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MEANS FOR PROJECTING AND MAGNIFY-
ING TUNING INDICIA

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3 Claims. (Cl. 116—124.4)

My invention relates to radio receivers and particularly to means for facilitating the applying and reading of the indicia on the tuning dials thereof.

Where the indicia, such as kilocycles or station identification letters, are intended to be read directly from a dial, the size of the figures or letters must be relatively small unless a dial is used of inconveniently large size. To obviate this difficulty I provide a dial of convenient size located within the radio cabinet and provided with indicia, preferably printed in reverse. I then mount a lamp in such position that rays of light are projected through the openings corresponding to the letters or figures, the rays being collected by a lens and by it projected onto a screen in position to be easily read by the user of the radio apparatus. Thus a large number of relatively minute letters or figures may be placed on a comparatively small dial, the projection, however, being as large as desired.

In adapting apparatus such as this to modern radio receiving sets, means are necessary for correlating it to the adjustments that provide for tuning in various bands; that is, different wave lengths. In order to adapt the receiving set for reception of signals of varying wave lengths, a so-called band switch is employed and in my apparatus I provide a connection between the band switch and the tuning dial, the dial having thereon indicia arranged in concentric circles representing stations in the different bands. Thus the device automatically adapts itself to the different adjustments and the user cannot make an error.

Preferably, the individual designations are arranged radially of the dial and the light and lens are located at a point parallel to a transverse horizontal line through the axis of the disc. When so arranged the disc is mounted for horizontal adjustment to accommodate the different bands. With this arrangement the indicia is displayed horizontally and will fade out and in from the top and bottom of the screen on which it is displayed.

The apparatus herein disclosed is constructed in the light of the recognition of certain inherent weaknesses in the system of radio construction in present use.

It is virtually impossible in the commercial production of radios to produce two or more consecutive chassis in which the calibrations indicated on the selection dial are accurate as an indication of the frequency or wave length of a signal that is received. There will be, notwith-

standing the greatest care in construction and assembly, a variation in either or both the inductance or the capacity in the circuit. In practice it is customary to calibrate a small number of instruments, then take the average thereof and provide a dial that will approximate the correct reception of the frequencies within the range. In the chassis subsequently produced there may be substantial accuracy at some points on the dial and radical departure therefrom at other points.

Furthermore, it is impossible to provide an accurate dial even though each individual circuit is calibrated at the factory, a practice that would very largely increase the cost and render commercial production impossible; this for the reason that changes take place after manufacture, due to adjustment of internal stresses in the materials, changes of temperature, etc., and a strictly accurate calibration is only possible after an individual receiving set has been located at the point of use and has become acclimated.

The apparatus here disclosed adapts itself to the last named operation and consequently to the production of an instrument in which the dial indications are strictly accurate. It is a known fact that few users are interested in the reception of programs from more than a dozen stations or thereabouts. In carrying out my idea, it is preferable that the disc for carrying the indicia should be composed of transparent or translucent material and should carry a number of bands, each roughly calibrated to show approximate frequencies in wave lengths in kilocycles, meters or megacycles, the arrangement being such that a continuous open space remains within the bands. The purchaser will be furnished with a strip or sheet containing the punched designations of the larger or more important stations, the individual designations being adapted to be clipped off and adhesively applied to the correct point on the dial when the instrument has been tuned to that station. If desired, the designations may be identified as to size, class or location by means of colors.

The invention will be more readily understood by reference to the accompanying drawing; in which,

Fig. 1 is a perspective view, diagrammatical in form, showing the described improvement as applied to a radio chassis; and,

Fig. 2 is an enlarged fragmentary elevation of the dial.

