

July 14, 1931.

F. MULLER

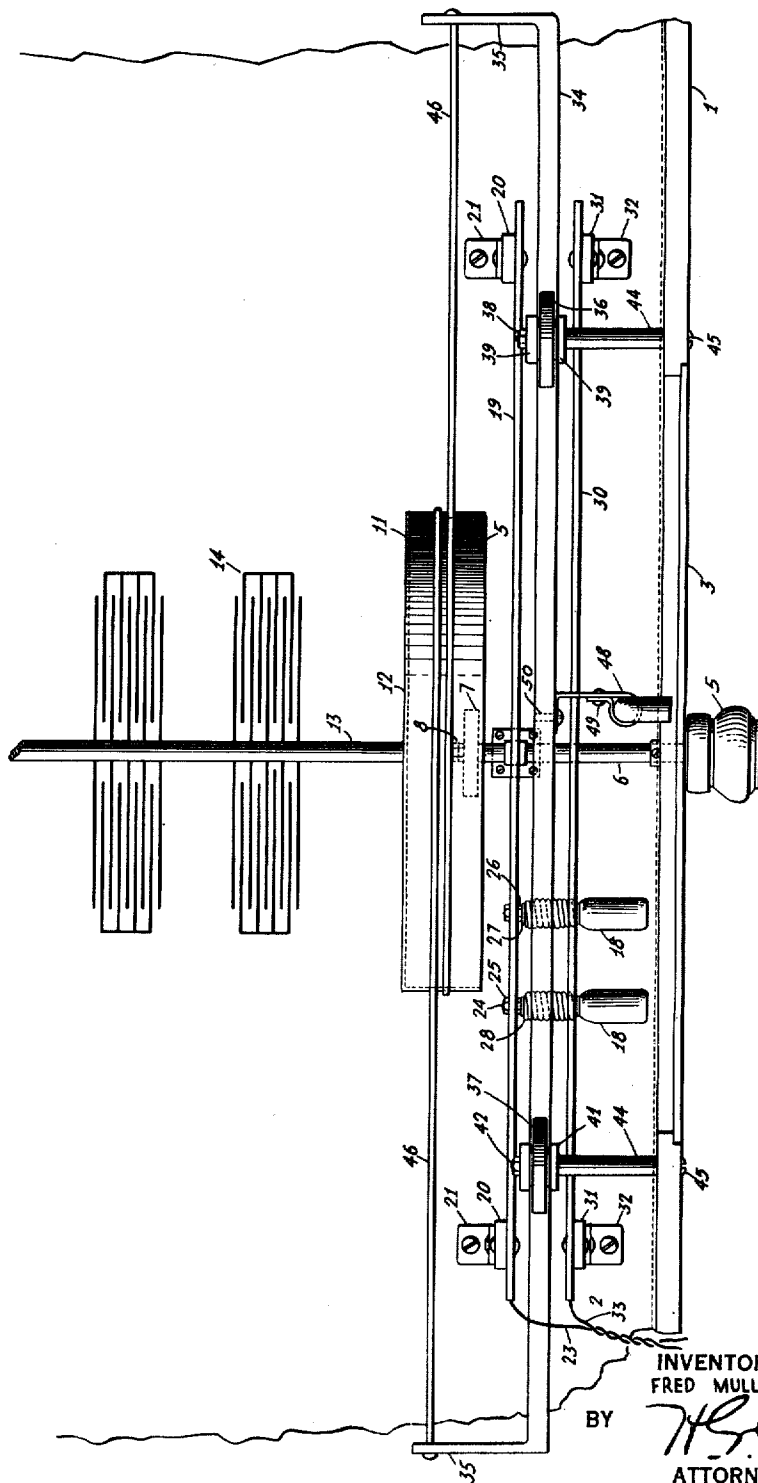
1,814,403

RADIO DIAL

Filed Jan. 22, 1930

4 Sheets-Sheet 1

Fig. 1



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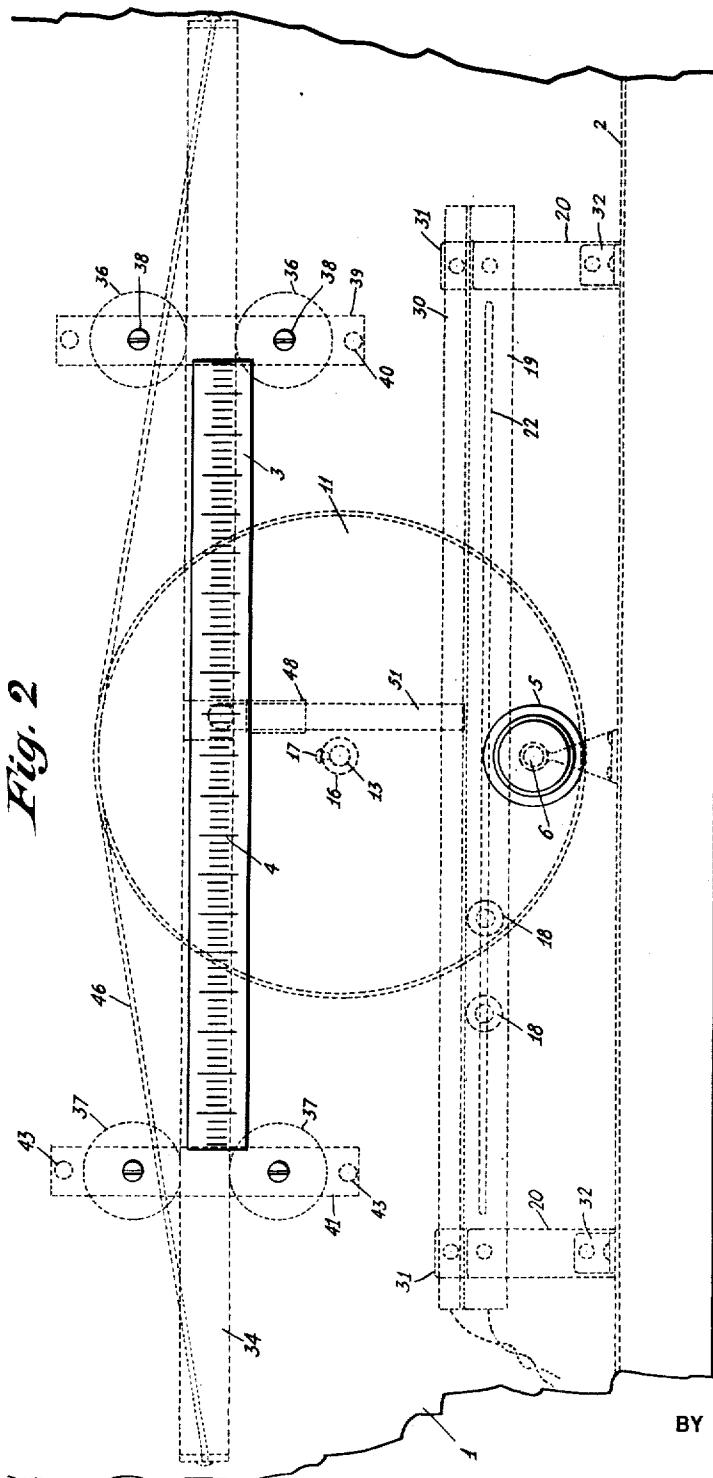
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RADIO DIAL

