

Oct. 16, 1934.

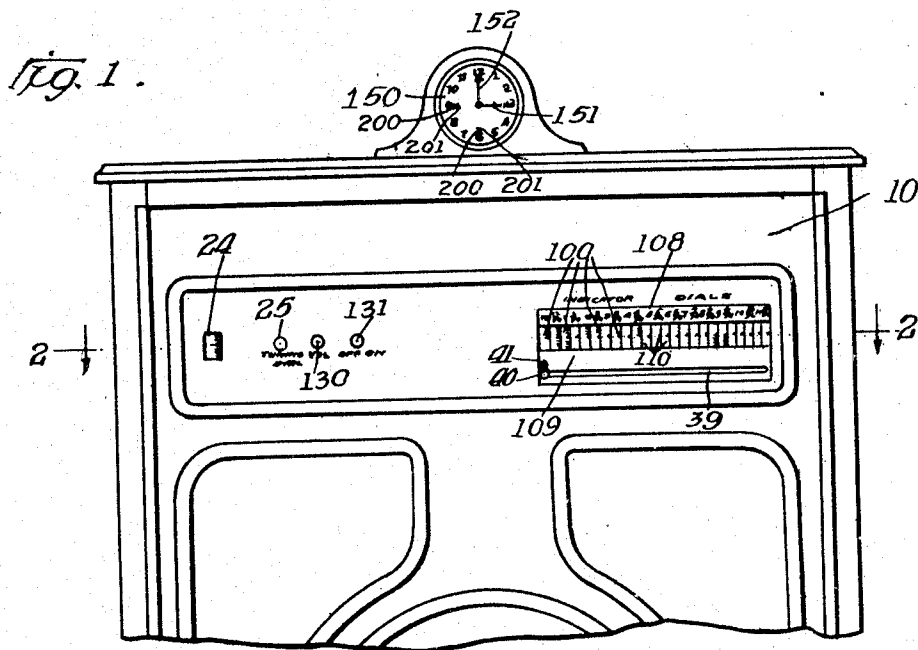
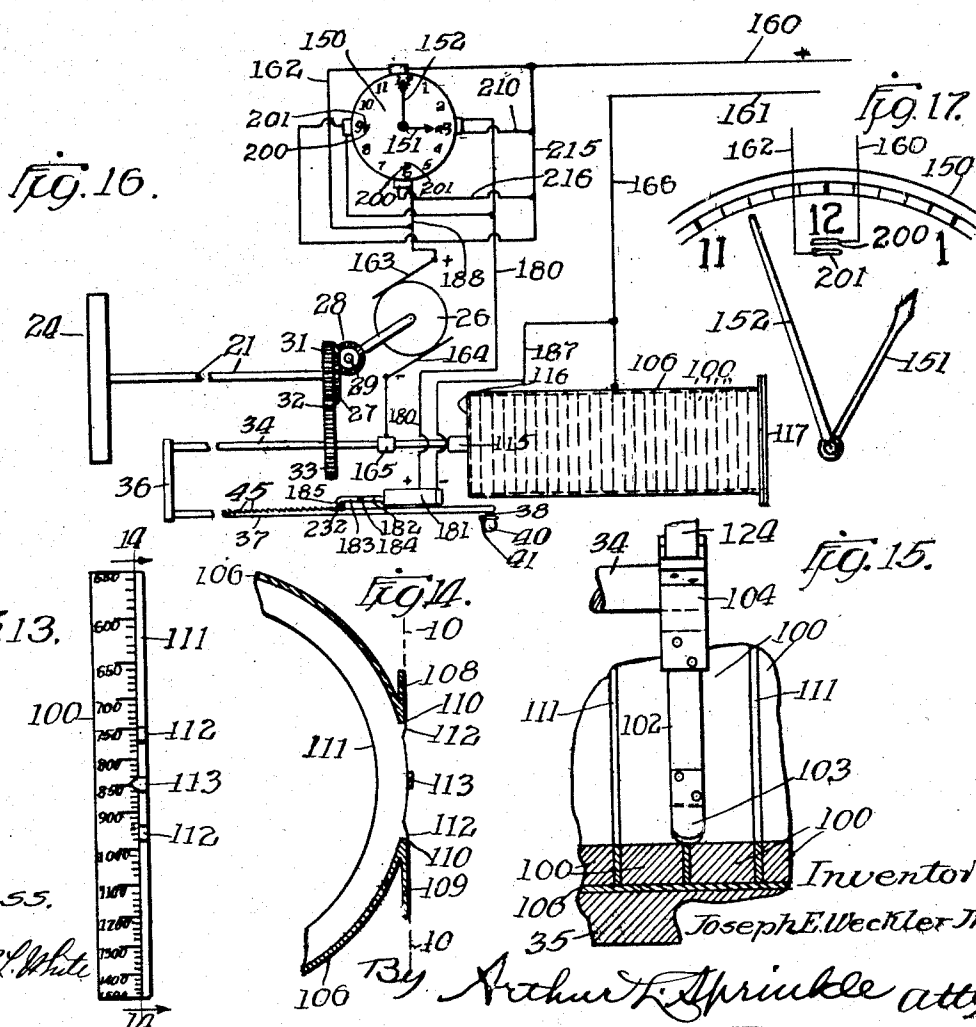
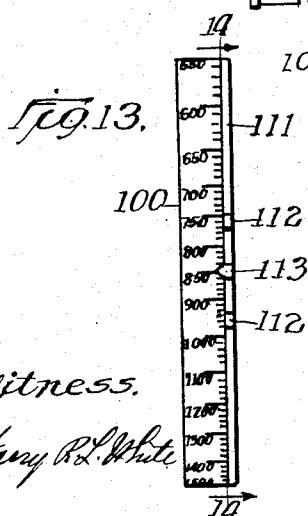
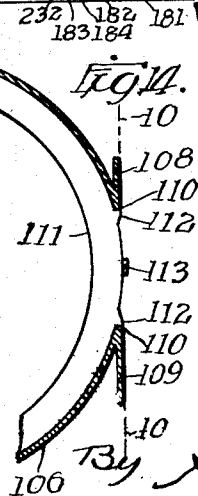
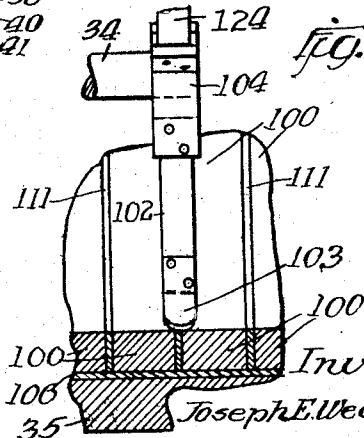
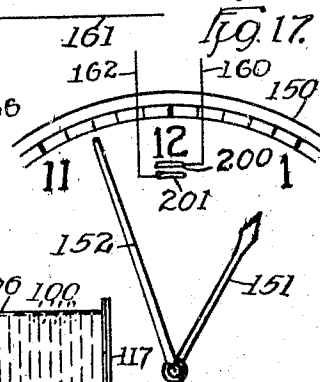
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1,977,330

AUTOMATIC SELECTIVE TUNING MECHANISM FOR RADIORECEIVING APPARATUS

Filed Feb. 28, 1933

3 Sheets-Sheet 1



Witness.

