into contact with the different contact fingers 28 at periodic intervals of time, said means comprising a constant-speed motor M mounted in the compartment 13, and a drive screw 41 adapted to move the carriage 34 longitudinally of the series of fingers 28 at a uniform rate.

A pointer 41*a* is mounted on the front portion of the carriage 34, whereby the position of the carriage will be indicated upon a graduated transparent time scale 41*b* mounted in the front wall of the cabinet 10.

The drive screw 41 is rotatably mounted in the partitions 11, 12 parallel to and between the upper and lower rods 37, 38, and is adapted to be driven from the motor M through a gear 42 and a drive pinion 43. The screw 41 is extended through the transverse partition 11 into the motor compartment 13 in the form of a cylindrical stud 44 having a key 45 thereon, the gear 42 being fixed upon a slidable gear shaft 46 having a socket 47 at its inner end, whereby the shaft 46 slidably embraces the stud 44 and the key 45. It will thus be seen that the slidable gear shaft 46 may be moved longitudinally upon the stud 44, whereby the gear 42 and the drive pinion 43 may be selectively meshed to afford a driving connection between the motor M and the drive screw 41 or may be disengaged to permit manual setting of the screw 41 and carriage 34 thereon, by means of a carriage setting knob 48 upon the outer end of the gear shaft 46.

Outward movement of the shaft 46 upon the stud 44 is limited by an enlarged screw 49 in the end the stud 44 adapted to engage a shoulder 50 in the socket 47, and inward movement thereof is limited by engagement of the shaft 46 with the side of a drive screw cam 51 to be further described.

The drive screw 41 is engaged in aligned threaded bores 52, 53 (Fig. 6) in the carriage 34 and passes through a parallel-sided cavity 54 intermediate said bores. The pitch of the drive screw 41 is such that one revolution of the screw will advance the carriage and the spring contact finger 33 thereon a distance equal to the spacing of the successive contact selector fingers 28.

In order to produce a snap-action of the spring finger 33 from one selector finger 28 to the next



during the uniform slow rotation of the drive screw 41, the switch arm 35, upon which the spring finger 33 is mounted, is urged in the direction of carriage travel (i. e. to the right), by a small coil spring 55 (Fig. 6). The upper end of the switch arm 35 carries a projection 56 following in the groove 57 of a worm section 58 mounted on the drive screw 41 within the cavity 54, whereby the worm section 58 will hold the switch arm 35 against the force of the spring 55.

It will be observed that the drive screw 41 has a right hand thread, while the worm section 58 has a left hand thread of the same pitch. Moreover, the screw 41 is provided with a keyway 59 to which the worm section 58 is splined, whereby the latter will be constrained to rotate with the screw 41 while being slid longitudinally thereof in the cavity 54 of the carriage 34.

This construction will result in the upper contact end 32 of the spring finger 33 and the projection 56 of the switch arm 35, being held stationary for limited times during the movement of the carriage 34. However, a lateral slot 60 (Fig. 1), which is formed across the thread of the worm section 58 at a central point, will permit the projection 56 to snap forwardly under the influence of the spring 55 once in each revolution of the worm section 58, whereby the contact end 32 will always remain in stationary engagement with one of the circular portions 29 of the fingers 28, excepting at periodic intervals when said contact end 32 will quickly shift its contact to the next circular portion 29.

In order to place the station selector in condition to receive the particular radio programs selected by the user, each of the contact fingers 28 must be adjusted to engage with one particular lug 25 in each row 26.

In order to accomplish this result, provision is made of a selector shaft 61, rotatably mounted in the partitions 11, 12 and passing through the switch compartment 14 and the indicator compartment 15 in parallel relation to the shaft 27, the upper and lower rods 37, 38, and the drive screw 41. The selector shaft 61 is provided with an exterior station hand knob 62 at the right hand end of the cabinet 10, so that said shaft may be manually operated.

Within the switch compartment 14, the selector shaft 61 has a square section 63 rotatably and slidably received in aligned circular bores 64, 65 in rearwardly extending arms 66, 67 of the carriage 34.

Confined between the arms 66, 67 and slidable therewith upon the square section 63, is a selector finger adjusting forked plate 68 provided with forwardly extending spaced upper and lower lugs 69, 70 which are adapted to contact the upper and lower sides respectively, of the rearwardly-extending arms 31 of the fingers 28, whereby said fingers 28 may be shifted to contact any desired lug 25. The aperture of the adjusting plate 68 is square whereby it will be rocked with the shaft 61.

The station-adjusting plate 68 is normally held in a neutral position by mechanism connected with the shaft 61 within the motor compartment 13, including an interlock disc 71 secured to the selector shaft 61 and having an eccentric stud 72 engaged in a spring centering device 73 mounted upon the partition 11 by means of a clamp 74, said centering device 73 contacting the opposite sides of said stud 72.

