Dec. 5, 1939. W. J. SCHNELL 2,182,572

RADIO TUNING INDICATOR

Filed May 15, 1937 4 Sheets-Sheet 1

FIG. 1.

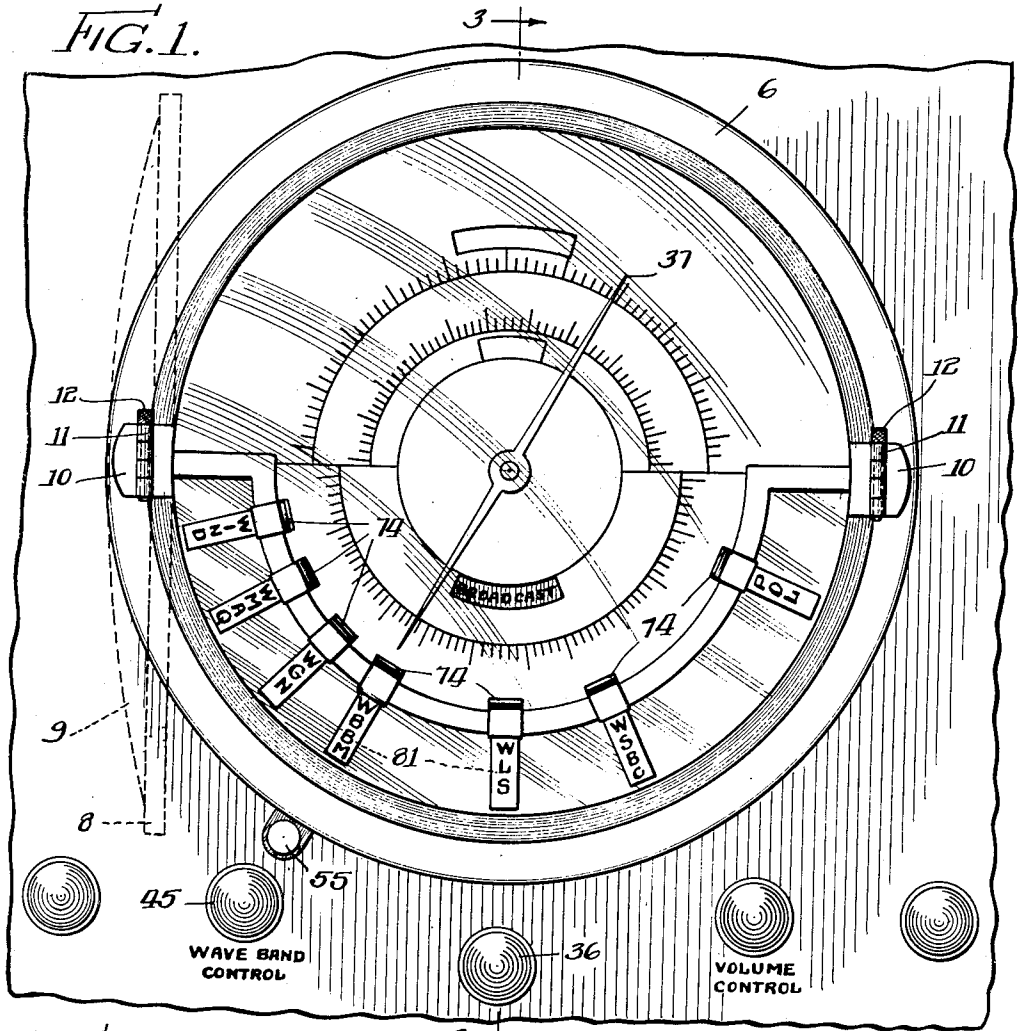
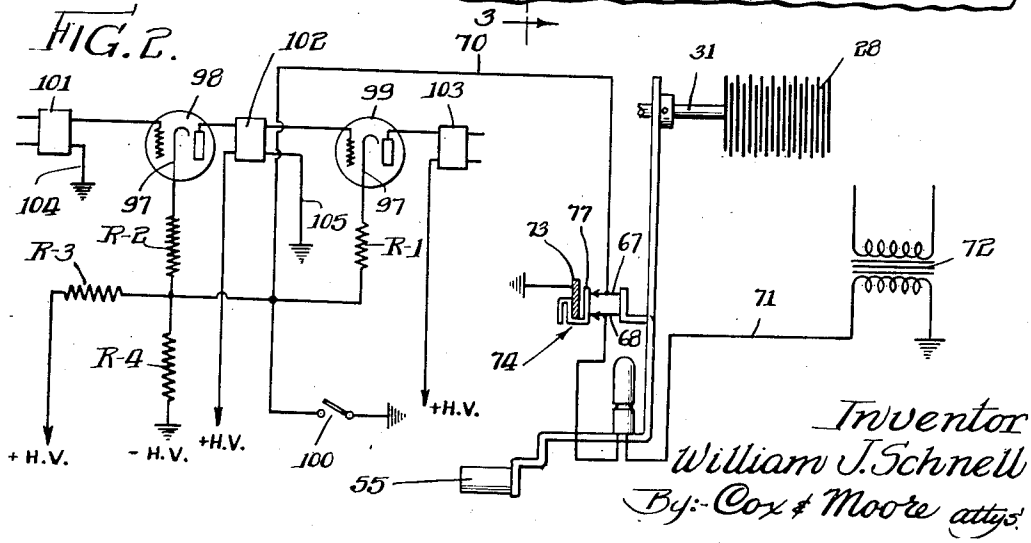


FIG. 2.