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3 Sheets-Sheet 2

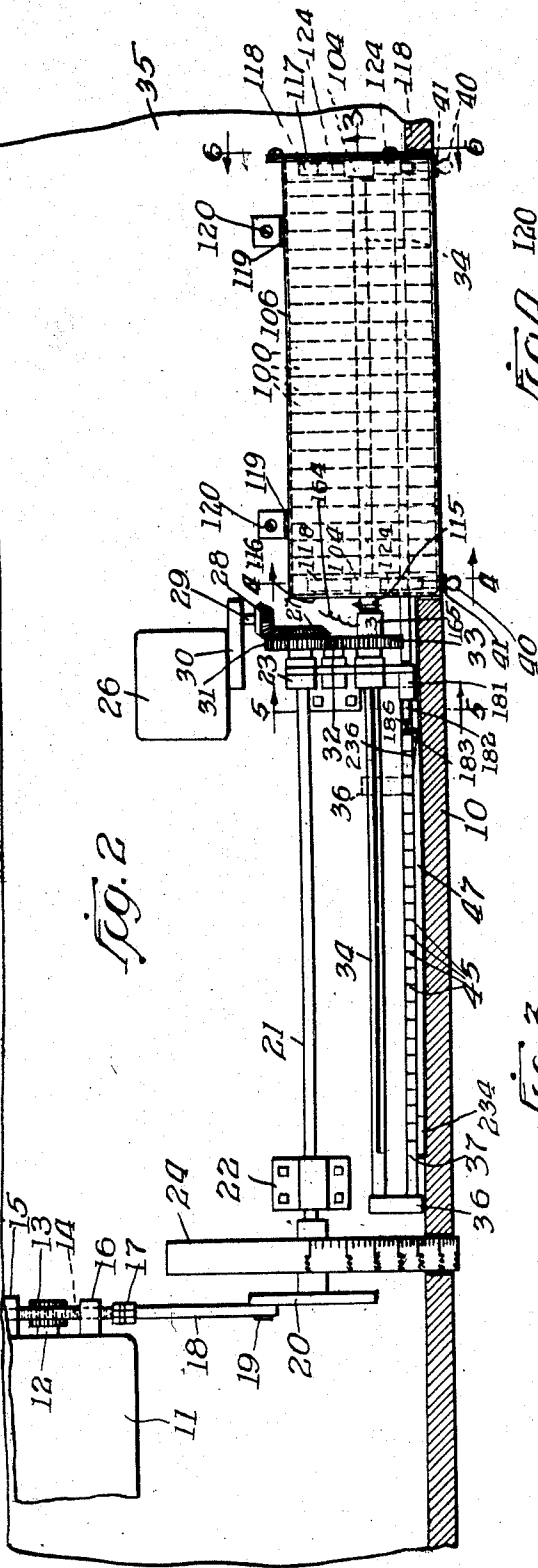


Fig. 2

Witness:

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Oct. 16, 1934.