In the drawing I have indicated a radio chassis at 10 on which a variable condenser 11 is mounted,

the condenser having an operating shaft 12. A tuning shaft 13 has a pinion 14 thereon engaging a large gear 15 fixed to the shaft 12. A pinion 16 in mesh with the gear 15 carries a flexible shaft 17 that engages the shaft 18 on which a dial 19 is mounted. The bearing 20 for the shaft 18 is mounted on a carriage 21 supported on rods 22, the carriage being movable horizontally by means of the metal belt 23. This belt passes over suitable antifriction rollers and is driven by a sprocket 24 fixed on a flat shaft 25 which constitutes the shaft for actuating a band switch 26. Thus as the band switch is turned to adapt the instrument for the reception of different frequencies the dial 19 is shifted in order to present different concentric circles bearing the station call letters or wave lengths to the light projecting apparatus.

The specific construction of the dial is best illustrated in Fig. 2 in which the customary bands are provided, the approximate calibration in wave lengths being indicated by the figures at the lines intervening between the bands. This will leave spaces 27 that are open and are adapted to receive pieces of paper 28 or similar material that may be adhesively secured to the disc. These pieces will be punched or otherwise marked in such manner that light will be projected through the designated characters thereon. In practice the user or dealer will accurately determine the correct tuning position for various stations and apply the designations in the described manner. The number of different bands is a matter of selection, depending on the capacity of the instrument.

The means for visualizing the tuning of the instrument comprise a light 29, the rays from which are projected by means of a reflector 30 through a diffuser 31 thence through the disc with its indicia thereon, the rays passing through the disc being collected by a lens 32 and projected onto a screen 33 of ground glass or similar material, carried by the case of the instrument. According to the design, the image may be enlarged to the extent desired. Where the indicia is in the form of reverse printing; that is, with opaque material surrounding the outline of the letters or figures, the light will be projected only through the outlines and the screen will be dark in the spaces surrounding said outlines; if the indicia is applied in the form of direct printing the reverse will be true. For convenience we have shown the indicia on the screen 33 in the form of direct printing.

It will be noted that the indicia is readable radially of the dial and the light projecting apparatus is placed at a point adjacent to a line through the transverse horizontal axis of the

disc. This enables the application of a larger number of identification symbols than if placed so as to be readable circularly of the disc. If the designations are placed as last indicated, the light projection apparatus should be placed at a point above or below the center of the disc, rather than laterally thereof.

I claim:

1. In a radio receiving set, the combination with a variable condenser, of a disc mounted for bodily movement transverse to the axis of rotation of the disc, a flexible shaft connecting the shaft of the disc to the rotating element of the condenser, said disc having a plurality of series of indicia arranged in circles of different radii, said indicia being radially disposed in light-contrast relation on said disc, a source of light positioned to project rays past said indicia, a lens placed to collect said transmitted rays, a screen on which said rays are projected to reproduce said indicia in enlarged form, and means for shifting said disc to present the indicia of different circles to said source of light.

2. In a radio receiving set, the combination with a variable condenser of a disc mounted for bodily horizontal movement transverse to the axis of rotation of the disc, a flexible shaft connecting the shaft of the disc to the rotating element of the condenser, said disc having a plurality of series of indicia arranged in circles of different radii, said indicia being radially disposed in light-contrast relation on said disc, a source of light positioned at a point adjacent to a horizontal line through the rotative axis of the disc whereby to project rays past said indicia, a lens placed to collect said transmitted rays, a screen on which said rays are projected to reproduce said indicia in enlarged form, and means for shifting said disc horizontally to present the indicia of different circles to said source of light.

3. In a radio receiving set having a variable condenser and a band switch, the combination of a disc rotatively mounted with capacity for bodily movement transversely of the axis of rotation, a flexible shaft connecting the rotating element of the condenser to the shaft of the disc, said disc having a plurality of series of indicia thereon, each series being circularly arranged and of different radius, a source of light placed to project rays through said disc past said indicia, a lens to collect said rays, a screen on which said rays are projected in enlarged size and a connection between the band switch and the disc whereby said disc is shifted to present another circle of indicia when said band switch is actuated.

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