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RADIO TUNING INDICATOR

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FIG. 3.

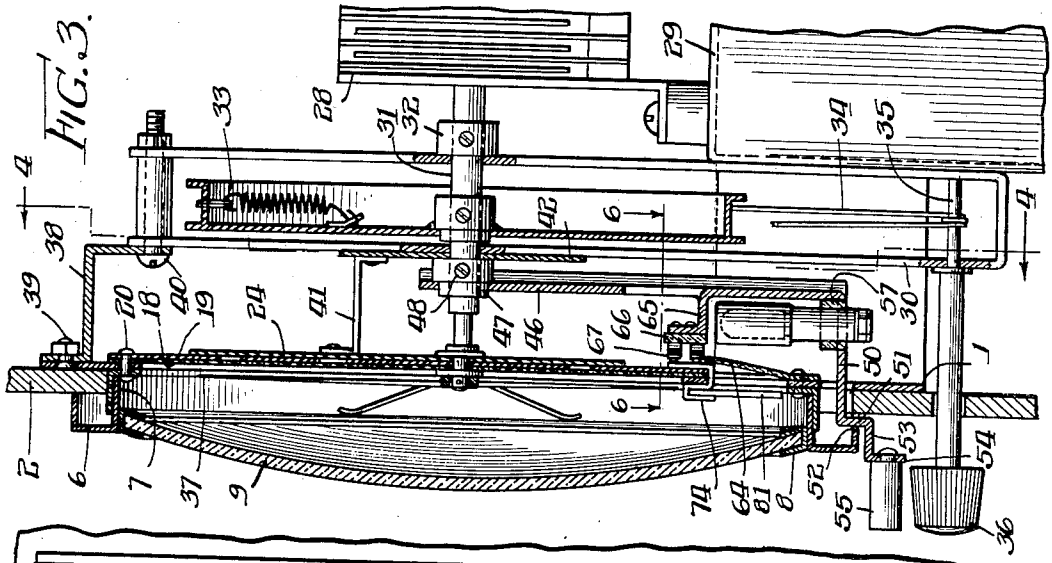
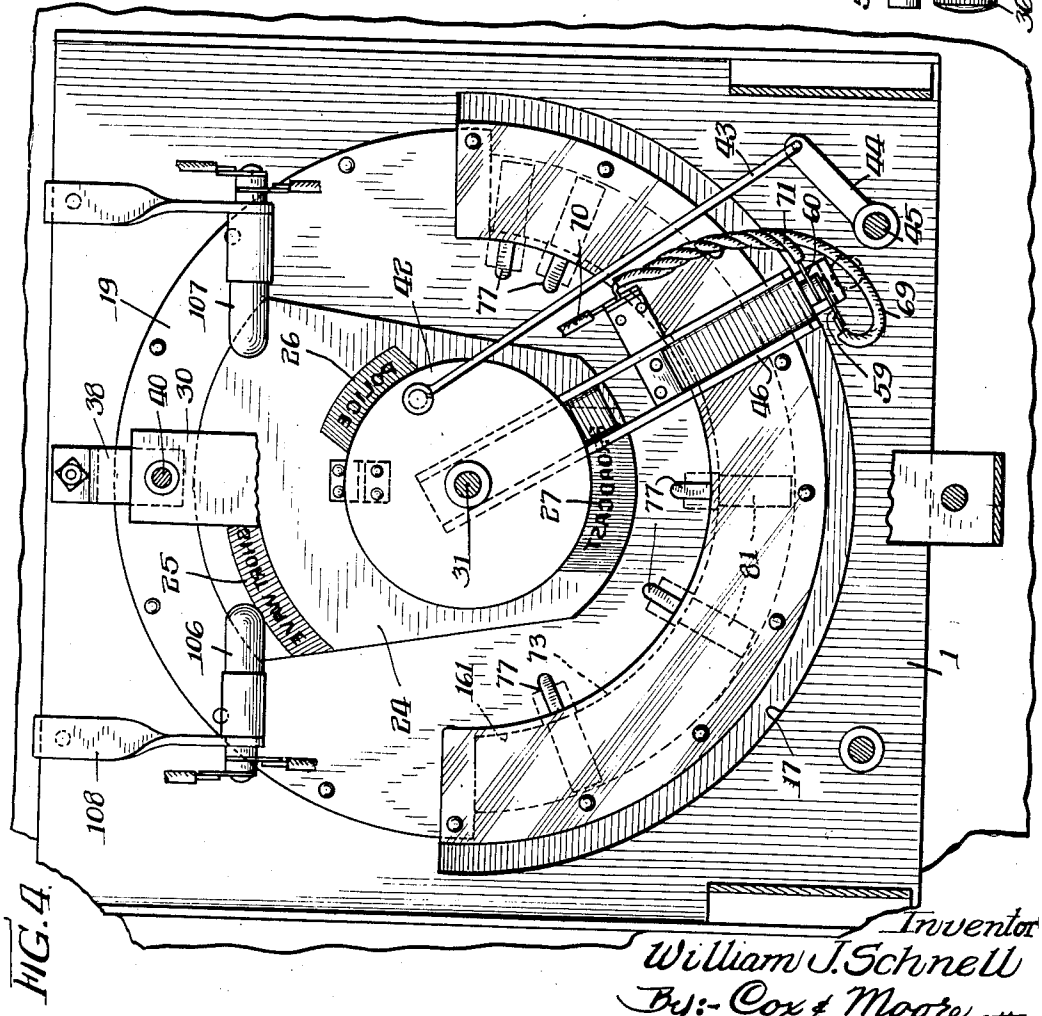