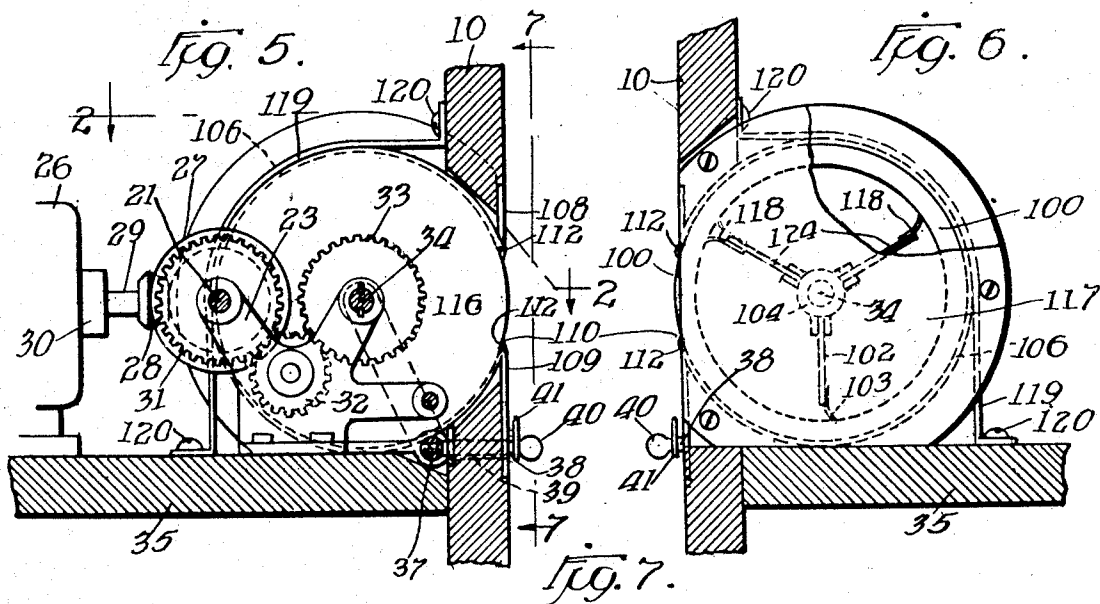
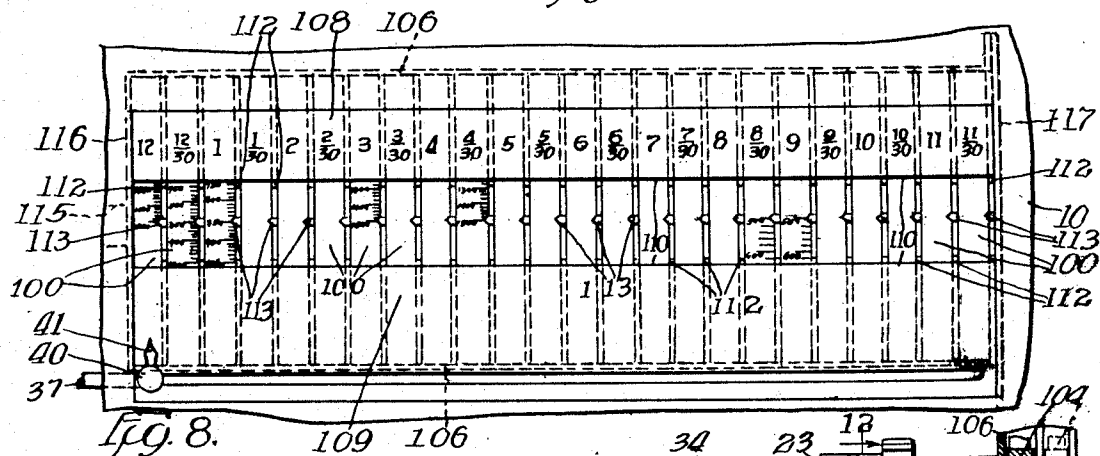
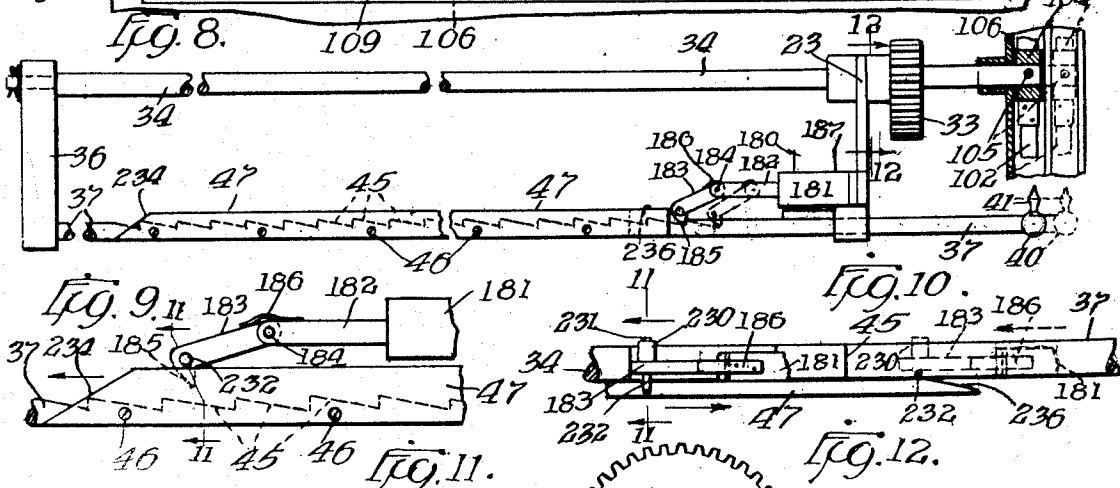
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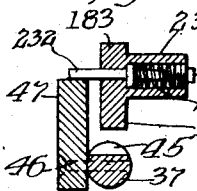
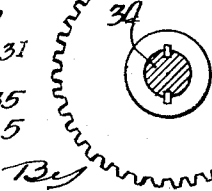
AUTOMATIC SELECTIVE TUNING MECHANISM FOR RADIORECEIVING APPARATUS

Filed Feb. 28, 1933

3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

1,977,330

AUTOMATIC SELECTIVE TUNING MECHANISM FOR RADIORECEIVING APPARATUS

Joseph E. Weckler, Jr., Blue Island, Ill.

Application February 28, 1933, Serial No. 658,909

12 Claims. (Cl. 250—20)

My invention relates to automatic selective mechanism by which radio receiving units may be tuned, and at predetermined time intervals, whereby different programs being broadcast over
 5 different frequencies may be selected during the whole or any part of the period the apparatus is designed to cover as, for example, twenty-four half hour programs over a twelve hour period as illustrated in the present embodiment herein
 10 shown and described.

The primary object of my invention is to generally improve, simplify and render more certain and effective apparatus of the character described, as well as to effect certain economies
 15 in the manufacture thereof.

It is a further object of the invention to provide improvements in automatic selective tuning mechanism for receiving apparatus of a character whereby the same is adapted for ready incorporation with a minimum amount of change and expense in connection with ordinary radio receiving apparatus as constructed at the present time, thus giving the invention a wide scope of adaptability.

It is a further object of the invention to provide in apparatus of the described character novel and improved dialing devices for operating automatic selective tuning mechanism for radio receiving apparatus.

Other objects of the invention will appear from the following description of the preferred form of apparatus in which my invention is embodied, reference therein being had to the accompanying drawings forming a part of the specification, the novel features being set forth in the appended claims.

In the said drawings:

Fig. 1 is a fragmentary elevational view of a conventional form of casing for radio receiving
 40 apparatus, the same having the invention applied thereto and illustrating such portions thereof as are visible from the exterior of the casing after the same is properly and commercially installed.

Fig. 2 is a broken sectional view looking in the direction indicated by the arrows on lines 2—2 of Figs. 1 and 5 respectively, the view being more or less diagrammatic with respect to the showing of certain unimportant parts, and parts also being omitted and broken away for simplification of the drawings.

Fig. 3 is an enlarged fragmentary, longitudinal, sectional, detail view on line 3—3 of Fig. 2 looking in the direction indicated by the arrows, this
 55 view being also taken approximately on line 3—3

of Fig. 4 looking in the direction indicated by the arrows.

Fig. 4 is an enlarged, detail, sectional view taken approximately on lines 4—4 of Figs. 2 and 3 respectively, looking in the direction indicated
 60 by the arrows.

Figs. 5 and 6 are enlarged detail, sectional views taken on lines 5—5 and 6—6 respectively of Fig. 2, looking in the directions as indicated by the
 65 arrows.

Fig. 7 is an enlarged detail, fragmentary, elevational view of the improved dialing mechanism as it appears in Fig. 1, the view being also indicated as taken approximately on line 7—7 of Fig. 5 looking
 70 in the direction indicated by the arrows.

Fig. 8 is an enlarged fragmentary view of a part of the mechanism shown in Fig. 2, parts being broken away and other parts in section to disclose details of construction.

Figs. 9 and 10 are broken, elevational and plan
 75 views of parts of the mechanism of Fig. 8.

Fig. 11 is an enlarged detail, sectional view taken approximately on line 11 of Fig. 10.

Fig. 12 is an enlarged elevational view partly in section, approximately on line 12—12 of Fig. 8
 80 looking in the direction indicated by the arrows.

Fig. 13 is an enlarged detail, elevational view of one of the hand actuated program setting devices with associated spacing ring having an indicator or pointer designed to be stationary with the
 85 casing.

