June 15, 1937. A. BLAIN 2,084,182

TUNING DIAL

Filed May 28, 1936 2 Sheets-Sheet 1

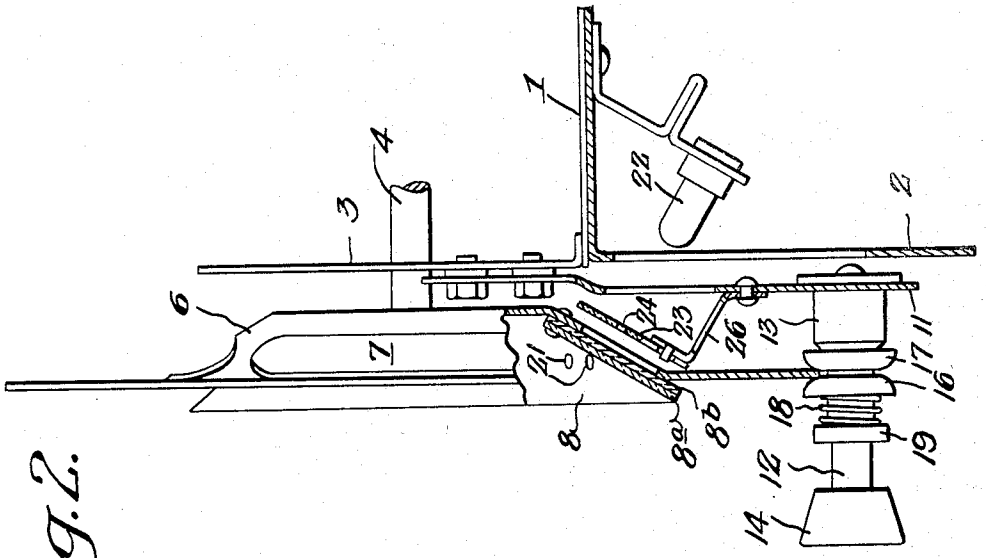


Fig. 2.

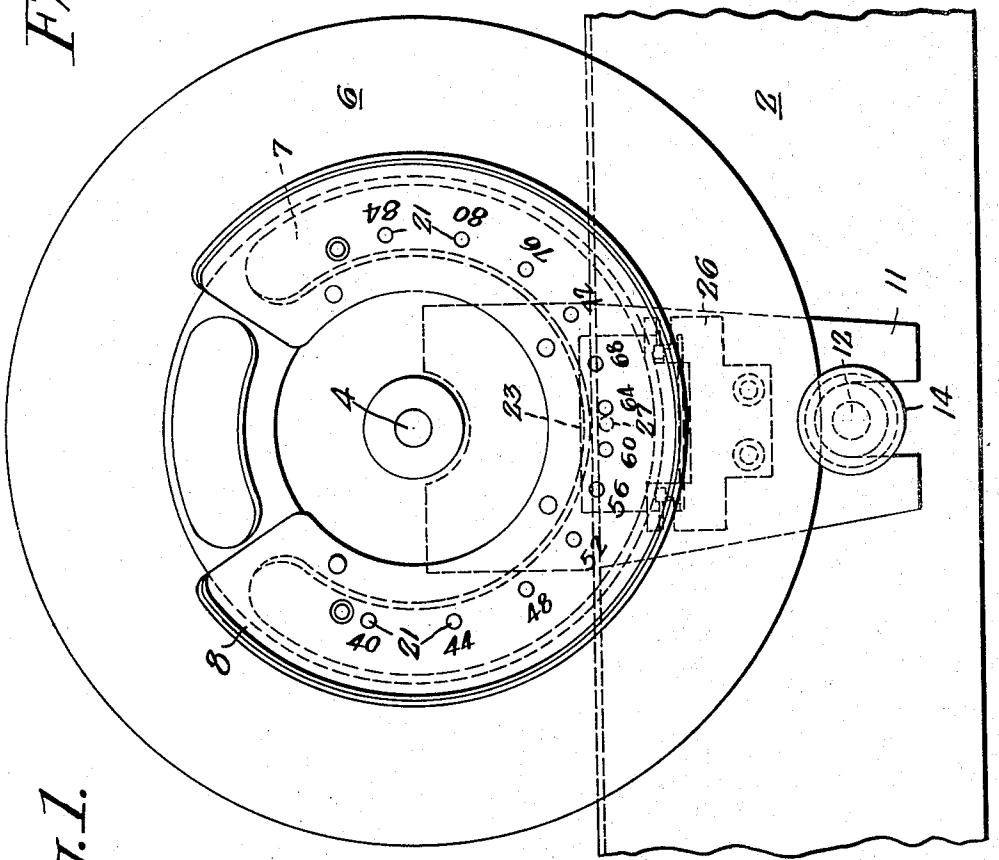


Fig. 1.