FIG. 4.

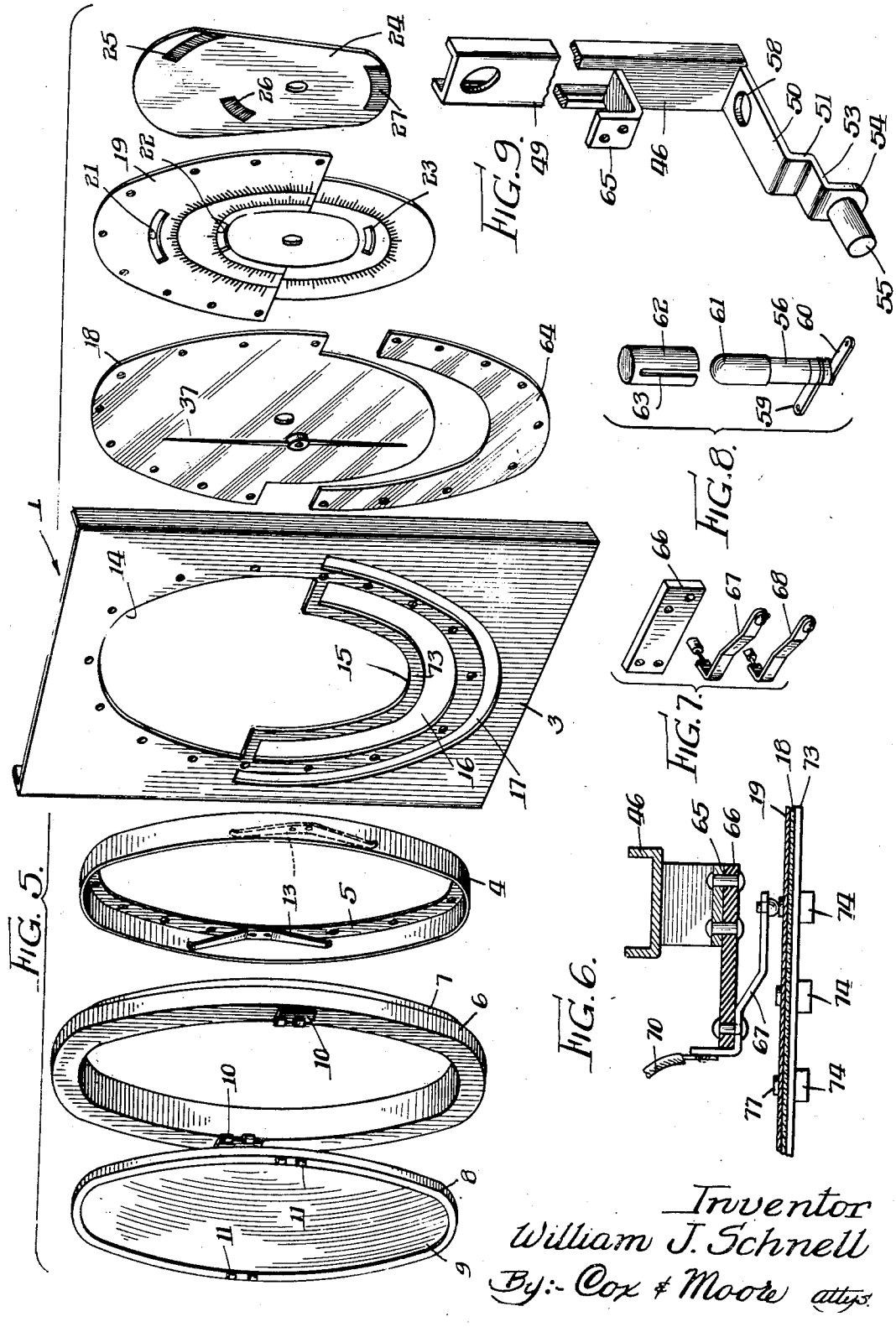


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FIG. 10.

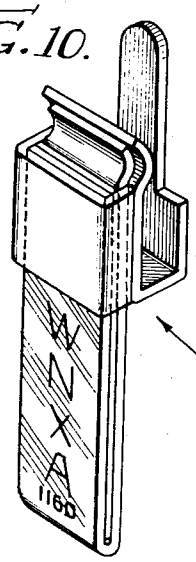


FIG. 11.