Fig. 14 is a detail sectional view taken on line 14—14 of Fig. 13 looking in the direction indicated by the arrows, showing also adjacent parts of
 90 dial housing.

Fig. 15 is an enlarged broken, detail view with parts in section of my improved, especially constructed dialing mechanism capable of adjustment and for power operation in automatically
 95 tuning radio receiving apparatus.

Fig. 16 is a diagrammatical view illustrating the clock controlled automatic, selective tuning mechanism for radio receiving apparatus showing the relative location of the electric motor with its mechanism and wiring connections for actuating
 100 the automatic tuning mechanism, and Fig. 17 is a diagrammatic view of clock controlling switch.

In the drawings, (Figs. 1, 2, 4 and 5 to 7 inclusive) the reference character 10 designates generally the front of the conventional casing for
 105 radio receiving apparatus, the casing being merely a suitable frame or support within which may be housed the usual radio receiver having a condenser or condensers diagrammatically indicated at 11 in Fig. 2. The condenser will be upon or
 110

operatively controlled by a shaft indicated at 12 so that the condenser apparatus will be adjusted by rotary movement of the shaft 12 through gear 13 affixed thereto and engaged by a toothed rack 5 bar longitudinally reciprocable in guides 15, 16 respectively, the toothed rack bar 14 being pivotally connected at 17 with a pitman or connecting rod 18 pivotally connected to the crank pin 19 eccentrically mounted upon the wheel 20 which 10 is secured to the rotatably mounted hand dial shaft 21, mounted in bearings 22, 23 fixed in relation to the supporting casing. The shaft 21 is provided with graduated and suitably marked hand dialing wheel or disc 24 (Figs. 1 and 2). 15 The hand dial 24 as illustrated in Fig. 1 will be visibly accessible through an aperture in the casing and it may be accessible as illustrated in Fig. 2 so that by the friction of the operator's hand or fingers thereupon or through tuning dial knob 20 25 it may be manipulated by hand for operating the condenser or condensers for tuning.

On the assembly of the casing as illustrated in Fig. 1, I also show diagrammatically at 25 a conventional hand tuning knob and if desired, suitable mechanical connections not shown may be 25 provided in an old and well known manner for rotating through the disc 24 on the shaft 21, the disc 20 operatively connected with the rack 14 for tuning the condenser, such connections, however, 30 not being shown as the same forms no part of the present invention, it sufficing to say, however, that while the shaft 21 is operatively connected with a suitable motor 26 electrically operated which motor will be of an exceedingly small character since very little power is required to operate 35 my apparatus, and hence hand operation of the tuning shaft 21 in the manner described would not be interfered with by the drag or friction of the motor when not energized.

In the embodiment shown in Fig. 2, the shaft 21 is provided at its extremity with a bevel gear 27 engaging a bevel pinion 28 on a shaft 29 operatively connected with any suitable form of reduction gearing leading to the motor 26 as designated diagrammatically at 30. The shaft 21 also 45 carries a spur gear 31 in engagement with an intermediate pinion 32 which in turn engages gear 33 splined upon a rotatable and longitudinally movable shaft 34 (Figs. 2 to 6 inclusive and 50 Figs. 8, 12, 15 and 16). The shaft 34 is journaled in an arm of aforesaid bearing bracket 23 secured to a plate 35 which may be utilized for supporting the motor 26 as illustrated in Fig. 5. The shaft 34 is connected by cross piece or arm 55 36 with a shaft 37 lying adjacent the front plate 10 of the casing and the same extends as illustrated in Figs. 5, 8 and 16 approximately parallel with the splined shaft 34 and at its terminal it is provided with an arm 38 extending through a 60 slot 39 (Figs. 1 and 4) in the front of the casing, terminating in a knob or hand piece 40 and having also an indicator or pointer 41 adapted to underlie a plurality of closely spaced adjusting rings as shown, for example, in Figs. 1 to 7 inclusive to be presently described. The shaft 37 65 is provided along its upper side with a plurality of spaced ratchet teeth as designated by the reference character 45 (Figs. 2, 8, 9, 11 and 16) and to the side of the shaft 37 adjacent the front wall 70 10 of the casing is secured by means of pins or screws 46, a cam plate 47.

In the present embodiment of the invention as before designated, the automatic selective tuning mechanism is arranged to be selectively set 75 by hand for automatically tuning the radio re-

ceiving apparatus and for changing the receiving apparatus to another designated station at half-hour intervals. In order to function for automatically tuning in various stations at such timed intervals under these conditions, obviously a space 80 of twelve hours will be divided into twenty-four half hour operating periods, during each half hour period of which the apparatus will be tuned for a particular selected station. To that end I provide in the casing 10 above the aforesaid slot 39 through which the knob 40 and the indicator 41 projects, a slot for visibly exposing portions 85 of the peripheries of a plurality of adjustable station selecting or indexing rings that have a part of their periphery exposed so that they may be frictionally adjusted by an operator. These rings, shown assembled in Figs. 1, 2 and 7 and in detail in Figs. 3, 4, 6, 13 and 15, are in the present embodiment provided to the number of twenty-four and are graduated by suitably spaced marks 90 as indicated in Figs. 7 and 13 to indicate kilocycles or wave lengths corresponding to the various sending stations with respect to which it is desired to tune the apparatus. Since these rings are all of identical construction and are similar- 95 ly graduated and indexed they are for convenience given the same reference character 100 throughout the several views of the drawings and the fact that in Fig. 7, for example, some of these rings 100 appear to differ in the number of their graduations from other similar rings, is obviously due 105 to the fact that they are differently adjusted. These rings 100 are of suitable conducting metal and constructed in cross section as appears in Figs. 3, 4 and 15. The aforesaid graduations on the respective rings 100 cover 180° or half the periphery of each ring and substantially in the middle of each ungraduated or unmarked semi-circular segment of these rings there is a transverse undercut groove in which is inserted appreciably thick strips of insulating material as indicated at 101 (Figs. 3 and 4) functioning during 110 the rotation of the rings 100 to break electrical contact with a conducting wiper arm 102 provided with a brush or terminal portion 103 (Figs. 3, 4 and 15). The conductor or brush arm may conveniently be attached to a metallic hub member 104 mounted upon the extremity of the aforesaid longitudinally shiftable splined shaft 34, being securely affixed thereto as by pin 105 (Fig. 8). 115 As before indicated, approximately 180° of each of the rings 100 will be unmarked or ungraduated for reasons to be hereinafter pointed out and this fact accounts for the appearance of the respective twenty-four rings as they appear in their assembled condition visible through the slotted casing 120 as shown, for example, in Figs. 1 to 7 inclusive.