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June 15, 1937. A. BLAIN 2,084,182

TUNING DIAL

Filed May 28, 1936 2 Sheets-Sheet 2

Fig. 5.

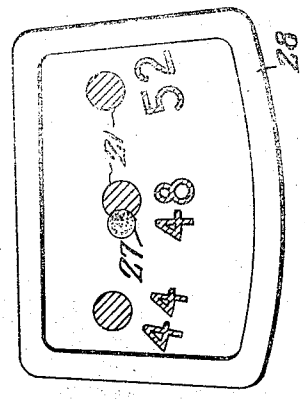
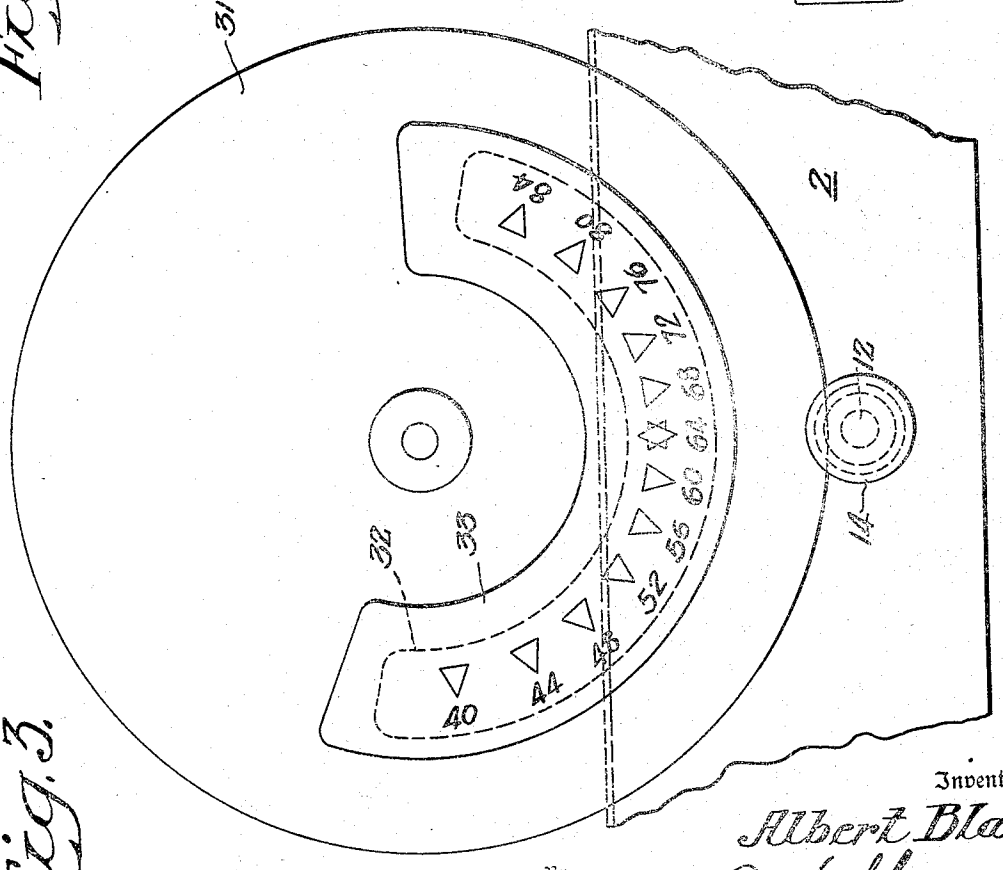


Fig. 4.

Fig. 3.



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UNITED STATES PATENT OFFICE

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TUNING DIAL

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Application May 28, 1936, Serial No. 82,199

9 Claims. (Cl. 116—124.4)

My invention relates to tuning dials for radio receivers or the like and particularly to tuning dials for television receivers designed to receive programs on short wave lengths.

An object of my invention is to provide an improved tuning indicating device for radio or television receivers.

A further object of my invention is to provide an improved television tuning dial whereby a television receiver may be tuned more easily to the desired transmitting station.

A still further object of my invention is to provide an improved tuning dial for a short wave receiver which is calibrated and which gives a suitable tuning indication even though there is a slight error in the calibration.