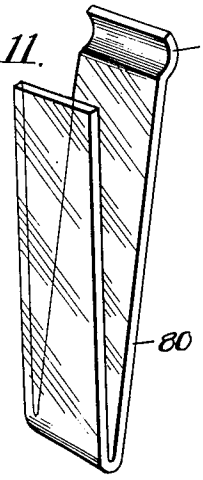


FIG. 12.

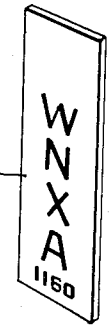


FIG. 13.

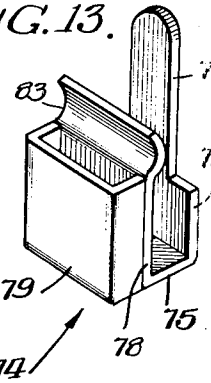


FIG. 14.

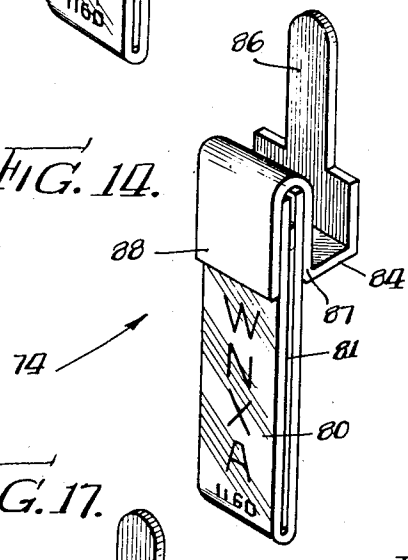


FIG. 15.

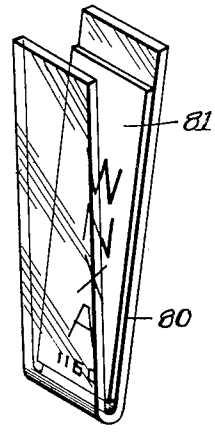


FIG. 16.

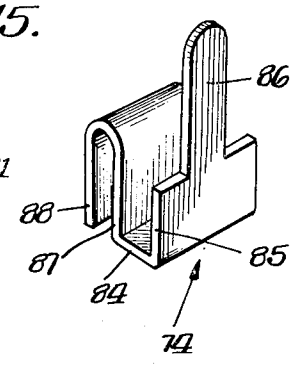


FIG. 17.

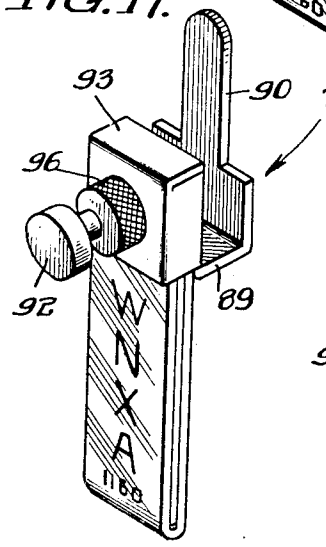


FIG. 18.

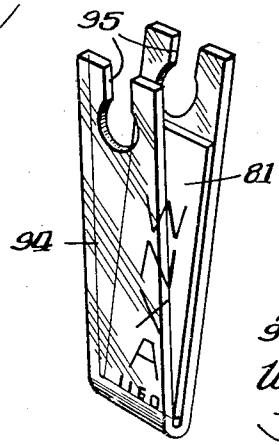


FIG. 19.

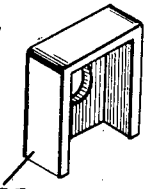
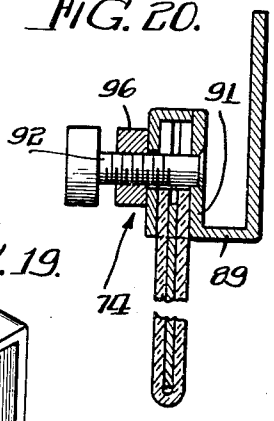


FIG. 20.



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Patented Dec. 5, 1939 2,182,572

UNITED STATES PATENT OFFICE

2,182,572

RADIO TUNING INDICATOR

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Application May 15, 1937, Serial No. 142,863

12 Claims. (Cl. 250—20)

This invention relates to a radio tuning indicator and adjusting device.

An object of the invention is to provide, in a radio tuning indicator, simplified and inexpensive means to indicate the proper tuning position of the receiver for any of a desired number of broadcast stations.

Another object is to provide a simple, accurate and inexpensive fast-operating tuning control for radio receivers.

A further object of the invention is the prosion of compact and efficient means operable in synchronism with the tuning device to indicate the tuned condition of the receiver.

It is another object of applicant's invention to provide means operable in synchronism with the tuning control and co-operating with fixed means carrying indicia representative of the various broadcasting stations to indicate the station to which the receiver is tuned.

A further object of the invention is to provide a simplified means for silencing the receiver during the tuning operation.