A stationary locating pin 75 controls the action of the centering device 73, and a limit pin 75*a*

engages in a circumferential slot 75*b* in the interlock disc 71 to limit the movement of said disk. Inasmuch as the adjusting plate 68 will not be in operation during normal motor-driven movement of the carriage 34, the lugs 69 and 70 thereof are spaced apart sufficiently to clear the rearwardly-extending arms 31 when the adjusting plate 68 is in its neutral position, regardless of the positions of said arms.

In order to prevent improper operation of the carriage-setting knob 48 and the station selector knob 62 which might result in damage to the timer mechanism, the adjusting plate 68 normally is held positively in its neutral position by one end of an interlock slider 76 which is slidably mounted upon the partition 11 by a horizontal guide 76*a*, said slider being urged against the periphery of the interlock disk 71 and a recess 77 therein by a coil spring 78.

The opposite end of the interlock slider 76 carries a roller 79 which rides upon the circular periphery of the drive screw cam 51, thereby insuring that the interlock slider 76 will always be engaged in the recess 77 during rotation of the drive screw 41.

A recess 80 in the drive screw cam 51 will permit the interlock slider 76 to yield to allow rotation of the interlock disk 71 and the selector shaft 61, but will insure that the drive screw 41 and the carriage 34 thereon are held stationary during this operation, since the roller 79 will then engage the recess 80 to prevent rotation of the cam 51.

Referring now to Fig. 2, an arcuate transparency 81 is mounted upon the selector shaft 61 within the indicator compartment 15 by means of a pair of radially-extending bracket arms 82. A stationary lamp 83 having a U-shaped reflector 84 behind it will illuminate the transparency 81 in order to project one of a plurality of station indicia 85 thereof through a lens 86 to a station screen 87 located on the front of the cabinet 10. The station indicia 85 will consist of the call letters of the various radio sending stations to which the circuits of the respective bus bars 19–24 are tuned. The parts are so proportioned that when the lower lug 70 of the adjusting plate 68 is in engagement with one of the rearwardly extending arms 31 (which will occur when the selector knob 62 is being turned away from the operator), the station indicia 85 will be accurately positioned to project the proper call letters upon the screen 87, thereby indicating the station circuit with which the corresponding finger 28 is engaged.

*Operation*

In operation, the improved station selector will be connected to a radio receiver R, diagrammatically shown in Fig. 7, of the type having a plurality of electrically selective pretuned radio frequency circuits which have respective terminals 19′ to 24′, inclusive, and which are normally operable by means of push buttons.

The instant invention will supplant the push buttons for normal operation, however, and each of the pretuned circuit terminals 19′ to 24′ will be connected to one of the respective bus bars 19–24, the circuits being completed through a connection between the spring contact finger 33 and a terminal 33′ of the receiver.

It will be noted that the bus bar 18 is unconnected to any circuit, thus providing a neutral or "dead" position for the fingers 28. The electrical connections between the station selector and the radio receiver R having been made, the



operator will proceed to adjust the contact fingers 28 to produce any desired program.

The apparatus is preferably designed so that the traveling carriage 34 will shift the operating circuit to the next finger 28 at the end of each 15-minute period—this being a time unit upon which radio programs are conventionally based. Thus, each finger 28 will control the radio receiver for 15 minutes, the program received being dependent upon whichever bus bar is contacted by said finger through one of the lugs 25.

The operator will employ the knob 62 at the right hand end of the cabinet 10 to swing the adjusting plate 68 upon the shaft 61 to move the fingers 28. Each finger 28 will preferably be swung first to the neutral position—that is to contact the lug upon the forward bus bar 18, whereupon a reverse movement of the adjusting plate 68 will bring the finger 28 into contact with the desired bus bar—the station circuit connected therewith being indicated upon the screen 87 at the same time.

This operation will be repeated for each finger 28—the carriage 34 and the adjusting plate 68 being brought into position opposite each finger successively by the knob 48.

The pointer 41*a* upon the carriage 34 will at all times give an indication upon the time scale 41*b* to inform the operator as to the exact position of the carriage.

It will be found convenient during the adjusting operation for the operator to grasp the knobs 48 and 62 in his left and right hands respectively so that he may control the time setting with one hand and the station setting with the other. The interlock slider 76, however, will prevent both knobs from being turned simultaneously—thereby preventing damage to the mechanism.

As shown in Fig. 1, the time scale 41*b* is graduated to cover a span of 18 hours—that is from 6:00 a. m. to 12:00 midnight. The station selector may be placed in operation at any time within this span, the carriage first being set so that the pointer will indicate the time of starting—the knob 48 will then be pushed inwardly to engage the gear 42 with the pinion 43 whereupon the constant speed motor M will propel the carriage 34 at a constant rate of speed.

The spring contact finger 33 will then be automatically shifted successively from one contact selector finger 28 to the next at 15 minute intervals, as long as the apparatus is in operation, so that the preselected programs will be heard in succession through the radio receiver R.