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4 Sheets-Sheet 2

Fig. 2



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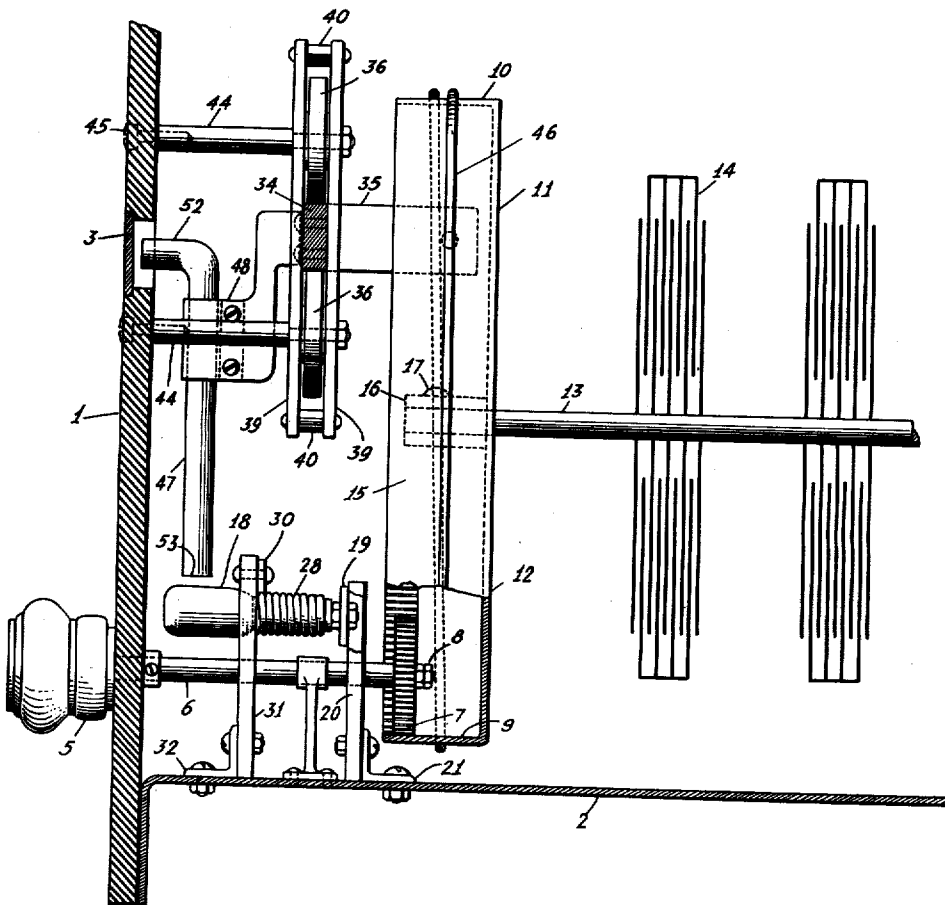
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RADIO DIAL