The arrangement of the metal rings 100 to have a common turning axis is accomplished by the provision of a metallic casing 106 of substantially cylindrical form but having a radially arranged longitudinal slot through which a portion of the peripheries of each of the rings 100 is visible. The wall 10 of the casing is cut away 125 as indicated at 107 (Fig. 4) and the cylindrical supporting casing 106 adjacent the exposure slot for the rings, and may be turned back upon itself as indicated at 108 and 109 to provide suitable surfaces for dialing indications as indicated in 130 Fig. 1, the lower turned portion 109 being slotted to receive the aforesaid adjusting arm 38 with the handle 40 and the pointer 41 thereupon (Figs. 3 and 4), the walls of the slot through which the indicating portions of the rings 100 are exposed 135 140 145 150

being designated in Figs. 1 and 4 by the reference character 110. The cylindrical casing 106 will preferably be of a size to comfortably hold the rings in rotatable side by side relation as indicated most clearly in Fig. 3, there being metallic circular spacer strips or rings 111 inserted between each adjacent pair of rings. The spacer strips 111 (Fig. 14) will be of substantially the same peripheral diameter as the rings 100 and hence held in position within the cylindrical metallic casing 106, and to prevent rotation of the spacer strips 111 each of these will be provided with the radially arranged lugs 112 so arranged on their peripheries as to engage the edges 110 of the slotted part of the casing before described (Figs. 13 and 14). The lugs 112 on each of the spacing members 111 will be, therefore, separated a distance substantially equal to the width of the slot 110 and intermediate lugs 112 indicators or pointers 113 will be struck up out of the metal of the disc 111 and turned laterally for the purpose of co-operating with the graduated and numbered spaces on the marked peripheral portions of the rings 100.

Referring to the arrangement of the adjusting rings 100 and their intermediate spacing elements 111 in the casing 106 as illustrated particularly in Fig. 3, it will be seen that these juxtaposed parts within the cylindrical casing 106 have a substantially tube-like formation on the hollow interior of which the aforesaid shaft 34 with its wiper arm 102 and brush 103 is adapted to reciprocate, the end thereof extending through a central hub 115 in the end portion 116 of the casing.

At the opposite end of the casing is a closure plate 117. The function of the shaft 34 is to form an electrical switch connection for purposes to be hereinafter described with the various adjustable contacting rings 100 and in order to properly centralize the unsupported end of the shaft 34 carrying the wiper arm 102 and brush 103, I provide preferably additional radial false arms 124 spaced apart as indicated in Figs. 3 and 4, these arms preferably being of insulating material and provided with contact brushes 118 in construction similar to brush 103 whereby in contacting with the inner peripheries of the respective rings 100 and circular spacing plates 111, the shaft 34 will be properly centralized and supported and the brush 103 held constantly in contact with the inner peripheries of the respective rings.

The cylindrical casing 106 for the adjusting rings 100 may be secured to the aforesaid supporting plate 35 within the casing and to the front wall 10 thereof by means of one or more metallic strips as indicated at 119 (Figs. 2, 3 and 4), the terminals of which are secured to parts of the casing by screws or other suitable fastening devices as indicated at 120.

The casing 10 may be provided with the usual volume adjusting dial 130 and with the usual electrical switch for controlling the power supply to the instrument and capable of being moved from the "off" to the "on" positions and designated by the reference character 131.

On the top of the casing (Fig. 1) indicated at 150 is illustrated the dial of clock mechanism having an hour hand 151, and a minute hand 152, this clock mechanism being for the purpose of controlling the operation of my improved automatic tuning mechanism for radio receivers. In the diagrammatic views, Figs. 16 and 17, the dial 150 of the control clock is shown and dia-

grammatically there is illustrated electrical switch contacts and circuits leading from a power source to the control clock and to the motor 26 and the various parts, as indicated, of my automatic tuning mechanism, further details of which will appear in connection with the following specific description of its mode of operation.

Operation

In operating my improved mechanism embodying the invention, the operator, of course, will be familiar enough with the set to know the various indicator settings as to wave lengths, etc. for tuning in different stations, whereupon he may select a complete day's program consisting of twenty-four half-hour periods, when the invention is constructed in the form as shown in the present embodiment utilizing twenty-four of the dialing rings 100 assembled as shown in detail in Fig. 7 and from which it will be seen that above the first dial ring 100 appearing in Fig. 7 will be the designation 12:00 while above the second dial ring will appear the designation 12:30 and above the third 1:00 etc., thus showing that each of the rings 100 successively from the left hand end, facing the apparatus as it appears in Fig. 7 is arranged for a dial setting for a different station and a different wave length and in the present embodiment will be intended to correspond for the selected station broadcasting each during a half-hour period, that is, the first dial ring 100 at the left will cover the period from 12:00 to 12:30, the second from 12:30 to 1:00, the third from 1:00 to 1:30, etc. Where twenty-four dial rings are provided for half hour periods, obviously the numerical designations of the hours indicated may be either A. M. or P. M.

Assuming that it might be desired to operate the selective mechanism over a twelve hour period consisting of twenty-four half-hour programs, the selector dial ring 100 at the left in Fig. 7 would be adjusted so as to have the desired wave length or kilocycle reading opposite the pointer or indicator 113. In the illustration shown in Fig. 7 the dial ring 100 covering the period from 12:00 to 12:30 is adjusted to the kilocycle or wave length reading 1500, the dialing rings in the second and third places covering the periods 12:30 to 1:00 and 1:00 to 1:30 are given the same adjustment, that is both standing at a wave length or kilocycle adjustment of 850 for the purpose of illustrating how the instrument might be continuously operated for an hour on a selected wave length of 850 kilocycles instead of having a thirty minute interval, or longer if desired, and so throughout the dialing rings 100, the operator before starting the operation of the machine may proceed to select in sequence the various stations by wave length or kilocycle readings on the dialing rings 100, understanding that when the apparatus is started they will be operative according to the half hour periods of arrangement of the apparatus from the left toward the right as the dialing rings are arranged in Fig. 7 and, in fact, throughout the present embodiment of the invention. Assuming that the selective mechanism shown most clearly in detail in Fig. 8 has been operated by the hand of the operator grasping the knob 40 and forcing the same toward the left and to the extreme left hand limits of the slot 39, it will be seen that the indicating pointer 41 will then underlie and coincide with the dialing ring 100 below the 12:00 to 12:30 indication and this adjustment of the ratcheted rod 37 will have caused the forward end of the