Largely because of the wide frequency band required for picture transmission, it is planned to transmit television programs on short waves in the frequency band between approximately 36 megacycles and approximately 88 megacycles. The frequency spacing between stations will be 4 megacycles whereby twelve or thirteen transmitting stations can transmit in a given area without interference.

My improved tuning dial described in the following pages is designed for a television receiver which can be tuned over the above-mentioned frequency band to receive programs from twelve stations transmitting on carrier waves of 40 megacycles, 44 megacycles, etc. These carrier frequencies are marked on the tuning dial and since there are only twelve stations the markings are spaced much farther apart than the kilocycle or station markings on a broadcast radio receiver.

In accordance with a preferred embodiment of my invention, the station markings on the dial are in the form of circles, squares, triangles, or the like, these markings being on a translucent dial and being more translucent than the surrounding dial. A spot of light is projected on the back side of the dial whereby it is seen dimly when the receiver is tuned between stations and brightly through the station marking when the receiver is tuned on a station.

The spot of light is made to have a substantial area for the purpose of producing an "eclipse" effect as the receiver is tuned close to or exactly on an incoming signal. This permits considerable latitude in the megacycle calibration of the receivers as the calibration may be in error a fraction of a megacycle and a section of the light spot will still show through the circular or other shaped marking. This is very desirable as in the mass-production of short wave receivers it is impossible to avoid considerable errors in the calibration of some of them.

Preferably, the spot of light is thrown on the dial by means of a plate of colored transparent celluloid or the like which has a small hole therein. This plate is located between the dial and a source of light whereby colored light is thrown on the dial in the region of the spot of light. By making the translucent dial a different color than the plate, pleasing color effects are obtained as the dial is rotated.

My invention will be more fully understood from the following description taken in connection with the accompanying drawings, in which

Figure 1 is a front view of a tuning dial constructed in accordance with one embodiment of my invention,

Fig. 2 is a side view, partly in section, of the tuning dial shown in Fig. 1,

Fig. 3 is a front view of another embodiment of my invention,

Fig. 4 is a side view, partly in section, of the tuning dial shown in Fig. 3, and

Fig. 5 is a view of the tuning dial shown in Fig. 1 as it appears from the front of a television receiver after the chassis has been placed in a cabinet.

Referring to Figs. 1 and 2, parts of a television chassis frame are indicated at 1, 2, and 3. The shaft of the tuning condenser is indicated at 4, this being the shaft upon which the tuning dial is mounted.

The tuning dial comprises a supporting frame 6 pressed or otherwise formed out of sheet metal. As illustrated in the drawings, this frame consists of three sections, the center section being attached to the condenser shaft 4, the middle section sloping outwardly and having a portion of the metal cut away at 7 whereby a celluloid strip 8 or the like carrying the station markings may be mounted thereon over the opening, and the outside section functioning as a friction disc for turning the dial.

In the particular embodiment illustrated, the tuning dial is rotated by means of a friction drive mechanism which is supported from a plate 11 bolted to the chassis plate 3. This driving mechanism includes a shaft 12 which is rotatably mounted at one end in a bushing 13 attached to the supporting plate 11. The tuning knob 14 of the receiver is fastened on the other end of the shaft. A pair of friction discs 16 and 17 are mounted on the shaft 12 to be rotated therewith, the disc 16 being pressed towards the other disc by means of a spring 18 located between a collar 19 and the disc 16. The friction disc section of the dial frame 6 is located between the two friction discs 16 and 17 whereby the dial may be rotated by rotating the tuning knob 14.

The strip 8 of translucent celluloid, which carries the station markings, is attached to the sloping section of the tuning dial frame 6. As shown more clearly in Fig. 1, these station markings indicated at 21 may be in the form of circular areas or dots having a substantial area, each dot

having a diameter of $\frac{1}{16}$ of an inch on the dial illustrated. There are twelve station markings on the dial, these station markings being calibrated in megacycles, the range being from 40 megacycles to 84 megacycles as indicated on the drawings.

The strip 8 is so designed that the circular areas 21 pass light more readily than does the remaining area of the strip. In one embodiment of the invention, the celluloid strip is made up of two layers 8a and 8b, the outside layer 8a being of white celluloid and the bottom layer 8b being of yellow celluloid. The station markings are printed on the white layer of celluloid, the printing being done by putting black ink on all of the dial except on the circular areas and on the figures. Preferably only a thin layer of ink is put on the celluloid so that light will shine dimly through the dial at points between the station markings. Thus it will be seen that if a spot of light is thrown upon the dial from the back side it can be seen dimly through the darkened portion of the dial and brightly through a circular area representing a station marking.