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4 Sheets-Sheet 3

Fig. 3



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1,814,403

RADIO DIAL

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4 Sheets-Sheet 4

Fig. 5

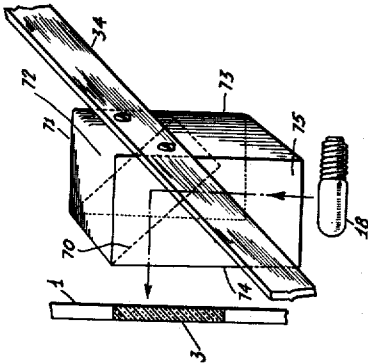


Fig. 4

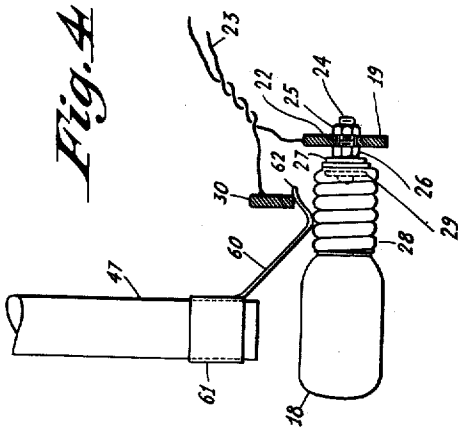
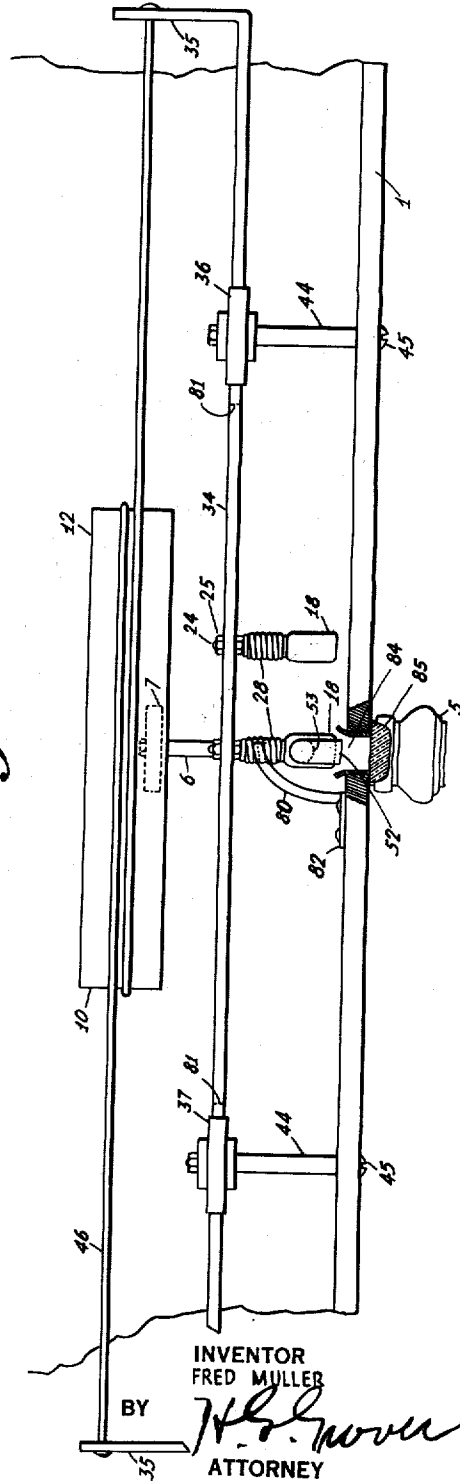


Fig. 6



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UNITED STATES PATENT OFFICE

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RADIO DIAL

Application filed January 22, 1930. Serial No. 422,521.

My present invention relates to indicating devices, and more particularly to methods of, and means for indicating adjustments of elements in an electrical apparatus, such as a radio receiving set.

With the adoption of the so-called uni-control tuning systems for radio receivers, it became desirable to perfect an efficient device for indicating to the set operator, adjustments made to the tuning shaft of the gang condenser. Practically all such devices designed were direct reading, and either of the dial or drum type. That is, a dial or drum was mechanically coupled to the tuning knob, the latter being on the exterior of the radio cabinet, station indications marked on the periphery of the dial or drum, and the dial or drum disposed either on the knob itself or within the cabinet, the periphery being observed through a sight opening in the control panel in the latter case.

Experience has shown that such indicating devices may be greatly improved. For example, the scale markings on the dial or drum may be indistinct or blurred. Again, where station call letters are inscribed by the operator on the indicator periphery, such inscriptions often disappear, or are smudgy due to fingering. Further, the illumination of the dial or drum surface may be poor, or even absent; in such cases, discomfort and eye strain mars the enjoyment of the receiver.