Another object of the invention is to provide, in a radio receiver having fixed means to indicate the position to which the tuning control should be adjusted to tune the receiver to a desired station, a circuit for silencing the receiver during the tuning operation, which circuit is operable by said indicating means to restore the receiver to normal condition when the desired station has been properly tuned.

A further object is to provide a rugged but inexpensive means for luminously indicating the tuned condition of the receiver, which means is automatically operable upon the tuning of the receiver.

Another object of applicant's invention is to provide, in a radio receiver, a luminous tuning indicator, a plurality of station indicating marking devices, and means co-operating with said tuning indicator and operable by said devices to energize said tuning indicator when the receiver becomes tuned to a station indicated by any one of said marking devices.

Still further objects of applicant's invention are to provide a radio receiver capable of both rapid and slow tuning; to provide in such a receiver, simplified means which indicates by call letters as well as by frequency or wave length the proper tuning position of the receiver for the desired one of a number of broadcast stations, which means is readily replaceable and adjustable at the will of the user; to provide tuning indicating means operable by said position-indicating means for indicating the tuned condition of the receiver; to provide automatically operable means for silencing the receiver during the tuning operation, which silencing means is rendered inoperative by the position-indicating means.

Other and further objects of this invention will become apparent from the following detailed description of one illustrative embodiment of the invention when considered with the accompanying drawings wherein:

Fig. 1 is a face view of a portion of a radio receiver embodying the invention;

Fig. 2 is a schematic illustration of the tuning indicator and silencing circuits;

Fig. 3 is a vertical section taken along the line 3—3 of Fig. 1;

Fig. 4 is a vertical section at right angles to Fig. 3 taken on the line 4—4 of Fig. 3;

Fig. 5 is an exploded perspective view of the dial assembly;

Fig. 6 is a fragmentary horizontal section taken along the line 6—6 of Fig. 3;

Figs. 7, 8 and 9 are perspective views of certain elements of the mechanism;

Figs. 10 to 13 are perspective views illustrating one form of marking device embodied in applicant's invention;

Figs. 14, 15 and 16 are perspective views of a modified form of marking device, and

Figs. 17 to 20 are perspective views of another modified form of marking device.

A tuning device of one form of applicant's invention comprises a supporting plate 1 mounted on the inner side of the front face or panel 2 of a radio receiver. On the front face 3 of the plate 1 there is mounted a ring 4 which fits closely within an opening provided in the panel 2 and has an inwardly projecting annular flange 5 for attaching the ring to the supporting plate. A second ring member 6 of channel cross-section is mounted in the ring 5, the inner flange 7 of the ring 6 being extended into frictional engagement with the ring 4 and the outer surfaces being finished to provide a pleasing appearance. A third ring or cover 8 is mounted on the ring 7 by hinge pintles 10 and 11 and pins 12, the pins 12 being readily removable to permit complete removal of the cover or its swinging to either side. Spring strips 13 are secured to the annular flange 5 of the ring 4 within said ring, and these spring strips bear against the cover ring 8 to prevent vibration of the same.

The face 3 of the supporting plate 1 is provided with upper and lower semi-circular apertures 14 and 15 registering with each other, and

annular openings or slots 16, 17 cut from the bottom portion of the face 3 concentric to the semi-circular aperture 15. A transparent or translucent shield 18 and a dial plate 19 are secured to the back of the supporting plate 1 by rivets 20 (Fig. 3) which pass through aligned openings in the annular flange 5 of the ring 4, the supporting plate 1, the shield 18 and the dial plate 19. The shield 18 and dial plate 19 are provided with semi-circular upper and lower portions mating with the apertures 14 and 15 in the supporting plate 1. The dial plate 19 is made of opaque material, or other material rendered opaque, and carries indicia representative of various broadcast scales etched in, or left transparent, to permit light to pass therethrough from the rear of the dial plate.

The dial plate 19 is provided with arcuate cut-outs 21, 22 and 23, which co-operate with a segmental band indicator 24 for indicating the band to which the receiver is responsive. This band indicator segment 24 is provided with transparent arcuate portions 25, 26 and 27 which are differently colored and inscribed with characteristic indicia representative of one of the bands and are adapted to be selectively positioned behind one of the cut-outs 21, 22 and 23.

The tuning condenser 28 is mounted in the usual manner on the receiver chassis 29 and on the front face of the chassis is mounted a U-shaped bracket 30 (Fig. 3) in which is journalled a tuning shaft 31. The tuning shaft 31 is connected by a common coupling 32 to the shaft of the tuning condenser 28 and to the hub of a pulley 33, the pulley 33 being driven in the usual manner by a cable 34 passing over an axle 35 journalled in the bracket 30 and operable by a control knob 36. It will be apparent that the control knob 36 has a step-down ratio of movement with respect to the shaft 31 and therefore provides a slow or fine tuning adjustment.