splined rod 34 projecting through the hub of the gear 33 to the interior of the dial ring casing 106 to bring the wiper arm 102 and the auxiliary insulated arms 124 into registry with the dial ring 100 at the extreme left hand position as shown in Figs. 7 and 8 where the contact brushes 103 and 118 will engage the inner periphery of the dial ring. Assuming then that the clock mechanism is in operation and properly set when the minute hand, which is the longer of the two hands, and designed to make and break various electrical circuits diagrammatically indicated in Fig. 16 and hereinafter described, reaches the numeral 12 on the dial face of the clock, the power circuit leading from a suitable power source not shown as designated by the positive line 160 and the negative line 161 will be closed at the instant that the minute hand 152 reaches the numeral 12. The circuit from the power source on the positive side is taken through the line 160 (Figs. 16 and 17) to one of the two switch terminals adjacent the numeral 12 on the clock face, which terminals like the other switching connections on the clock face, as illustrated diagrammatically in Fig. 16 at 3, 6 and 9 respectively, are adapted to be closed by the minute hand 152 as it passes thereover. These terminals or switch members, designated at 200, 201, may be insulated raised contact members adapted to be bridged and electrically contacted by the end of the minute hand 152. The circuit continues thence through line 162 to the positive brush 163 of the motor, thence through the negative brush 164, the sleeve 165 which is in sliding electrical contact adjacent the aforesaid gear 33 with shaft 34. The circuit is thence traced through the shaft 34, the live wiper arm 102 with its brush 103, the respective dial rings 100, the contacting casing 106 and thence through the line 166 to the negative power line 161.

Assuming that the clock is in operation and that current controlling switch 131 is in the "on" position to energize the condenser unit or units 11 and the usual radio receiving apparatus with the condensers, not herein shown since the same forms no part of the present invention, it will be seen that when the minute hand 152 reaches the "12" position on the master clock dial 150, the before described circuit will be closed and the motor 26 will operate, through the train of gearing 30, the bevel gears 27 and 28 imparting rotation to the shaft 21 and the disc 20 thereon which will have the effect of reciprocating through the pitman 18, the toothed rack bar 14 for rotating the pinion 13 on the condenser tuning shaft 12 and this power movement thus imparted to the condenser tuning shaft through the rotation of the shaft 21 will obviously rotate the normally hand adjustable tuning disc 24 to its graduated showing position in relation to the dial face having the effect of adjusting through the motor the hand disc 24 to a position where the condenser or condensers 11 will be properly tuned as if correspondingly operated through the hand adjusting disc 24. The graduated dialing indications upon the semi-circumferential peripheral portions of the dialing rings 100 will correspond with the similar graduated designations on the hand dialing disc 24 and when the before described circuit is closed by the action of the clock when the minute hand passes 12 o'clock on the dial, the motor 26 will start to operate and will continue to operate until the circuit is broken which will occur whenever the rotation of the

shaft 34 carries the wiper arm 102 and the brush 103 thereon into engagement with the insulating section 101 of this ring corresponding with the period from 12:00 to 12:30 since the before described negative side of the circuit passes through the shaft 34 and through the negative power line 166 connected with the dialing ring casing. The insulating section 101 on the inner periphery of the dialing rings 100 will be constructed and positioned so as to break the circuit whenever the shaft 34 carrying the wiper arm 102 shall have been rotated to a position which will have caused the tuning shaft 21 to be rotated to a position for tuning the condenser or condensers 11 to the wave length or kilocycle adjustment as indicated both upon the periphery of the hand tuning disc 24 and upon the dial rings 100. With the parts in this position the motor 26 will be stopped, and the radio receiving apparatus thus being properly tuned will continue to operate for the whole of the half hour-period or until 12:30. When the minute hand 152 passes the 3 designation on the dial 150 the adjacent positive and negative circuit terminals as indicated in Fig. 16 will be closed, the circuit being traced through the positive lines 160, 210, contacts at 3 and thence through line 180 to the positive side of a solenoid coil or casing designated by the reference character 181 and having therein a suitable magnet core operatively connected with an oscillating bar 182 carrying a toothed dog 183 pivoted thereto at 184, the toothed portion being indicated by the reference character 185 and being pressed downwardly by spring 186 toward the engagement with the aforesaid ratchet teeth on the reciprocating power switch adjusting bar 37. The solenoid and its casing 181 is only figuratively illustrated as the same will be of common construction and forms no part of the present invention. From the solenoid coil or armature 181 the circuit is traced through the negative line 187 to the aforesaid negative line 166 and thence to negative power line 161. Hence it will be seen that when the minute hand passes the numeral 3 or the quarter past 12, the apparatus having been operating already for fifteen minutes on the previous automatically tuned station adjustment, the circuit to the solenoid 181 will be closed. The ratchet dog 183 with its tooth 185 thereupon will engage the bar 37 and draw the same one space toward the right as indicated by the dotted line positions of the respective parts in Fig. 8, special reference being had to the indicating pointer 41 and the wiper arm 102. This action of the solenoid 181 thus energized will, therefore, bring the wiper arm 102 in to position to contact with the inner periphery of the second dialing ring corresponding to the period from 12:30 to 1:00 or as indicated on the dialing face beginning at 12:30. The energizing of the last said circuit by the minute hand passing the numeral 3 on the clock dial will be but a momentary contact and after the same is broken the clock will continue to operate and the condenser remain in the original 12:00 o'clock adjustment until the minute hand 152 makes contact with the positive and negative switch terminals at the numeral 6 at the bottom of the dial 150 thus terminating the normal half-hour broadcasting period on the selected station. The closing of the switch contacts opposite the 6 o'clock designation at the bottom of the dial will close the power circuit through the positive line 160, lines 215 and 216 to switch contact at 6 designation on the dial and thence

through the positive line 188 to the positive brush of the motor 26 and thence through the negative lines 184, the bushing 165, the splined reciprocating shaft 34, the dialing casing 106 and the line 166 to the negative power line 161. This will cause the motor at 12:30 to operate in the same manner as before described until the dialing ring 100 in the 12:30 position shall be caused to have its insulating segment 101 traversed by the wiper arm 102 and the brush 103 thereon when the circuit will again be broken and the motor stopped with the condenser or condensers 11 again tuned according to the predetermined adjustment of the second dialing ring 100 in the manner before described in the specific embodiment of the invention as shown in Fig. 7. In the same manner as above described, the clock action will continue to operate the mechanism in the manner described at the beginning and end of each half-hour interval while at the intermediate stations as the minute hand passes the contacts at 3 and 9 stations on the dial, the solenoid 181 will be operated to move the wiper arm and its supporting shaft 34 inwardly of the dial rings successively so that at half-hour intervals following the contact of the wiper arm 102 with the dials indicated at 12 and 12:30 respectively, the wiper arm of the automatic tuning mechanism will successively travel throughout the dialing rings, next to the 1:00 o'clock ring, then to 1:30 and so throughout the series from the left hand end as appears in Fig. 7 toward the right thereof and if the successive rings have been properly adjusted to indicate the necessary kilocycle or wave length adjustment of the stations to be automatically tuned in, the instrument will run continuously for the whole twenty-four periods or until the power is turned off by the operator.

