Jan. 19, 1932. H. F. ELLIOTT 1,841,941

ADJUSTMENT CONTROL AND INDICATOR

Filed Aug. 7, 1930 3 Sheets-Sheet 1

Fig. 1.

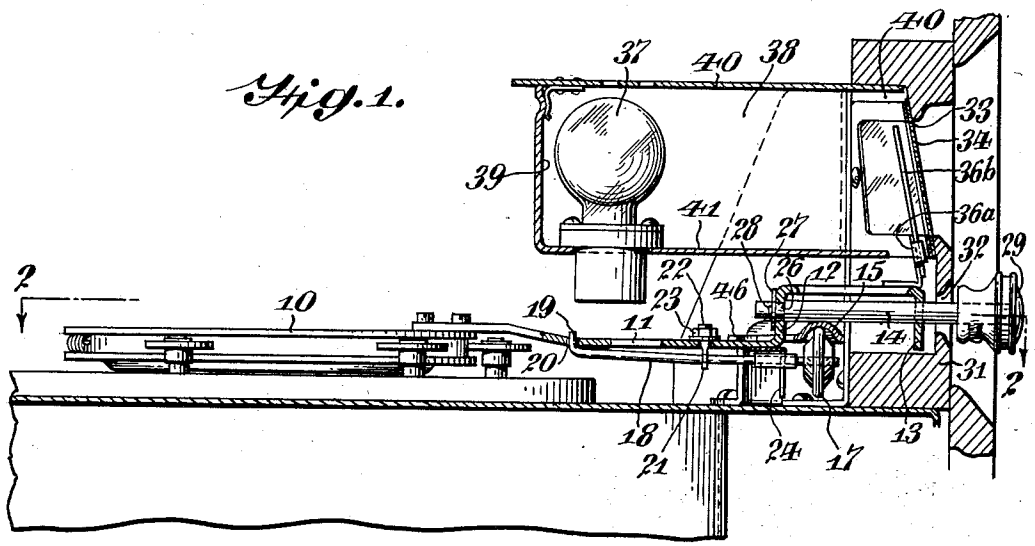
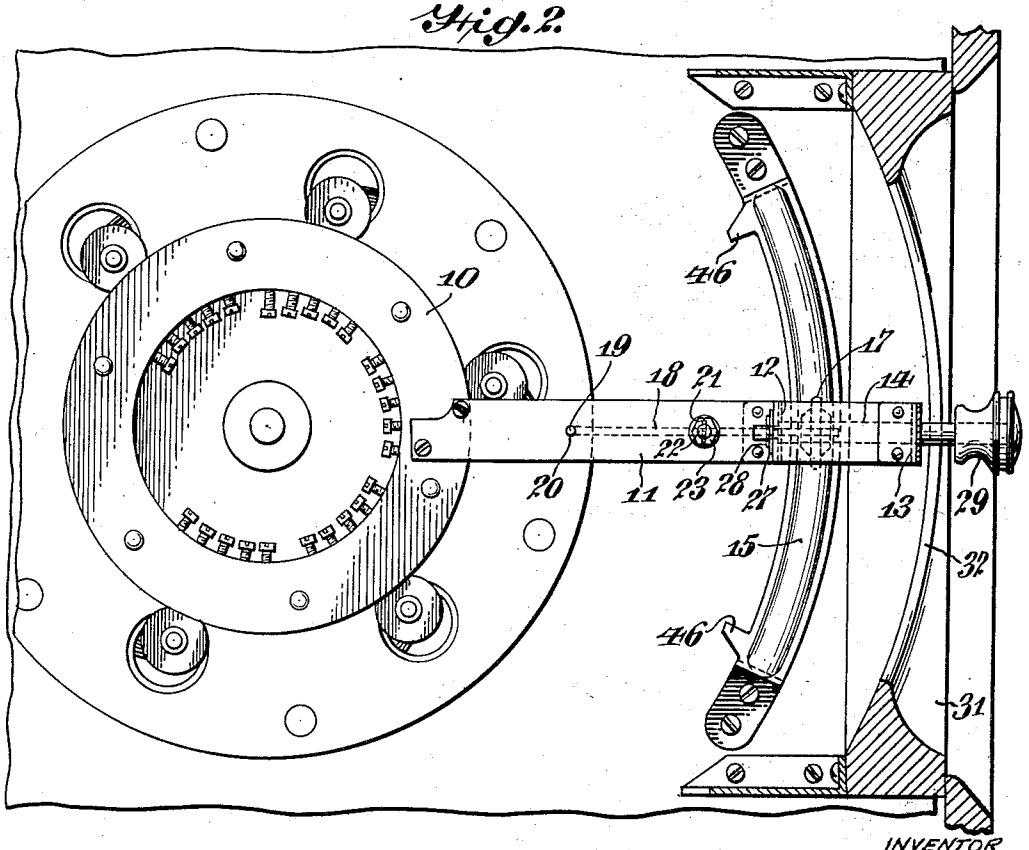


Fig. 2.