In order to project a spot of light upon the back side of the dial, a lamp 22 is mounted upon the chassis frame, and a plate 23 having a small opening 24 therein is positioned between the lamp 22 and the dial. The plate 23 preferably is of transparent colored celluloid or the like whereby the light shining through the colored plate will produce desired colored effects as will be described later. In the embodiment illustrated, the celluloid plate 23 is supported from a bracket 26 which is riveted to the supporting plate 11.

It will be apparent that the light shining through the opening 24 in the celluloid plate is seen from the front of the dial as a yellow spot of light on the dial. This spot of light is indicated at 27 in Figs. 1 and 5. Also as indicated in Fig. 5 the circular areas 21 representing the station markings and the unprinted areas representing the megacycle figures appear green as a result of the blue light from the celluloid plate 23 shining through the yellow backing of the celluloid strip 8. The bezel indicated at 28 in Fig. 5 masks off that portion of the dial which does not receive light shining through the plate 23 and the opening 24 therein.

When a program is tuned in with my tuning dial, the appearance of the dial is as follows: As the tuning dial is rotated to bring a station marking, the 48 megacycle marking, for example, toward the spot of light 27, this spot of light is first seen dimly through the darkened portion of the celluloid strip 8. As the tuning dial is further rotated so that the spot of light and the circular station marking begin to overlap the effect shown in Fig. 5 is produced, a section of the spot of light now showing brightly as yellow light through a section of the circular station marking. It may be that at this point the television receiver is tuned exactly to a transmitting station as will be indicated by listening to the sound accompanying the picture signal. Perhaps, it should be mentioned that it is intended that the television receiver employing my improved dial will be tuned accurately to the transmitting station in the same way that broadcast receivers are ordinarily tuned to transmitting stations at the present time since a picture ordinarily will be accompanied by sound. In other words, the receiver is tuned until the ear indicates that the receiver is exactly on the station carrier or until some tuning indicating device indicates that the receiver is tuned exactly to the station carrier.

It will be understood that it is because of the difficulties in calibrating a short-wave receiver accurately that the receiver may be tuned exactly to the incoming signal when the light spot and the circular station marking are in the relation illustrated in Fig. 5. If the calibration is exact the receiver will be tuned exactly to the incoming signal when the light spot is exactly in the center of the circular station marking. In that case, since the light spot preferably has a slightly smaller diameter than the station marking it will appear as a yellow spot surrounded by a green border. Obviously, because of errors in calibration, it may be that the receiver is not tuned exactly to the incoming signal until the tuning dial has been rotated sufficiently to move the station marking entirely across the light spot to produce an eclipse effect, similar to the one illustrated, on the other side of the circular station marking.

In Figs. 3 and 4 another embodiment of my invention is illustrated. In these figures and in Figs. 1 and 2 like parts are indicated by the same reference numerals. In this embodiment of the invention a different form of supporting frame for the strip member carrying the station markings is employed, although it will be understood the form illustrated in Figs. 1 and 2 may be employed if preferred. This supporting frame is a flat disc 31 which is fastened to the condenser shaft. It has an arcuate opening 32 therein in front of which an arcuate translucent strip or member 33 is mounted.

The translucent member 33 has station markings thereon which, in the specific embodiment illustrated, are triangular in form and of substantial area. The opening 24 in the plate 23 is also triangular in shape, this triangle being inverted with respect to the triangular markings on the translucent member 33 and being so positioned that the two triangles may be superimposed as illustrated in Fig. 3 at the 64 megacycle marking.

The member 33 carrying the station markings, as well as the plate 23, may have the same coloring and construction as the corresponding members shown in Figs. 1 and 2. In the embodiment which is illustrated, however, the translucent member 33 is not colored and consists merely of translucent material having triangular transparent areas thereon. The figures indicating megacycles also preferably are marked on the member by transparent lines as in the dial illustrated in Fig. 5. A simple way of forming the member 33 is to take a photograph of the desired station markings and then employ the developed negative. Preferably the back surface of the negative is frosted, as by sand blasting, to make the negative translucent and thereby prevent glare from the spot of light. On such a negative the triangles, of course, are more translucent than the rest of the negative, as are the numbers indicating megacycles. When a member made in this way is employed it may be utilized in combination with a plate 23 which is colored and transparent as in the modification first described, or it may be used in combination with a plate which is opaque whereby the only light from the lamp reaching the member is the light passing through the opening 24.