From the above description of the preferred embodiment, it will be seen that I have provided simple, economical and efficient mechanism that may be installed or attached to various forms of commercial types of radio receiving apparatus which permits the tuning of the instrument to be predetermined as long as may be desired including where desired the entire series of twenty-four half hour periods of reception and that by arranging desired reception settings from the left hand end of the dial rings as they appear in detail in Fig. 7 toward the right hand end thereof, the operator upon starting the machine will cause it to operate continuously and bring in the successive predetermined stations without further attention.

My invention has a wide field of usefulness not only for radio receiving apparatus in private homes and the like but is particularly useful and adaptable for apparatus where used over a considerable period of time as in public places, dance halls and the like where it is desired to receive successive programs from a series of stations broadcasting programs at different successive time periods and either continuous or variable wave lengths as to successive periods as may be the case.

In order that the invention might be understood I have set forth in detail the preferred embodiment of my invention but it is not desired to be limited to the specific details thereof except as set forth in the appended claims since it will be apparent that persons skilled in the art may resort to various modifications without departing from the purpose and spirit of my invention.

I claim:

1. Automatic selective tuning mechanism for radio receiving apparatus comprising in combination with a radio receiving set having tuning elements, a plurality of station setting dialing rings having conducting surfaces with a gap of non-conducting material therein, said rings being arranged in side by side relation and in a suitable tube like formation on a common axis, means for supporting said rings to have relative rotary movements, power operated means for automatically adjusting said tuning elements, and means for predetermining and controlling the movement of said power operated means comprising a revoluble shaft longitudinally movable along said ring axis and having affixed thereto a radially extending switch arm adapted to have successive contacts with the respective conducting and non-conducting inner surfaces of said station setting dialing rings.

2. Automatic selective tuning mechanism for radio receiving apparatus comprising in combination with a radio receiving set having tuning elements, a plurality of station setting dialing rings having conducting surfaces with a gap of non-conducting material therein, said rings being arranged in side by side relation and in a suitable tube like formation on a common axis, power operated means for automatically adjusting said tuning elements, and means for predetermining and controlling the movement of said power operated means comprising a longitudinally movable, rotatable shaft carrying a switch arm adapted to have successive contacts with the respective conducting and non-conducting surfaces of said station setting dialing rings.

3. Automatic selective tuning mechanism for radio receiving apparatus comprising in combination with a radio receiving set having tuning elements, a plurality of station setting dialing rings having conducting surfaces with a gap of non-conducting material therein, said rings being arranged in side by side relation and in a suitable tube like formation on a common axis, power operated means for automatically adjusting said tuning elements, and means for predetermining and controlling the movement of said power operated means comprising a rotatable and longitudinally movable shaft, a switch arm connected to said shaft and adapted to have contacts with the respective conducting and non-conducting surfaces of successive station setting dialing rings, said switch arm and said station setting dialing rings being interposed in electric circuits for operating said power means.

4. In automatic selective tuning mechanism for radio receiving apparatus a plurality of station setting dialing rings each having interiorly arranged conducting surfaces with a gap of non-conducting material therein, said rings being arranged in side by side relation and in a tube like formation on a common axis, means for supporting said dialing rings to have relative rotation with respect to each other and with respect to said supporting means, a plurality of ring like spacer strips, one of which is interposed between each pair of adjacent dialing rings in the tube like assembly thereof, means for anchoring said spacer strips to the dialing ring supporting means, the said dialing rings being graduated on their outer peripheries to indicate wave length or equivalent station setting designations, and a ring adjustment indicator carried by each of the spacer strips for cooperation with the peripheries of the respective graduated dialing rings for visibly indicating ring settings.

5. In automatic selective tuning mechanism for radio receiving apparatus a plurality of station setting dialing rings each having interiorly arranged conducting surfaces with a gap of non-conducting material therein, said rings being arranged in side by side relation and in a tube like formation on a common axis, means for supporting said dialing rings to have relative rotation with respect to each other and with respect to said supporting means, a plurality of ring like spacer strips, one of which is interposed between each pair of adjacent dialing rings in the tube like assembly thereof, means for anchoring said spacer strips to the dialing ring supporting means, the said dialing rings being graduated on their outer peripheries to indicate wave length or equivalent station setting designations, power operated means adapted for automatically adjusting the radio receiving apparatus for tuning the same, a rotatable shaft operably connected with said power operated means, means for moving said shaft longitudinally over the interior surfaces of said dialing rings, a wiper arm carried by said shaft and adapted to have contact with said respective rings during the longitudinal adjustments of said shaft, and an electric circuit for controlling said power operated means, said circuit being operatively connected respectively with said dialing rings and with said shaft whereby to be closed during the contact of said wiper arm with the interior metallic surfaces of said dialing rings and opened by the contact of the wiper arm with the interior insulated portions of said rings.

6. In automatic selective tuning mechanism for radio receiving apparatus a plurality of station setting dialing rings each having interiorly arranged conducting surfaces with a gap of non-conducting material therein, said rings being arranged in side by side relation and in a tube like formation on a common axis, means for supporting said dialing rings to have relative rotation with respect to each other and with respect to said supporting means, a plurality of ring like spacer strips, one of which is interposed between each pair of adjacent dialing rings in the tube like assembly thereof, means for anchoring said spacer strips to the dialing ring supporting means, the said dialing rings being graduated on their outer peripheries to indicate wave length or equivalent station setting designations, power operated means adapted for automatically adjusting the radio receiving apparatus for tuning the same, a rotatable shaft operably connected with said power operated means, means for moving said shaft longitudinally over the interior surfaces of said dialing rings, a wiper arm carried by said shaft and adapted to have contact with said respective rings during the longitudinal adjustments of said shaft, an electric circuit for controlling said power operated means, said circuit being operatively connected respectively with said dialing rings and with said shaft whereby to be closed during the contact of said wiper arm with the interior metallic surfaces of said dialing rings and opened by the contact of the wiper arm with the interior insulated portions of said rings, and hand operated means for resetting the said longitudinally movable shaft and the wiper arm carried thereby to a starting position in relation to said dialing rings.