Now, I have devised a new and greatly improved system for indicating the adjustments made to a concealed electrical control element, and specifically to indicate the positioning of the tuning shaft of a radio set, in an efficient, positive and highly ornamental manner. Briefly, I utilize, in the present arrangement, illumination phenomena for indicating purposes. Colored areas of light are projected, by transmission or reflection, upon a dial screen, the colored areas being arranged to coincide with predetermined scale indications on the screen upon actuation of the tuning instrumentality.

Accordingly, it is one of the main objects of the present invention to provide a method of, and means for, positioning a concealed electrical instrumentality, which consists in

projecting a beam of colored light upon an image receiving medium, the projection being accomplished by transmission or reflection of the light, and varying the color of the beam in a predetermined manner when the instrumentality is varied to a predetermined station position.

Another important object of the invention is to provide a method of, and means for, indicating adjustments of a tuning instrumentality in a radio set on a screen bearing station designations, which consists in providing differentially colored sources of illumination, establishing a path for guiding light from any of said sources on to said screen, and then varying the relative positions of said sources and path simultaneously with adjustment of said instrumentality whereby said screen designations are differentially colored in accordance with said adjustment.

Another object of the invention is to provide in a radio set including a tuning instrumentality housed within a cabinet, a control panel provided with a screen bearing station markings and a tuning knob, one or more differentially colored sources of illumination, a non-linear path for guiding light from any of said sources to said screen, said path specifically including a material capable of transmitting light without loss, and means for moving the path and sources relative to one another in accordance with variation of the tuning instrumentality, whereby predetermined markings on the screen have projected adjacent them areas of illumination colored in accordance with said sources.

Still other objects of the invention are to provide an indicating device of simple, practical construction which will possess an inherent smartness totally absent in present day dial arrangements, be rugged, durable and efficient in usage, and particularly well suited to the requirements of economical manufacture and ready manipulation.

The novel features which I believe to be characteristic of my invention are set forth in particularity in the appended claims, the invention itself, however, as to both its organization and method of operation will

best be understood by reference to the following description taken in connection with the drawings in which I have indicated diagrammatically several circuit organizations whereby my invention may be carried into effect.

In the drawings,

Fig. 1 is a fragmentary plan view of a radio cabinet, the top being removed, embodying my invention,

Fig. 2 is a fragmentary front view of the cabinet in Fig. 1, viewing the interior through the control panel,

Fig. 3 is a fragmentary side view of the cabinet, the side being removed,

Fig. 4 is a detail view of a modified form of the invention,

Fig. 5 is a detail view of another modification,

Fig. 6 is a fragmentary plan view of another modified form of the invention.

Referring to the accompanying drawings in which like characters of reference indicate the same parts in the different views, there is shown in Figs. 1, 2 and 3, the front control panel 1 of a radio cabinet, the base 2 of which is only shown for simplicity of disclosure. The panel 1 is provided with an indicating screen 3, adjacent the upper central portion thereof. The screen is arranged as a flat, narrow, horizontally disposed tuning scale, and is made of a translucent material, such as molded glass, celluloid, or mica, instead of the drum dial window of present day construction.

The face of the screen towards the observer, i. e., the outer face, has station scale markings or graduations 4 provided thereon, by any suitable method, only a few of the graduations being shown in Fig. 2 to simplify the drawings. Below the screen 3, and central thereof, there is located a manually manipulable tuning knob 5. The knob is affixed to one end of a control shaft 6, the other end of the latter shaft having affixed thereto a small roller 7 acting as a friction gear, the roller being affixed by means of a threaded nut 8.

The periphery of roller 7 contacts with the inner surface 9 of the periphery 10 of hollow drum 11. The drum has a closed face 12 to which the rotor shaft 13, of the gang of condensers 14, is rigidly secured. I have shown merely a portion of the gang of condensers, and not any other part of the radio set, in order to confine the description to the subject matter embodying the invention. The construction of the gang 14 is well known to those skilled in the art, it being understood that the gang includes a plurality of condensers, each condenser comprising a plurality of stator plates and a plurality of rotor plates, all the rotors of all the condensers being mounted upon the common shaft 13 for rotation therewith.

The drum 10 is arranged with its open face 15 parallel with the inner face of the panel 1, and faces the latter, the axis of rotation of the drum being normal to the panel and parallel to the control shaft 6, as shown in Figs. 1 and 3. The drum is further provided with a sleeve 16, formed at the center of the closed face 12, the sleeve projecting towards the open face 15. A set screw 17 is used for rigidly securing the end of the shaft 13 within the sleeve or hub 16. It will, thus, be seen that as the knob 5 is rotated to the right or left, by virtue of the mechanical coupling between the knob, drum and shaft 13, the latter is caused to rotate to move in the same directions.

In order to adjustably mount a plurality of sources of illumination 18 within the cabinet, there is provided an elongated rod 19, the latter being of a metallic composition, secured at its ends to insulating uprights 20. The latter are secured to the base 2 by angle irons 21. The rod 19 is provided throughout practically its entire length, it being noted that the flat side of the rod or strip 19 faces the rear face of the panel 1, with a slot 22. It will be realized that the slotted metal strip 19 is insulated from the cabinet, it, therefore, has potential applied to it from a current source (not shown) through a conductor 23 affixed to one end of the rod 19.