INVENTOR.

By Harold F. Elliott,

T. R. Goldsborough Attorney

Jan. 19, 1932. H. F. ELLIOTT 1,841,941

ADJUSTMENT CONTROL AND INDICATOR

Filed Aug. 7, 1930 3 Sheets-Sheet 2

Fig. 3.

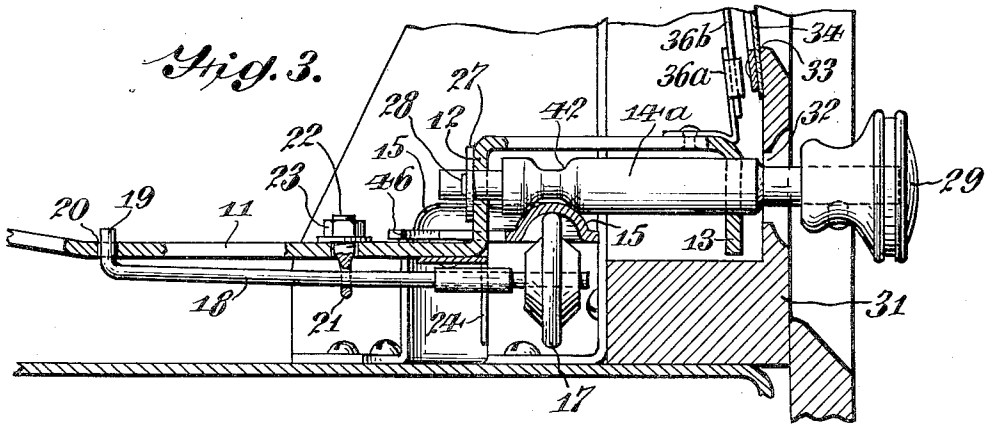


Fig. 4.

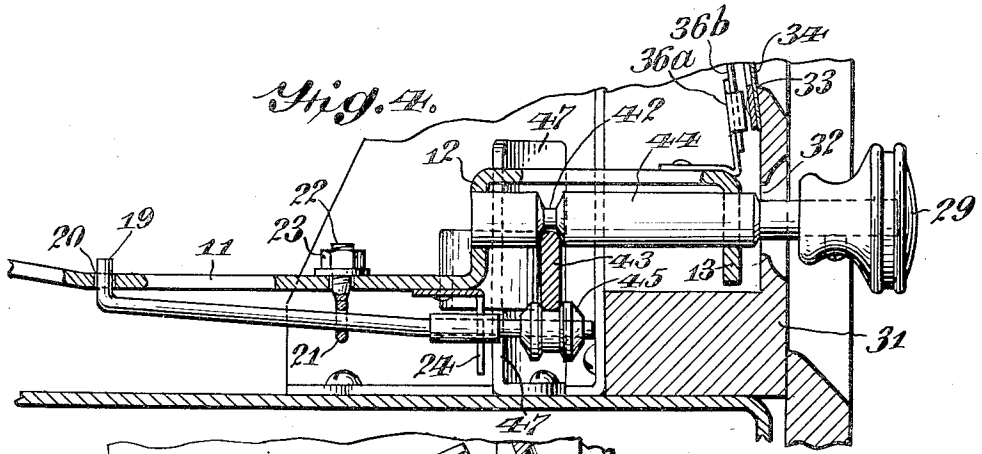
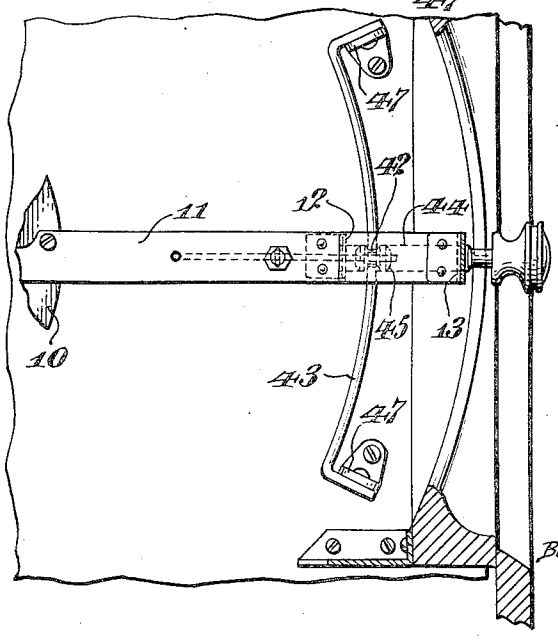


Fig. 5.