The tuning shaft 31 extends forwardly from the bracket 30 and passes through the segmental band indicator 24, the dial plate 19, the shield 18 and the supporting plate 1, and receives on its outer end a double-ended pointer 37 adapted to co-operate with the dial plate 19 to indicate the position of the tuning condenser. A bracket 38 is secured by a bolt 39 to the rear side of the plate 1 and by a bolt 40 to the upper end of the bracket 30 to support the same. The band indicator 24 is secured by a bracket or arm 41 to a disc 42 loosely mounted on the shaft 31 adjacent the bracket 30 and the disc 42 is operated, through a link 43 and a crank 44, by a manually operable knob 45 passing through the panel 2 and secured to the crank 44. The knob 45 also controls, in the usual manner, the selective contacts by which the various bands of the receiver are selected.

A fast operating control lever 46 is secured at its upper end to a collar 47 which is secured to the shaft 31 by a set screw 48. In addition to the vertical portion 49, to which the collar 47 is secured, the control lever 46 is provided with a horizontal portion 50 extending forwardly from the portion 49 through the slot 17 of the plate 1; a vertical portion 51 extending downwardly from the portion 50 and passing through an arcuate slot 52 in the outer flange of the ring 6; a horizontal portion 53 extending forwardly from the vertical portion 51 beyond the plane of the ring 6 and a vertical portion 54 extending downwardly from the portion 53 and carrying an operating knob 55.

A lamp socket 56 is mounted by an insulating bushing 57 in an aperture 58 formed in the portion 50 of the lever 46 adjacent the vertical portion 49. The lamp socket 56 is provided with contacts 59 and 60 insulated from each other and connected internally to the usual lamp-engaging contacts. A pilot lamp 61 of ordinary type, is inserted in the socket 56 and a shield 62 having a slot 63 is adapted to be inserted over the lamp 61 and direct the rays of light therefrom forwardly through a translucent strip 64 secured along its lower edge to the face plate 3 of the support 1. The translucent strip 64 extends across and registers with the aperture 16 in the support 1.

A lug 65 is struck from the vertical portion 49 of the lever 46 and to this lug is attached an insulating strip 66 which carries a pair of spring contact strips 67 and 68. A wire or lead 69 extends from one of the lamp contacts (59 and 60) to the contact 68 and the contact 67 is connected by a lead 70, in a manner later to be described to certain of the grid biasing and silencing circuits of the radio receiver. The other contact for the lamp 61 is connected by a lead 71 to one side of the grounded secondary winding of a power supply transformer 72 (Fig. 2).

Between the semi-circular aperture 15 and the arcuate slot 16 of the supporting plate 1 there is left a semi-circular annular strip or guide 73 and this strip is adapted to detachably receive a plurality of annularly spaced clips 74. As shown in Figs. 10–13, the clip 74 may comprise a channel member 75, the rear flange 76 of which is provided with an upstanding contact lug 77 and the front flange 78 of which forms one wall of a housing 79. The channel member 75 is made of a resilient conductive material for the purpose of frictionally retaining the clip 74 on the strip 73 and for completing a connection between the contacts 67 and 68 carried by the operating lever 46. The housing 79 is adapted to receive a bent strip 80 of any transparent material possessing the necessary stiffness and resiliency for the purpose. A tab 81 of transparent or translucent material is adapted to receive suitable inscription representing the call letters and/or wave length or frequency of a desired broadcasting station. The tab 81, after being inscribed, is inserted between the folds of the bent strip or cover 80, and the cover 80 is provided with a convex-concave lip 82 at its upper edge to register with a similar concave-convex lip 83 formed on the front flange 78 of the channel member 75; these two lips interengaging to resiliently lock the tab 81 and the cover 80 to the clip 74.

In the form shown in Figs. 14 to 16, the clip 74 comprises a channel member 84 similar to the channel member 75 and this member 84 has a rear flange 85 provided with an upstanding contact lug 86 similar to the contact lug 77. The front flange 87 of the channel member 84 is bent forwardly and then downwardly to form, between the flange 87 and the downwardly bent portion 88, a channel for receiving and frictionally retaining the bent strip or cover 80 and the tab 81.

The clip 74 shown in Figs. 17 to 20 comprises a channel member 89 similar to the channel members 84 and 75, and the rear flange of this channel has an upstanding contact lug 90 similar to the contact lugs 77 and 86. To the forward flange 91 of the channel member 89 there is secured a cap bolt 92 and a box-like member 93, which is open at the back and bottom, is pro-

vided with an aperture in one wall for admitting passage of the bolt 92 therethrough. A transparent cover strip 94 similar to the cover strip 89 is provided at its opposite ends with bayonet slots 95 for permitting insertion of the cover strip into the box-like member 93 beyond the bolt 92. A nut 96 is adjustable on the bolt 92 to force the box-like member 93 into gripping relation with the cover strip 94 and tab 81.

The operating lever 46 controls the energization of the lamp 61 and renders the silencing circuit inoperative when the receiver is tuned to the desired station through the following circuit: The lead 70 from the contact 67 carried by the operating lever 46, is connected to the cathodes 97 of a pair of tubes 98 and 99 of the radio receiver through resistors R1 and R2 in parallel. These tubes may be the radio or intermediate frequency tubes or one of the audio-amplifier tubes. Resistors R3 and R4 are connected across the plate supply source, the negative side of which is grounded, and the lead 70 and resistors R1 and R2 are connected to a point between the resistors R3 and R4. An auxiliary switch 100 is connected to the lead 70 in shunt with resistor R4. Interstage connections 101, 102 and 103 may be any usual or conventional coupling in which the grid leads 104 and 105 of the tubes 98 and 99 are grounded or otherwise connected to the negative voltage side of the resistor R4.