Each source of illumination 18 is a small colored incandescent lamp bulb of 2.5 or 5 volts and is adjustably mounted on the slotted rod. This adjustability is secured by disposing the usual threaded contact post 24 of a bulb in the slot 22 (see Fig. 4 for detail construction), and securing the post to the rod by means of a nut 25. The later contacts with the rear face of the strip 19, while a second nut 26 is disposed between the forward face of the strip 19 and an insulating washer 27. The latter insulates the outer metallic shell 28 of the bulb from the nut 26, rod 19 and nut 25. It will be understood by those skilled in the art that a second insulating washer 29 is disposed within the shell 28 to insulate the head of the contact post 24 from the shell 28.

Thus, the shell 28 forms one terminal of the bulb, and the post 24 the other terminal. To complete the circuit through the bulb, a second elongated flat metallic strip 30 (see Figs. 1, 2 and 3) is provided to carry half the bulb filament current. The strip 30 has its wider face parallel to the control panel, and is supported at its ends by insulating uprights 31, the latter being rigidly affixed to the base 2 by angle irons 32.

One end of a conductor 33 is connected to an end of the strip 30, the other end of the conductor being connected to the terminal of the source of current to which the conductor 23 is connected. The rods 19 and 30 should preferably, be of the same length. It will,

thus be observed that when a bulb is secured in position on the rod 19, its shell 28 automatically contacts with rod 30 and closes the circuit through the said bulb.

5 The invention, as stated heretofore, includes means for guiding illumination from a given bulb to the screen 3. This is accomplished by providing a carriage 34, which
10 comprises an elongated, flat strip having ends 35 bent at right angles to the length of the strip. The wide face of the strip is parallel to the rear face of the control panel 1, the strip having a length dependent on the length of the screen 3, as will be presently described.
15 The carriage strip is supported for rolling, linear movement in a direction parallel to the screen length by two pairs of rollers 36 and 37. Each pair of rollers is mounted between parallel uprights 39.
20 Rollers 36 are mounted on bolts 38, the latter acting as axles for the rollers. The pair of parallel uprights 39 are secured together by upper and lower bolts 40. The rollers 36 are spaced apart a sufficient distance to permit the upper and lower edges of carriage strip 34 to contact with the periph-
25 eries of the rollers. It will also be observed that the uprights are spaced apart a distance equal to the thickness of the strip 34.

30 In the same manner, uprights 41 support rollers 37 on bolt axles 42, the uprights being secured together by upper and lower bolts 43. Both pairs of uprights are affixed in a rigid manner to the control panel 1 by means
35 of fastening strips or sleeves 44, each of the latter being secured to the control panel by a fastening means 45, such as a screw.

As shown in Figs. 2 and 3, the rear ends of two strips 44 are secured to the front upright
40 39, and the rear ends of the two remaining strips are secured to the other front upright 41. The roller supporting structure is affixed to the control panel, as shown in Fig. 2, so that the strip 34 is supported in alignment
45 with the screen 3.

The carriage strip 34 is furthermore, maintained between each pair of the rollers and associated uprights, so that it may reciprocate from side to side with facility.

50 A reciprocatory movement is imparted to the carriage strip by means of a flexible cable 46 which is wound around the periphery of the drum 10, and secured at each of its ends to the bent ends 35 of the carriage strip.
55 Thus, by turning the tuning knob 5 to the right or to the left, the drum is rotated about its axis of rotation 13 to the right or the left, with the result that the carriage strip 34 is moved to the right or to the left of the tuning knob 5 by virtue of the flexible, mechanical coupling between the drum and the ends of the carriage strip.

60 The rollers 37 can be made of a flexible material such as compressed fibres or rubber, the essential requirement of its construction

being that it be capable of frictional engagement with the edges of the carriage strip 34. It will thus be seen that the roller structure forms a suitable guiding means for the reciprocatory carriage strip.

70 In order to guide light from any one of the bulbs 18 to a predetermined portion of the screen surface, there is provided a quartz rod 47, of circular cross section, the rod being rigidly affixed to the forward face of the carriage strip 34 by means of a sleeve 48, the sleeve being flexible and adjustably held together by a bolt and nut arrangement 49, a bent end of the sleeve being rigidly, and adjustably secured to the forward face of the
80 carriage strip by means of a bolt and nut 50.

The quartz rod comprises an elongated portion 51, the end of which, is in proximity to the surface of a given bulb 18, whenever the rod is positioned over a bulb, while the
85 upper portion 52 is bent at right angles to the portion 51, the end of the bent portion being in proximity to the rear face of the screen 3, throughout the reciprocation of the carriage strip from side to side. It will be obvious
90 that when light from a given bulb falls upon the lower end 53 of the quartz rod, by virtue of the low loss, light transmitting properties of the quartz rod, light is transmitted around the bent portion 52 of the rod and is project-
95 ed upon a desired portion of the screen in the form of a circle of light. The quartz rod is positioned on the carriage strip so that when it reaches either end of the scale 3, either bent arm 35 will not have reached a
100 roller upright member, or just have left the latter. In that way, it will be seen that the length of the portion of the carriage strip 24 between each pair of rollers and a bent arm 35 determines to a great extent the position-
105 ing of the quartz rod on the portion of the carriage strip between the rollers. For example a proper positioning of the quartz rod on the carriage strip is shown in Figs. 1, 2 and 3.