7. In automatic, selective, tuning mechanism for radio receiving apparatus adapted for automatic setting to successively receive a plurality of pre-determined program changes, the combination of a plurality of metal rings, each being

provided with a segment of insulating material and being rotatably mounted in juxtaposition with respect to each other on a common axis, each of said rings being arranged in an electric circuit to form parts of switches therein, there being one ring for each desired program change, each of said rings being arranged to permit independent settings thereof for any desired wave length reception within the normal capacity of the said receiving apparatus, a rotatable shaft provided with a wiper arm moving longitudinally of and rotating within the interior of said rings in contact with the said conducting and insulating segments thereof to form co-operating parts of said switches, a motor for operating the said rotatable shaft, gearing interposed between the motor and said shaft, and an electric circuit for controlling the motor adapted to be opened by the contact of the wiper arm on the shaft with said non-conducting segment of each individual ring, said circuit being also arranged to be closed by the contact of the wiper arm of the shaft with the interior conducting surfaces of each of the respective rings.

8. An automatic selective tuning mechanism for radio receiving apparatus having tuning elements, the combination with a plurality of station setting dialing rings having interior conducting surfaces with a gap of non-conducting material therein, said rings being arranged in side by side relation and in suitable tube like formation on a common axis, power operated means for automatically adjusting said tuning elements, means for predetermining and controlling the movement of said power operated means comprising a longitudinally movable rotatable shaft operatively connected with said power operated means for adjusting the tuning elements, a switch arm carried by the rotatable shaft and adapted to have contact with the inner peripheries of said dialing rings including the gap of non-conducting material therein, the said individual dialing rings and the said shaft with its wiper arm being interposed in an electric circuit for controlling said power operated means in adjusting the tuning elements, an electrically operated device for operating the shaft with the wiper arm longitudinally of the dialing rings in one direction to cause the said wiper arm to traverse the respective dialing rings, and hand operated means for restoring the said shaft and the wiper arm carried thereby to an initial position of adjustment in the opposite direction over the interior surfaces of the dialing rings.

9. Automatic selective tuning mechanism for radio receiving apparatus comprising in combination with a radio receiving set having tuning elements, a plurality of station setting dialing rings having conducting surfaces with a gap of non-conducting material therein, said rings being arranged in side by side relation and in tube like formation on a common axis, power operated means for automatically adjusting said tuning elements comprising a train of gears operatively connected with said tuning elements and with an electric motor having a power circuit, a shaft operatively connected with one of the gears of said train and being longitudinally movable therein and arranged to pass within the inner periphery of the respective dialing rings, a wiper arm carried by said shaft and adapted to engage the respective conducting and non-conducting surfaces of said rings, said rings and said shaft being interposed in the said circuit for operating the motor, a clock controlled switch mecha-

nism for controlling the electric power circuit to the motor, and an electrically operated device for actuating said shaft and the wiper arm carried thereby in one direction in relation to the said dialing rings to have successive contacts therewith, means for restoring the said shaft and the wiper arm carried thereby from its automatically actuated position in one direction over the dialing rings toward the opposite end of said rings for resetting the apparatus.

10 10. Automatic selective tuning mechanism for radio receiving apparatus comprising in combination with a radio receiving set having tuning elements, a plurality of station setting dialing rings arranged in side by side relation and in
15 suitable tube like formation on a common axis, power operated means for automatically adjusting said tuning elements, means for predetermining and controlling the movement of said
20 power operated means comprising a longitudinally movable rotatable shaft adapted to be actuated by said power operated means, said shaft carrying a switch arm adapted to have successive
25 contacts with the respective surfaces of said dialing rings, a longitudinally movable member extending approximately parallel to the said rotatable shaft and being operably connected thereto at the end thereof remote from the said switch
30 arm thereon, the last said member being provided with a plurality of ratchet teeth each spaced apart a distance equal to the width of the said station setting dialing rings, an electrically operated ratchet device for engaging the said
35 ratchet teeth for successively moving the said shaft and switch arm carried thereby over the interior surfaces of the said rings, and means operably connected with the said ratcheted longitudinally movable member for restoring the
40 latter and the rotatable shaft and switch arm carried thereby to a designated initial position after being actuated by the said ratchet mechanism through the longitudinal member.

11. In combination with radio receiving apparatus having tuning elements, a plurality of
45 rotatably mounted-switch rings, a shaft carrying an arm adapted to be moved into electric contact with the inner surfaces of said rings, means for moving the shaft in one direction in step by step movements over successive rings in the
50 series one step at a time during each broadcasting period, means for restoring the shaft to a designated initial position in relation to said

rings, the shaft having an arm as one element of an electric switch, the other element of which is a selected one of said rotatable rings, said shaft being slidably mounted in a rotatable gear, an electric motor, a gear train including the afore-
50 said gear, means operated by the gear train for adjusting said tuning elements, an electric circuit adapted to be opened and closed by the contact of the arm on said shaft with said rings,
85 means actuated by the closing of said electric circuit for operating said gear train and the shaft with the arm thereon in one direction, and means for restoring the shaft and its arm in the opposite direction in relation to said rings.

12. In automatic selective tuning mechanism
90 for radio receiving apparatus a plurality of station setting dialing rings each having interiorly arranged conducting surfaces with a gap of non-conducting material therein, said rings being arranged in side by side relation and in a tube-like
95 formation on a common axis, means for supporting said dialing rings to have relative rotation with respect to each other and with respect to said supporting means, a plurality of ring like
100 spacer-strips, one of which is interposed between each pair of adjacent dialing rings in the tube like assembly thereof, means for anchoring said
105 spacer strips to the dialing ring supporting means, the said dialing rings being graduated on their outer peripheries to indicate wave length or equivalent station setting designations, power operated means adapted for automatically adjusting the radio receiving apparatus for tuning the
110 same, a rotatable shaft operably connected with said power means, means for moving said shaft longitudinally over the interior surfaces of said
115 dialing rings, a wiper arm carried by said shaft and adapted to have contact with said respective rings during the longitudinal adjustments of said shaft, an electric circuit for controlling said
120 power operated means, said circuit being operatively connected respectively with said dialing rings and with said shaft whereby to be closed during the contact of said wiper arm with the interior metallic surfaces of said dialing rings and
125 opened by the contact of the wiper arm with the interior insulated portions of said rings, and means for resetting the said longitudinally movable shaft and the wiper arm carried thereby to a starting position in relation to said dialing rings.

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