While there has been disclosed in this specification one form in which the invention may be embodied, it is to be understood that this form is shown for the purpose of illustration only, and that the invention is not to be limited to the specific disclosure, but may be modified and embodied in various other forms without departing from its spirit. In short, the invention includes all the modifications and embodiments coming within the scope of the following claims.

Having thus fully described the invention, what is claimed as new, and for which it is desired to secure Letters Patent, is:

1. In a radio station selector, a plurality of conductors each adapted for connection to a different pretuned radio circuit, a series of spaced insulated fingers, each adjustable to selectively contact any one of said conductors, a spring contact member, mechanism movably supporting said spring contact member for selecting contact with any one of said fingers, and constant speed

means for operating said mechanism to move said spring contact member successively from one of said fingers to the next, whereby an operating radio circuit may be shifted at periodic intervals from one of said fingers to the next, and through the conductor to which each respective finger is adjusted.

2. In a radio station selector, a cabinet containing an elongated concave contact panel, a plurality of parallel longitudinally extending bus bars secured to said panel, said bus bars being provided with upstanding contact lugs disposed in transverse rows, a series of swingable selector fingers, each mounted adjacent one of said rows, and adapted to selectively contact any one of the lugs in the row, and means movable longitudinally of said series of fingers for selectively contacting any one of said fingers.

3. The invention as defined in claim 2, in which said longitudinally movable means comprises a swingable contact finger upon a carriage, and including a screw for moving said carriage, a constant speed motor, and a driving connection between said motor and said screw, said longitudinally movable means also comprising mechanism for swinging said contact finger with a step-by-step movement from one selector finger to the next during operation of said screw.

4. The invention as defined in claim 3, in which said driving connection includes a pair of manually disengageable elements, whereby said screw may be disconnected from said motor for manual operation of the screw.

5. In a radio station selector, a cabinet mounting an aligned series of selector fingers, a carriage movable longitudinally of said series, and carrying a relatively movable spring contact member adapted to contact said fingers one at a time, screw means engaged with said carriage for moving it, and worm and spring means on said carriage connected to said contact member for effecting step-by-step movement of said member from one selector finger to the next during movement of the carriage.

6. In a radio station selector, a cabinet containing an elongated concave contact panel, a plurality of parallel longitudinally-extending bus bars embedded in said panel, said bus bars being provided with upstanding contact lugs disposed in transverse rows, a series of swingable selector fingers each mounted adjacent to one of said rows, and adapted to selectively contact any one of the lugs in its respective row, means movable longitudinally of said series of fingers including a contact finger for selectively contacting any one of said selector fingers, said longitudinally movable means including an adjusting plate having lugs adapted to selectively move any one of said selector fingers for establishing electrical contact between said selector finger and any one of said bus bars, and a shaft mounted in said cabinet for operating said adjusting plate.

7. The invention defined in claim 6 in which said shaft carries a station indicator means, whereby contact between each finger and the respective bus bar lugs may be visually determined.

8. The invention defined in claim 7, in which said longitudinally-movable means carries a time indicator device, whereby contacts between said longitudinally movable means and the respective selector fingers may be visually determined.

9. In a radio station selector, a cabinet containing an elongated concave contact panel, a plurality of parallel longitudinally-extending bus bars embedded in said panel, said bus bars being provided with upstanding contact lugs disposed in transverse rows, a series of swingable selector fingers, each mounted adjacent one of said rows and adapted to selectively contact any one of the lugs in its respective row, a carriage movable longitudinally of said series of fingers for selectively contacting any one of said fingers, said carriage including an adjusting plate having lugs adapted to selectively move any one of said fingers for establishing electrical contact between said finger and any one of said bus bars, a shaft mounted in said cabinet for operating said adjusting plate, screw means for moving said carriage, and interlocking mechanism for preventing simultaneous rotation of said shaft and said screw means.

10. In a radio station selector, a series of insulated selector fingers swingably mounted upon a shaft, a row of contact lugs mounted adjacent each finger, for selective contact thereby, a carriage, means mounting said carriage for sliding movement parallel to said series of fingers, said carriage being provided with a spring contact finger adapted to engage said selector fingers, and an adjusting plate having lugs adapted to engage said selector fingers for moving them over the contact lugs in the respective rows.

11. The invention as defined in claim 10, including means for sliding said carriage at a uniform speed, and mechanism for periodically retarding movement of said spring contact finger with respect to said carriage, whereby said contact finger will engage each successive selector finger with a snap action.

12. The invention as defined in claim 10 including means for sliding said carriage at a uniform speed, and means for sliding said carriage manually, said adjusting plate being of a width to engage one of said selector fingers at a time, whereby each selector finger may be adjusted by said adjusting plate, when said carriage is manually moved to a position adjacent said one selector finger.

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