110 The operation of the indicating device should be apparent from the foregoing description taken in connection with Figs. 1, 2 and 3. In the preferred form of the invention, each of the bulbs 18 are provided
115 with a different surface coloration, thus permitting the quartz rod to project upon the screen, the points on the screen immediately above a given bulb, a circle of light colored in accordance with the coloration of the bulb
120 positioned beneath the said colored area.

It will be realized that the present invention utilizes the property of quartz glass of conveying light from its source around curves with a minimum of loss. However, I do not
125 confine the present invention to the use of a quartz rod to carry light from a source of illumination, as an incandescent lamp, to a desired place for serving as a visual indicator, it being within the scope of the present in- 133

vention to include such other materials which possess similar properties. The essential feature of such a light guiding path is that it transmits light in a non-linear path with substantially loss, and that it be capable of projecting an area of light upon an image receiving medium, the area being of any desired configuration. In other words, the cross section of the quartz light guiding path could obviously be a square, a rectangle, a triangle, or any other well known form of geometric configuration.

It will also be obvious that by the use of a plurality of differentially colored sources of illumination with a light guiding path which is movable with respect to the said sources, I am enabled to transmit light from any of the lamps and thus project a colored indicating image on the indicating scale on the front panel. This results in a structure having an inherent smartness totally absent in present day dial arrangements.

Assuming that the scale is suitably marked by graduations 4, the knob 5 is turned until the circular spot of light projected on the screen by the end of the quartz rod adjacent the screen coincides, or is superposed upon, a particular graduation on the screen. The rest of the scale may be in semi-obscurity, or as shown in the present case would be illuminated with a composite, colorful hue which is very pleasing to the eye.

It is a well known fact that most radio listeners have three or four well known stations on which they rely for a substantial portion of their radio programs. By means of the present arrangement in which the lower end of the quartz rod travels directly over the series of differentially colored lights, a station is tuned to, say WEA, and a colored light 18, which may have a red coloration, for example, is adjusted on the strip 19 directly under the quartz rod, the quartz rod being positioned at any desired point along the scale, depending upon to which portion of the front face of the carriage strip it has been decided to affix the quartz rod. The colored light is secured in that particular position and the same process is repeated with bulbs of other colors for the other station positions.

Thus, thereafter, when a circular spot of red light appears upon the screen it will be known that the station coming in is WEA, while a circular spot of yellow light, for example, on a different part of the scale will designate station WOR and a circular spot of green light on still another portion of the scale designates station WJZ and so on. The listener has now only to switch on the set, turn the knob until a predetermined colored spot of light appears on the scale, and there he has his favorite desired station. It will thus be seen that strain of eyes to see indistinct scale markings or blurred and

smudged pencilled station calls are effectively eliminated in my present invention.

In Fig. 4 I have shown in detail the construction of a modified form of circuit making and breaking arrangement between the metallic strip 30 and the strip 19. Instead of employing a permanent contact between the strip 30 and each of the shells 28 of the bulbs 18, as shown in Figs. 1 and 3, a sliding resilient contact 60 may be rigidly affixed to the lower end of the quartz rod 47 so that light from a particular lamp is secured only at the moment the lower end of the rod is directly over the lamp.

It is to be understood that the structure in Fig. 4 is exactly the same as shown in the first three figures, with the sole change, that, while current for the bulbs are still applied to the ends of the strips 19 and 30 as shown in Fig. 1, for example, contact between the shell 28 of each bulb 18 and the strip 30 only are made when the lower end of the quartz rod moves into position over a bulb 18, this being accomplished by virtue of the fact that the spring contact 60 is affixed to the lower end of the quartz rod by means of a spring sleeve 61 which fits around the circumference of the lower portion of the rod and has depending therefrom the spring contact 60, a bent portion of the spring member 60 moving into contact with a shell 28 whenever the quartz rod moves into position over a bulb. The extreme end 62 of the spring member 60 is constantly in contact, however, with the strip 30, it therefore being obvious that current will be applied to a shell 28 whenever the lower portion of the quartz rod moves into position over a given bulb, movement away from the bulb breaking the circuit for that particular bulb.

In Fig. 5, there is shown a modified form of the invention in which the quartz rod 47 is replaced by a reflecting means, such as a mirror 70. The structure shown in Figs. 1, 2, and 3 are exactly the same for this modification, the new structure, therefore, only being shown for simplicity of disclosure. The carriage strip 34, in this case, has affixed to the front face thereof, a hollow, elongated shield member 71, the latter having a closed top 72, closed rear wall 73, open front wall 74, and open bottom 75.

The rear wall 73 is, of course, secured to the front face of the strip 34. The mirror 70 is positioned within the shield, adjacent the top and rear walls, with its reflecting surface at an angle behind the screen 3. As a plurality of differentially colored lights 18 are employed, the sides of the shield extend downward to a lamp so as to cut out light from the lamps on either side of the shield, when the latter is over any particular lamp.