Inventor

Harold F. Elliott,

BY T. R. Goldsborough

Attorney

Jan. 19, 1932. H. F. ELLIOTT 1,841,941

ADJUSTMENT CONTROL AND INDICATOR

Filed Aug. 7, 1930 3 Sheets-Sheet 3

Fig. 6.

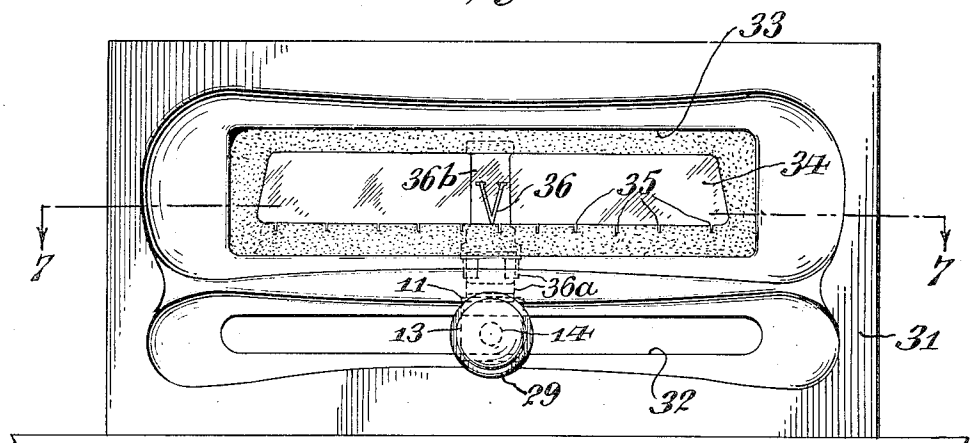


Fig. 8.

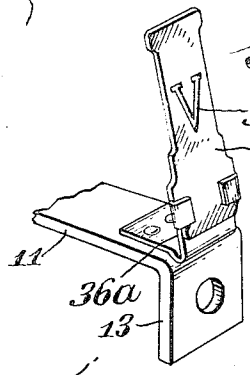


Fig. 7.

Inventor

Harold F. Elliott,

By J. R. Goldsborough

Attorney

Patented Jan. 19, 1932 1,841,941

UNITED STATES PATENT OFFICE

HAROLD F. ELLIOTT, OF HADDONFIELD, NEW JERSEY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO RADIO CORPORATION OF AMERICA, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE

ADJUSTMENT CONTROL AND INDICATOR

Application filed August 7, 1930. Serial No. 473,753.

The present invention relates to mechanism for making adjustments and to means for visibly indicating the adjustment, and more particularly to an indicating control means for radio tuning apparatus and the like.

The invention in the present embodiment is applied to the simultaneous adjustment of a plurality of condensers such as are used in radio apparatus of the character illustrated in my Patent 1,707,948, granted April 2, 1929.

An object of the invention is to provide an improved means for combined coarse and fine adjustment which will be capable of greater precision of adjustment and facility of manipulation, while at the same time being simpler in construction and operation and less costly of manufacture than devices of this character heretofore known.

A further object is the provision of an instrumentality by non-rotary movement of which a coarse adjustment may be effected and by rotation of which a fine adjustment may be effected, the axis of rotation of the instrumentality remaining in the same plane while being rotated and when being non-rotarily moved.

The above objects are accomplished in the present embodiment of the invention by providing a track which may be concavo-convex in transverse section and along which is moved an adjusting instrumentality having a pair of rollers yieldably urged toward each other and riding on opposite surfaces of the track, one of the rollers being preferably of much greater diameter than the other and much greater than the shaft on which it is rotatably mounted, the said shaft being preferably of spring material. This adjusting instrumentality includes an adjustment indicator having a curved, calibrated member in the nature of a window and a pointer within a chamber behind the window, the shadow of which is thrown upon the calibrations of the window by a lamp within the chamber and behind the pointer.