The circuit for the lamp 61 is completed from the ungrounded side of the secondary supply transformer 72 through wire 71, lamp 61 and wire 69 to contact 68, from contact 68 to the contact lug 77 of the clip 74 and to the grounded strip 73 to which the clip 74 is resiliently secured. Lamps 106 and 107 (Fig. 4) may be mounted on the plate 7 behind the band indicator 24 by brackets 108 and 109 for the purpose of diffusely illuminating the dial plate 19 and color segments 25, 26 and 27.

During the tuning operation, i. e., during movement of the contacts 67 and 68 between the clips 74, the receiver is rendered silent by the biasing resistors R1, R2, R3 and R4. These resistors are so proportioned in value that the grids of the tubes 98 and 99 automatically are biased to plate current cut-off so that no signal can be passed through said tubes. When the receiver is tuned to the desired station, indicated by a tab 81, the contact 67 will be connected by the clip 74 to the grounded strip 73. The grounding of the lead 70 shunts out the resistor R4 and therefore decreases the bias on the grids of the tubes 98 and 99. Signals received by the tubes 98 and 99 will therefore be amplified and passed through the receiver in the normal operating manner.

In use, a number of tabs 81, after being inscribed with the call letters of the most frequently selected broadcasting stations, are inserted into covers 80 and mounted on the clips 74, as previously described. The receiver is then tuned to one of the stations for which a tab has been prepared, and the clip 74 which carries a tab indicating that station is pressed on the annular strip 73 in alignment with the pointer 37 and with the tab 81 and cover 80 overlying the translucent strip 84. The remaining clips are mounted in like manner at spaced distances along the annular strip 73. The clips having been thus arranged will thereafter energize the lamp and render the silencing circuit inoperative whenever the receiver is tuned to a station for which a tab has been prepared and affixed. Since the lever 46 is connected directly to the shaft 31, it will have a ratio of movement of substantial unity with respect to the tuning condenser and may be moved at such speed past an undesired station represented by one of the affixed tabs to the desired station, that the silencing circuit is not rendered inoperative. If, however, the lever 46 is moved more slowly only a slight "click" will be heard as the contacts 67—68 engage a clip associated with an undesired intermediate station.

It will be seen from the above description that applicant has provided a radio receiver capable of both rapid and slow tuning; that he has provided simplified, inexpensive means which indicates by call letters as well as by frequency or wave length the proper tuning position of the receiver for the desired one of a number of broadcast stations, which means is readily replaceable and adjustable at the will of user; that he has provided tuning indicating means operable by said position-indicating means for indicating the tuned condition of the receiver; that he has provided automatically operable means for silencing the receiver during the tuning operation, which silencing means is rendered inoperative by the position-indicating means.

Changes may be made in the form, construction and arrangement of the parts without departing from the spirit of the invention or sacrificing any of its advantages, and the right is hereby reserved to make all such changes, as fairly fall within the scope of the following claims.

The invention is hereby claimed as follows:

1. In a tuning indicator for radio receivers and the like, a supporting plate having a plurality of openings and a portion separating said openings, a dial plate carrying indicia representative of broadcast frequencies in alignment with one of said openings, a plurality of spaced marking tabs, each carrying indicia representative of a selected broadcasting station, adapted to be detachably secured to said separating portion and overlying another of said openings, and means for selectively illuminating through said other opening the particular tab representing the station to which the receiver is tuned.

2. In a tuning indicator for radio receivers and the like, a tuning element, means for operating said tuning element, a pointer associated with said operating means, a dial plate having a scale associated with said pointer, a supporting plate having a guide portion extending parallel to said scale, said supporting plate having a pair of openings of which one is alined with said dial plate, a plurality of marking devices each carrying indicia representative of a selected broadcasting station adapted to be detachably secured to said guide portion and extending over the other of said openings, and means for illuminating, through said openings, said dial plate and said marking devices.

3. In a tuning indicator for radio receivers and the like, a tuning element, cooperating and relatively movable scale and pointer elements, one of which is associated with said tuning element, indicating the tuning position of said tuning element, a supporting plate having a guide portion extending parallel to said scale element, a plurality of marking devices each comprising a tab carrying indicia representative of a selected broadcasting station, a transparent cover member for said tab, and a resilient clip having a portion for detachably securing said tab and cover member to said clip, and a portion for

detachably securing said clip to the guide portion of said supporting plate.

4. In a tuning indicator for radio receivers and the like, a tuning element, cooperating and relatively movable scale and pointer elements, one of which is associated with said tuning element, indicating the tuning position of said tuning element, a supporting plate having a guide portion extending parallel to said scale element, a plurality of marking devices each comprising a tab carrying indicia representative of a selected broadcasting station, a transparent cover member for said tab, a resilient channel member having a front and rear flange for receiving therebetween the guide portion of the supporting plate, said front flange having a resilient bent portion and forming the rear wall of a housing for receiving said tab and cover member, said member having a complementally bent portion engaging the bent portion of the front flange to be held thereby in detachable engagement with said channel member.