Of course, this type of light projecting device works exactly as the form described hitherto, with the exception that a narrow

rectangle of colored light, the height of the screen width, is projected on the screen at a predetermined point of the screen. By designing the shield and mirror sufficiently narrow, the rectangle of light projected on the screen may be reduced to a mere slit of colored light.

The indicating system heretofore disclosed may be modified, as shown in Fig. 6, so that the quartz rod is stationary, and the plurality of bulbs relatively movable. To accomplish this, the carriage strip 34 of Fig. 1 is provided with a slot 81 (shown in dotted lines) and the bulbs 18 adjustably mounted in this slot exactly as shown in Fig. 1, where the bulbs are mounted on slotted strip 19. Of course, the strip 34 is metallic in this modification.

To complete the circuit through a lamp 18, a metallic spring contact 80 is secured to the rear face of the control panel 1, and potential applied to the metallic bar 34 and the contact leaf 82 (which is affixed to the rear face of the control panel at a point adjacent the control shaft 6 of the tuning knob 5).

The quartz rod is positioned above a bulb, when one is in position substantially above the control shaft 6, the lower end 53 of the rod being in proximity to the bulb, and the upper end 52 of the rod registering with the open end of a small tube 84, the opposite end of the tube being closed by an observation glass 85. Thus, the quartz rod is stationary (the means for affixing the rod to the rear face of the control panel being omitted to simplify the drawings), and the bulbs 18 rendered movable with respect to the rod, by actuating the knob 5 to reciprocate the carriage bar 34 and bulbs from one side to the other.

Each bulb 18, all bulbs if desired, having different colors, necessarily moves under the lower end 53 of the light transmitting rod. Bulbs are positioned in the slot 81, in accordance with stations secured by initially tuning with knob 5, it being pointed out that in this modification a bulb is secured at the slot position immediately to the rear of the rod when a particular station is secured.

Thereafter, as the knob 5 is rotated, the drum 10 is actuated, the flexible cable 46 caused to move the carriage bar 34, and some bulb moved under the rod. As the bulb moves under the rod, spring 80 contacts with the shell 28, whereupon the bulb lights. Light therefrom is transmitted through the rod, and projected from top end 52 into tube 84, the screen 85 immediately being colored in accordance with the color of the particular bulb below the quartz rod.

The screen 85 can be translucent or transparent, and made of glass, celluloid and the like. Furthermore, it may have a shape other than circular.

While I have indicated and described several systems for carrying my invention into

effect, it will be apparent to one skilled in the art that my invention is by no means limited to the particular organizations shown and described, but that many modifications in the circuit arrangements as well as in the apparatus employed, may be made without departing from the scope of my invention as set forth in the appended claims.

What I claim is:

1. The combination with a non-transparent dial, of one or more differentially colored sources of illumination, and a non-linear, low-loss optical path disposed between at least one of said sources and said dial.

2. In a device of the kind described, a dial permitting the passage of light therethrough, a support, said support and dial being relatively movable, one or more sources of colored light, means including a quartz rod associated with said support and adapted to cooperate with at least one of said sources and said dial to project the area of colored light upon said dial, a tuning instrumentality, said support being mechanically coupled to said instrumentality for movement therewith, and means for actuating said instrumentality and producing relative movement between said support and dial.

3. In a device of the kind described, a translucent dial, a support, said dial and support being relatively movable, a plurality of differently colored lights, means for guiding light from any of said sources to said dial, said means being associated with said support and including a reflecting surface, and means for producing relative motion between said light guiding means and said colored lights.

4. In a device of the kind described, a fixed dial permitting the passage of light therethrough, one or more sources of differently colored lights, a movable means for guiding light from any of said sources to said dial arranged between said sources and the dial, and means including a tuning instrumentality mechanically coupled to said first means for producing relative motion between the dial and the light projected upon it.

5. In a device of the kind described, a translucent dial, one or more stationary sources of light, said light sources being of different colors, and a transparent light guiding path in the path of the rays of light from at least one of the sources to the dial, whereby an indicating area of colored light is produced on the dial.

6. In a device of the kind described a fixed translucent dial for a plurality of differentially colored lights, means in the path of the rays of light from at least one of the sources to the dial, said means being adapted to project a colored circular area indicating areas of light upon said dial, and means for

moving said projecting means relative to the dial.

7. In a device of the kind described, a translucent dial, a source of illumination, and a non-linear path composed of a material having homogenous optical properties arranged in the path of the rays of light from the source to one side of the dial.

8. A method of indicating adjustments of a tuning instrumentality in a radio set on a screen bearing station designations which consists in providing differentially colored sources of illumination, establishing a path for guiding light from any of said sources on to said screen, and then varying the relative positions of said sources and path simultaneously with the adjustment of said instrumentality whereby said screen designations are differentially colored in accordance with said adjustment.