In the drawings:

Fig. 1 is a vertical section through a fragmentary portion of a radio casing showing the mechanism for adjusting the variable condensers of a hookup, together with visible indicating instrumentalities connected therewith;

Fig. 2 is a sectional plan view on line 2—2, Figure 1.

Fig. 3 shows a part of the structure illustrated in Figure 1 on an enlarged scale, emphasizing the adjustment control and its relation to the track, and showing the roller shaft slightly modified.

Fig. 4 is a view similar to Figure 3, showing a different track and roller relationship.

Fig. 5 is a plan view of Figure 4.

Fig. 6 is a front elevation of the adjustment mechanism and indicating instrumentalities.

Fig. 7 is a fragmentary section on line 7—7, Figure 6, showing the relation of parts of the indicator to each other.

Fig. 8 is a perspective detail of a form of the indicator.

The present embodiment of my invention is herein disclosed in relation to condenser adjustment such as is disclosed in my above named patent, and relates particularly to the instrumentalities for operating the control member or cam wheel 10 through which the condenser stators and rotors (not shown) are actuated, and to a device for visibly indicating the amount of adjustment from a given relative position.

The adjusting instrumentalities comprise a lever arm 11 which is rigidly connected with the cam wheel in any suitable manner, so as to have angular movement therewith. The lever arm is of relatively thin material whereby it is slightly flexible and is bowed at one end to provide vertical portions 12 and 13 in which may be journaled a shaft 14 adapted to ride on a track 15 which may be in the nature of a sector of a circle such as shown in Figure 2 of the drawings. This track and roller relationship may be of any suitable character; three forms being herein illustrated.

The form shown in Figures 1 and 2 will be first described, which shows the track as being concavo-convex in transverse section and bowed upwardly, affording a rounded ridge

on its upper side and a trough in its lower side for purposes as will hereinafter appear.

The shaft 14 in the nature of an elongated roller, is maintained normally in contact with the upper surface of the track by a second roller 17 riding in the trough and yieldingly urged toward the roller 14 and the track by a spring arm or shaft 18 on which it is rotatably mounted. The shaft 18 in turn is connected to the arm 11 by a lug 19 extending at an angle thereto and projecting through an aperture 20 in the arm. The connection between the lug and lever arm 11 is loose and the lug 19 is held in the aperture by the upward pressure exerted thereon by the roller 17 and the fulcrum afforded by the eye 21 on the end of the bolt 22 through which arm 18 passes. By means of this bolt, together with the nut 23, the tension of the arm or shaft 18 may be adjusted so as to cause the wheel to exert a lesser or greater pressure on the track. The roller 17 may be loosely mounted on the shaft 18 and held from disengagement therefrom by its position in the trough of the track.

The end of the arm 18 adjacent the roller 17 rides in a slot or notch 24 formed in a depending flange on the member 11, thereby allowing for the free movement of the arm 18 vertically while preventing lateral movement thereof relative to the arm 11.

It will be noted by reference to Figure 1 of the drawings that the roller 17 is of great diameter compared with the shaft 18 on which it is mounted, whereby frictional resistance in rotation is small while the leverage between the tread and the shaft is comparatively great. The roller 17 is also of greater diameter than the roller 14, and while, with its resilient mounting, maintaining the latter roller in engagement with the track, will not exert a material drag upon its movement therealong. The drag is further minimized by providing the roller 17 with a narrow tread and affording through the bowed up portion of the track a comparatively narrow contact with the tread of the roller 14.

The roller 14 is held against axial movement by means of the shoulder 26 formed by reduction of the inner end of the roller and a washer 27 held on this end by a cotter pin 28. This roller is both slidable and rotatable upon the track 15 and may be manually controlled with respect to these movements by means of the knob 29 secured on its outer end. The front wall or panel 31 of the apparatus to which the above described control means is applied is provided with a horizontally extending slot 32 through which the roller 14 projects, locating the knob 29 exteriorly of the said casing.

Above this slot, the panel is provided with a horizontally elongated window 33 which may be covered by any suitable translucent material 34, as celluloid or parchment, and upon which may be scored or otherwise indicated a number of divisions or calibrations 35 constituting a dial for cooperation with a suitable pointer in indicating to an observer the adjustment of the arm 11 relative to a given zero mark.