5. In a tuning indicator for radio receivers and the like, a tuning element, cooperating and relatively movable scale and pointer elements, one of which is associated with said tuning element, indicating the tuning position of said tuning element, a supporting plate having a guide portion extending parallel to said scale element, a plurality of marking devices each comprising a tab carrying indicia representative of a selected broadcasting station, a transparent cover member for said tab, and a resilient clip having a channel member for engaging the guide portion of the supporting plate and a clamping member adjustably secured to said channel member for clamping said tab and cover member thereto.

6. In a tuning indicator for a radio receiver or the like, a dial plate carrying indicia representative of the broadcasting frequencies, a supporting plate for said dial plate having an opening therein for exposing said dial plate and a plurality of parallel annular slots concentric to said opening, a tuning element, a tuning shaft for operating said element, the free end of said shaft extending through said dial plate and said opening, a pointer on the free end of said shaft and co-operating with said dial plate to indicate the position of the tuning element, swingable operating means directly connected to said tuning shaft and extending through one of said annular slots to provide a high speed tuning adjusting means, and a plurality of marking devices each carrying indicia representative of selected broadcast stations secured to said supporting plate and extending into the other of said annular slots, said devices co-operating with said pointer to indicate the position to which the tuning element should be operated to tune the receiver to a desired station and to indicate the station to which the receiver is tuned.

7. In a tuning indicator for a radio receiver, a tuning element, means for adjusting said tuning element, a plurality of spaced marking devices, each of said devices indicating the position to which the tuning element should be moved to tune the receiver to a selected station, and electric signal means separate from the receiving circuits of a radio receiver, and cooperating switch means carried by said marking devices in said adjusting means for energizing said signal means to indicate that the receiver has been properly tuned to the desired one of said stations.

8. In a tuning indicator for a radio receiver, a tuning element, means for operating said tuning element, a dial assembly comprising a dial plate, a supporting plate, and a plurality of marking devices having metallic clips for securing said devices to said supporting plate, each of said marking devices carrying indicia representative of a selected broadcasting station, means for normally silencing the receiver, and means movable with said operating means and controlled by the resilient clips of said marking devices for rendering said silencing means inoperative when the receiver is tuned to a desired one of said selected stations.

9. In a radio receiver comprising a plurality of thermionic tubes having grids, the combination of a tuning element, means for adjusting said tuning element, grid biasing means for silencing the receiver during tuning operations, a face plate, a plurality of fixed marking devices indicating the positions to which the tuning element should be moved to tune the receiver to desired stations and including metallic clips for securing said devices to said face plate, and switch means including the metallic clips of said marking devices and a member carried by said adjusting means for controlling said grid biasing means and rendering said silencing means inoperative when the receiver is tuned to a desired station.

10. In a tuning indicator for a radio receiver, a tuning element, means for operating said tuning element, a plurality of spaced marking devices, each of said devices indicating the position to which the tuning element should be moved to tune the receiver to a selected station, luminous indicating means, and means controlled by said marking devices for energizing said luminous indicating means to indicate that the receiver has been properly tuned to the desired one of said selected stations.

11. In a tuning indicator for a radio receiver or the like, a movable pointer, a movable luminous indicator, fixed marking devices co-operating with said pointer and said luminous indicator, said marking devices having face portions adapted to be inscribed with the call letters of various broadcasting stations, means for synchronously moving said pointer and said luminous indicator, and means controlled by said marking devices for energizing said luminous indicator thereby to illuminate the marking devices corresponding to the station to which the receiver is tuned.

12. In a tuning indicator for radio receivers and the like, a tuning element, means for operating said tuning element, cooperating and relatively movable scale and pointer elements, one of which is associated with said operating means, for indicating the tuning position of said tuning element, a supporting plate having a guide portion extending parallel to the scale element, a plurality of marking devices each compriisng a tab carrying indicia representative of a selected broadcasting station and a resilient clip having a portion for frictionally engaging said tab and a portion for frictionally engaging the guide portion of said supporting plate, means for diffusely illuminating the scale element and means cooperatively controlled by said clips and said operating means for selectively illuminating the marking device corresponding to the desired station with a concentrated beam of light whereby to provide a selective, luminously contrasting indication of the selected station.

WILLIAM J. SCHNELL.

CERTIFICATE OF CORRECTION.

Patent No. 2,182,572. December 5, 1939.

WILLIAM J. SCHNELL.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 1, first column, line 11-12, for "prosion" read provision; page 4, second column, line 51, claim 11, for the word "devices" read device; line 61, claim 12, for "compriisng" read comprising; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 16th day of January, A. D. 1940.

Henry Van Arsdale,
Acting Commissioner of Patents.

(Seal)

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WILLIAM J. SCHNELL.

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Signed and sealed this 16th day of January, A. D. 1940.

Henry Van Arsdale,

(Seal) Acting Commissioner of Patents.