It will be apparent that when tuning a receiver having the dial illustrated in Figs. 3 and 4, the triangular spot of light will be seen dimly between

the triangular station markings and will be seen brightly as a triangular station marking is made to overlap the triangular spot of light. If the receiver is perfectly calibrated, a triangular station marking and the triangular spot of light will be superimposed, as shown in Fig. 3, when the receiver is tuned exactly to an incoming signal. As previously pointed out, however, such exact calibration is unlikely and the receiver will be tuned to the incoming signal when the station marking and the spot of light are partially overlapping.

It will be understood that circular and triangular station markings have been illustrated merely by way of example and that markings having various other shapes may be employed if preferred. The important point is that these markings have a substantial area whereby they may cooperate with a spot of light of substantial area to produce an overlapping or eclipse effect as the receiver is tuned to an incoming signal.

It will be apparent from the foregoing description that various modifications may be made in my invention without departing from the spirit and scope thereof and I desire, therefore, that only such limitations shall be imposed thereon as are necessitated by the prior art and are set forth in the appended claims.

I claim as my invention:

1. A tuning dial comprising a member having station markings of substantial area thereon which have a better light transmitting characteristic than the surrounding portion of the member, means for projecting a spot of light upon the back side of said member, and means for producing relative movement between said member and said spot of light as the receiver is being tuned to a desired station, said markings and said spot of light being so located with respect to each other that at least a portion of the spot of light is superimposed upon each of said markings as the receiver is tuned throughout its tuning range.

2. The invention, according to claim 1, characterized in that said station markings are spaced apart by a distance which is greater than any dimension of a station marking.

3. A tuning dial comprising a member having circular station markings of substantial area thereon which have a better light transmitting characteristic than the surrounding portion of the member, means for projecting a circular spot of light of substantial area upon the back side of said member, and means for producing relative movement between said member and said spot of light as the receiver is being tuned to a desired station, said markings and said spot of light being so located with respect to each other that at least a portion of the spot of light is superimposed upon each of said markings as the receiver is tuned throughout its tuning range.

4. The invention according to claim 3 characterized in that each of said station markings has a diameter of at least ⅛ of an inch.

5. A tuning indicating device comprising a translucent dial having a plurality of station markings thereon, each marking being more translucent than the surrounding dial and being of substantial area, means for projecting a spot of light on the back side of said dial, said spot of light having an area comparable to that of each of said markings, and means for producing relative movement between said light spot and said dial, said light spot and said markings being so located that at least a portion of the light spot is superimposed upon each of said markings as relative movement is produced between said light spot and said dial.

6. A tuning dial for a radio receiver or the like comprising a translucent dial, a plurality of station markings on said dial which are spaced apart by a distance which is greater than the width of the markings, each of said markings having a substantial area and being more translucent than the surrounding dial, and means for projecting a spot of light on the back side of said dial, said light spot and said markings being so located that at least a portion of the light spot is superimposed on each of said markings as relative movement is produced between said light spot and said dial.

7. A tuning dial for a television receiver, said dial comprising a member having not more than 15 station markings thereon, each of said markings being of substantial area and having a better light transmitting characteristic than the surrounding portion of said member, said markings being spaced apart by a distance greater than the width of a station marking, means for projecting a spot of light upon the back side of said member, and means for causing relative movement between said member and said spot of light as said receiver is being tuned, said station markings and said spot of light being so relatively positioned that the spot of light is superimposed upon at least a portion of each station marking successively as the receiver is tuned throughout its tuning range.

8. A tuning dial for a radio receiver or the like comprising a colored translucent member having station markings of substantial area thereon which have a better light transmitting characteristic than the surrounding portion of the member, a source of light mounted behind said member, a colored light transmitting plate having an opening therein positioned between said source of light and said member whereby a spot of light is projected upon said member, the color of said plate being different than the color of said member, and means for producing relative movement between said member and said spot of light as the receiver is being tuned, said markings and said spot of light being so located with respect to each other that at least a portion of the spot of light is superimposed upon each of said markings as the receiver is tuned throughout its tuning range.

9. A tuning dial comprising a member having station markings of substantial area thereon which have a better light transmitting characteristic than the surrounding portion of the member, means for projecting an area of light upon the back side of said member, means for producing relative movement between said member and said area of light as the receiver is being tuned to a desired station, said markings and said area of light being so located with respect to each other that at least a portion of said area of light is superimposed upon each of said markings as the receiver is tuned throughout its tuning range, said area of light at the point where it is superimposed upon a marking having a dimension in the direction of said relative movement which is comparable to the dimension of said markings in said direction.

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