Such a pointer is provided at 36 and may be adjustably connected with the arm 11, as at 36^a, so as to be properly positionable to throw its shadow on the calibrated portion of the window, as shown in Figure 6 of the drawings. The pointer may be of any suitable character, as here shown it is in the shape of a V either printed on or cut from a member 36^b, of translucent or transparent material. The shadow of this pointer suitably projected on the window as by means of a lamp 37 secured within a chamber 38 provided by a casing having walls 39 and top and bottom closures 40 and 41; only the front of the casing being open, and this opening being made to substantially coincide with the window 33 and to be closed by the dial member 34. The casing walls and top at the forward end are projected into a recess 40 formed in the wall of the casing 31 with the bottom spaced from the rear wall sufficiently to accommodate the extension of the pointer 36 into the chamber in a position between the lamp and the window.

By this arrangement the adjustment indication is projected upon the scale and lies in the plane thereof, eliminating all possibility of parallax in reading the scale. This is of importance in adjusting the control member 10, particularly in the factory adjustment of the same. Positioning of the pointer within the casing and rearwardly of the window has a further important advantage in that it reduces the number of breakable parts on the outside of the casing and permits unobstructed access to the window for dusting or for other purposes.

The walls of the chamber 38 should be of a non-reflecting nature and the lamp should be completely enclosed either by the walls of the chamber or of the casing in order to obtain the best results.

In Figures 4 and 5 a variation of the track and roller relationship is shown, the track 43 thereof being comprised of a strip of material turned on edge and of sector shape, the same being shown suitably supported from the casing. On the upper and lower edges of this track the peripherally grooved rollers 44 and 45 ride, the lower roller being yieldingly mounted and of large diameter compared to its carrying shaft and compared to the roller 44.

In the forms of the device shown in Figures 3, 4, and 5, the tuning shaft is provided with a peripheral groove 42, whereby the frictional tread thereof on the track is increased.

In the form shown in Figures 1 and 2, track 15 is provided with limiting abutments

46 for the arm 11, and in Figures 4 and 5, track supports 47 serve as abutments to the same end.

Still further forms of the invention might be herein set forth. It is believed, however, that the forms herein illustrated will make clear the wide application of the principles of the invention and will make it clear that the invention is not limited to any one or any particular form involving these principles.

Having described my invention, what I claim is:

1. In a radio apparatus, the combination with a pivoted, angularly adjustable tuning control device, of means for effecting manual adjustment thereof, including a lever arm connected to said member and movable therewith, a curved guide track for said arm having an axis of curvature common to the pivot axis of said device, a pair of guide rollers connected with said arm and arranged resiliently to contact with opposite sides of said track, one of said rollers being manually rotatable, an indicator connected with said arm to move therewith whereby it is guided by said track to move in a fixed path, a lamp, a casing for said indicator and lamp, and a translucent dial member forming a closure means for said casing.

2. In a device of the character described, a rotatable member, a lever arm connected therewith, a track, a roller rigidly journalled in the arm and engaging one side of the track, an indicator carried by the arm, manual means for operating said roller to move the arm, a spring arm connected to the first-named arm, and a second roller of relatively large diameter with respect to the first named roller mounted on said spring arm and urged thereby against the opposite side of the track, said track being concave in section to form a trough, and said second roller being arranged to travel in said trough, whereby said indicator and arm are guided to move along said track.

3. In a device of the character described, a curved track, a pivotally mounted control arm having a free end movable along the track to various positions of adjustment, a roller journalled in the arm and engaging one side of the track, manual means for rotating the shaft and moving the arm, a spring shaft extending from the arm, a second roller rotatably mounted on the shaft and resiliently contacting with the opposite side of the track, said second roller being of greater diameter than the shaft and the first named roller, an indicator carried by the lever whereby it is guided to move along said track, and a fixed dial means therefor having substantially the same axis of curvature as the track.

4. In a tuning control apparatus adapted for effecting coarse and fine adjustment, the combination of a movable control member, a curved track, an arm connected with said member and movable along the track, a pair of rollers secured to said arm and engaging opposite edges of the track, means yieldingly urging said rollers toward each other, a manual control member on one of said rollers for selectively sliding or rotating the said roller on said track, an indicating means directly connected with said lever, a dial member curved on the same axis of curvature as the track and lying adjacent said manual control member, and means adapted to co-operate with said dial member to provide a protective casing for said indicating means.