9. In combination in a radio set including a tuning instrumentality housed within a cabinet, a control panel provided with a screen bearing station markings and a tuning knob, one or more differentially colored sources of illumination, a non-linear path for guiding light from any of said sources to said screen, said path consisting of a material capable of transmitting light without appreciable loss, and means for moving the path and sources relative to one another in accordance with variation of the tuning instrumentality whereby predetermined markings on the screen have projected adjacent them areas of illuminated color in accordance with said sources.

10. In an indicating device, a cabinet member containing indicating means, said cabinet including an illuminated translucent dial and a source of colored light, said illuminated dial having a graduated scale thereon, and means including a bent quartz rod having at least one of its ends disposed adjacent said source of light, said dial adapted to receive a beam of light from said other end of said rod directed upon a predetermined portion of said scale.

11. A device of the class described comprising a cabinet, indicating apparatus in said cabinet, a dial disposed in an opening of said cabinet and having a plurality of graduations thereon, a reflector movably disposed within said cabinet, and differentially colored illuminating means mounted within said cabinet and adjacent said reflector for projecting indirect light on said dial.

12. A device of the class described comprising a radio cabinet, a station indicating dial disposed in an opening of the control panel of said cabinet, a carriage mounted without said cabinet, a light bulb mounted within said cabinet for illuminating said dial, and means fixedly mounted on said carriage for directing light from said bulb upon a predetermined portion of said dial, and means

mechanically coupled to said carriage for intermittently shifting the illuminated area of said dial from one predetermined portion to another.

13. In combination, in a radio cabinet, a tuning shaft, a carriage mechanically coupled thereto, a dial provided with station indications, illuminating means mounted within said cabinet for projecting lights of varying color on the inner side of said dial, and a quartz rod mounted upon said carriage and having one of its ends in proximity to said illuminating means and the other end adjacent said inner side of the dial.

14. A device of the class described comprising a casing, a station indicating chart in said casing, a carriage mounted within said casing, a quartz rod affixed to said carriage, said quartz rod having one of its ends shiftable along said chart, and a plurality of light bulbs of different colors mounted below said carriage for illuminating the inner side of said chart, the other end of said rod being in proximity to each bulb as the first end is shifted along said chart.

15. A logging and indicating device for radio receiving sets comprising a cabinet, a control panel on said cabinet having a slot therein, a translucent chart mounted in said slot, means for projecting a circular area of colored light upon said chart, said means being slidably supported within said cabinet, and at least one source of colored light within said cabinet, and means for producing relative movement between said projecting means and light source.

16. In a radio receiving set comprising a cabinet and tuning apparatus, a translucent indicating means mounted in said cabinet, a plurality of electric bulbs of different colors mounted below said carriage, means for sliding said carriage in one direction when said tuning apparatus is rotated comprising a drum on said tuning apparatus and a flexible cable secured thereto and to said carriage, a quartz rod affixed to said carriage and having one of its ends in proximity to said bulbs and its other end adjacent the inner side of said dial, means for adjusting said bulbs relative to said dial in a predetermined manner.

17. In a radio receiving set an indicating dial, a source of illumination relatively movable thereto, and a quartz light path for directing light from said source to said dial.

18. In combination with a radio tuning mechanism, a fixed translucent scale, a source of illumination, means for adjusting the tuning mechanism, and additional means for intermittently projecting a circular area of light upon the scale in accordance with predetermined positions of said adjusting means.

19. In combination with a radio tuning mechanism, a fixed translucent scale, a source of illumination, means for adjusting the tun-

ing mechanism, and additional means for intermittently projecting a colored circular area of light upon the scale in accordance with predetermined positions of said adjusting means.

5 20. In combination with a radio tuning mechanism, a fixed translucent scale, a source of illumination, means for adjusting the tuning mechanism, and additional means for intermittently projecting differently colored
10 circular areas of light upon the scale in accordance with predetermined positions of said adjusting means.

15 21. In combination with a radio tuning mechanism, a fixed translucent scale, a source of illumination, means for adjusting the tuning mechanism, and additional means for intermittently projecting differently colored
20 areas of light upon the scale in accordance with predetermined positions of said adjusting means.

FRED MULLER.

ing mechanism, and additional means for intermittently projecting a colored circular area of light upon the scale in accordance with predetermined positions of said adjusting means.

6 20. In combination with a radio tuning mechanism, a fixed translucent scale, a source of illumination, means for adjusting the tuning mechanism, and additional means for intermittently projecting differently colored
10 circular areas of light upon the scale in accordance with predetermined positions of said adjusting means.

15 21. In combination with a radio tuning mechanism, a fixed translucent scale, a source of illumination, means for adjusting the tuning mechanism, and additional means for intermittently projecting differently colored
20 areas of light upon the scale in accordance with predetermined positions of said adjusting means.

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CERTIFICATE OF CORRECTION.

Patent No. 1,814,403.

Granted July 14, 1931, to

FRED MULLER.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 4, line 5, before the word "loss" insert the word low, and line 104, after "bulb" insert the word automatically; page 6, line 61, claim 12, for "without" read within; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 17th day of May, A. D. 1932.

(Seal)

M. J. Moore,
Acting Commissioner of Patents.

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