5. The combination with an apparatus having an adjustable rotary control member, of an indicating control means therefor including an elongated flexible lever arm connected at one end with said member to move it about its axis of rotation, said lever being bent at its opposite free end to provide spaced shaft bearings, a control shaft journalled in said bearings and projecting at one end from the lever in continuation thereof, a manual control knob mounted on the shaft at its projecting end for manually rotating the shaft and for moving the lever, an indicator carried by the lever adjacent its free end, means providing a chamber into one end of which said indicator projects, a translucent dial means arranged to close said end of the chamber and being arranged to be viewed when manually moving said control knob, a lamp in said chamber for illuminating said dial means, a track with which the control shaft engages, and means including a resilient guide roller and a resilient mounting means therefor on the lever for holding said control shaft in engagement with said track.

6. The combination with an apparatus having an adjustable rotary control member, of an indicating control means therefor, including an elongated flexible lever arm connected at one end with said member to move it about its axis of rotation, said lever being bent at its opposite free end to provide spaced shaft bearings, a control shaft journalled in said bearings and projecting at one end from the lever in continuation thereof, a manual control knob mounted on the shaft at its projecting end for manually rotating the shaft and for moving the lever, an indicator carried by the lever adjacent its free end, means providing a chamber into one end of which said indicator projects, a translucent dial means arranged to close said end of the chamber and being arranged to be viewed when manually moving said control knob, a lamp in said chamber for illuminating the dial, a track with which the control shaft engages, means including a guide roller and a resilient mounting means therefor on the lever for holding said control shaft in engagement with said track, and said track and dial means being curved and having a common center

of curvature with said rotary control member.

7. In a radio apparatus, the combination with a rotatable control means therefor, of a lever arm connected at one end with said control means and having a movable free end, a panel adjacent the free end of the lever, a slot in the panel, a control shaft arranged to project through said slot and being journalled in the free end of the lever, a window in said panel adjacent said slot, a casing mounted adjacent said lever and in alignment with said window, a translucent dial member forming a closure means for said window and said casing, an indicator carried by said lever and projecting into said casing, a lamp in said casing arranged to project an image of said indicator upon said dial, said dial member and panel being curved about an axis of curvature common to the axis of curvature of said control member, and means for guiding said lever and indicator to move in fixed relation to said dial member and to said slot, including a guide track with which said control shaft engages on one side of said track and a resiliently mounted roller of relatively large diameter mounted upon the lever arm and arranged to engage the opposite side of said track.

8. In a radio apparatus, the combination with rotatable control means therefor, of a lever arm connected at one end with said control means and having a movable free end, a panel adjacent the free end of the lever, a slot in the panel, a control shaft arranged to project through said slot and being journalled in the free end of the lever, a window in said panel adjacent said slot, a casing mounted adjacent said lever and in alignment with said window, a translucent dial member forming a closure means for said window and said casing, an indicator carried by said lever and projecting into said casing, and a lamp in said casing arranged to project an image of said indicator upon said dial.

9. In a radio apparatus, the combination with rotatable control means therefor, of a lever arm connected with said control means whereby it is movable therewith at one end about the axis of said control means, a translucent dial member along which said end of the lever is arranged to move, an indicator for the dial member carried by said movable end of the lever adjacent said dial member, and a lamp arranged to illuminate said dial member and to project an image of said indicator upon said dial member.

10. In combination, in a radio set, a station scale, a source of illumination for said scale, a tuning arm, and illumination obstructing means, arranged for movement in accordance with displacement of said arm, interposed between said source and scale for providing an index image on said scale in alignment with said tuning arm.

11. In combination, in a radio apparatus, an elongated, fixed, scale, means for illuminating the entire scale, a tuning means including the knob disposed beneath the scale and adapted for displacement along the entire length of the scale, and means, associated with said tuning means, interposed between said scale and illuminating means for providing an index image on said scale in substantial alignment with said tuning knob.

12. In combination, in a radio set, an illuminated scale, a tuning arm provided with a manually adjustable knob, and means operable with the arm for projecting an index image on the scale constantly in alignment with said knob.

13. In a radio apparatus, the combination with movable control means therefor, of an arm connected with said control means whereby it is movable therewith, a translucent dial member along which one end of the arm is arranged to move, an indicator for the dial member carried by said arm adjacent said dial member, and a lamp arranged to illuminate said dial member and to project an image of said indicator upon said dial member.

14. In a radio apparatus, the combination with movable control means therefor, of a translucent dial member, an indicator arranged to move along said dial member, means providing a connection between said indicator and said control means whereby said indicator moves in response to movement of said control means, and a lamp arranged to illuminate said dial member and to project an image of said indicator upon said dial member.

In testimony whereof I have hereunto subscribed my name this 29th day of July, 1930.

HAROLD F. ELLIOTT.