June 16, 1936. J. DREYFUS 2,044,759

RADIO RECEIVER

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Fig. 2

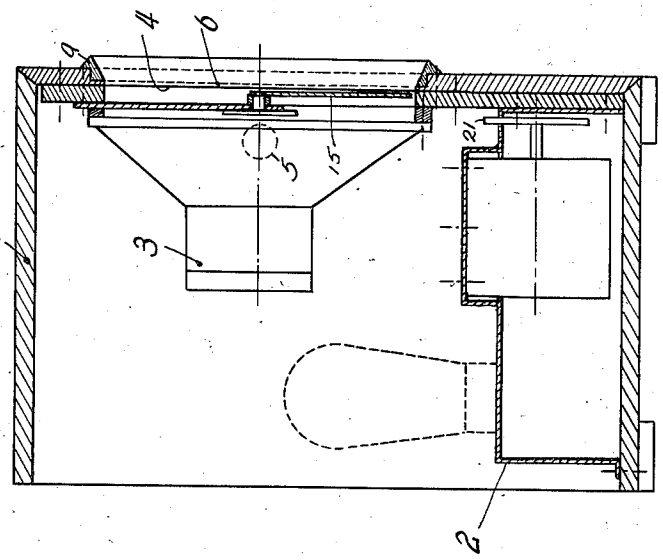
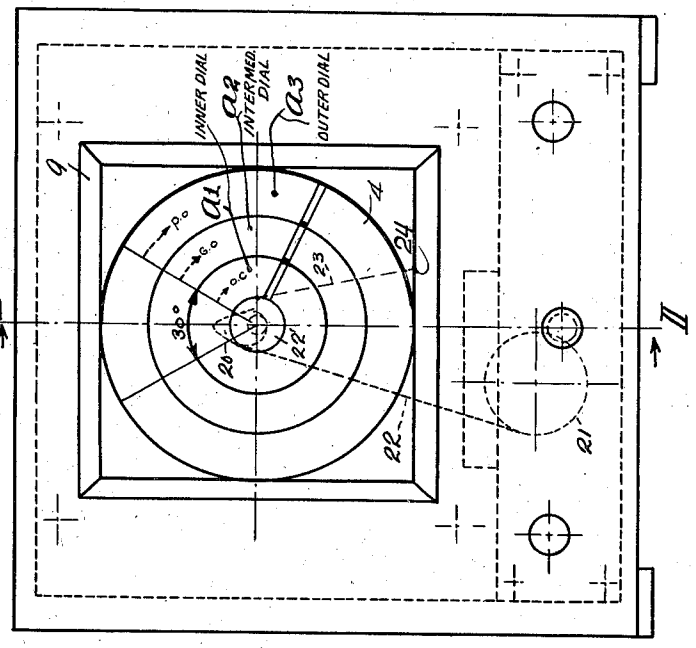


Fig. 1



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Fig. 3

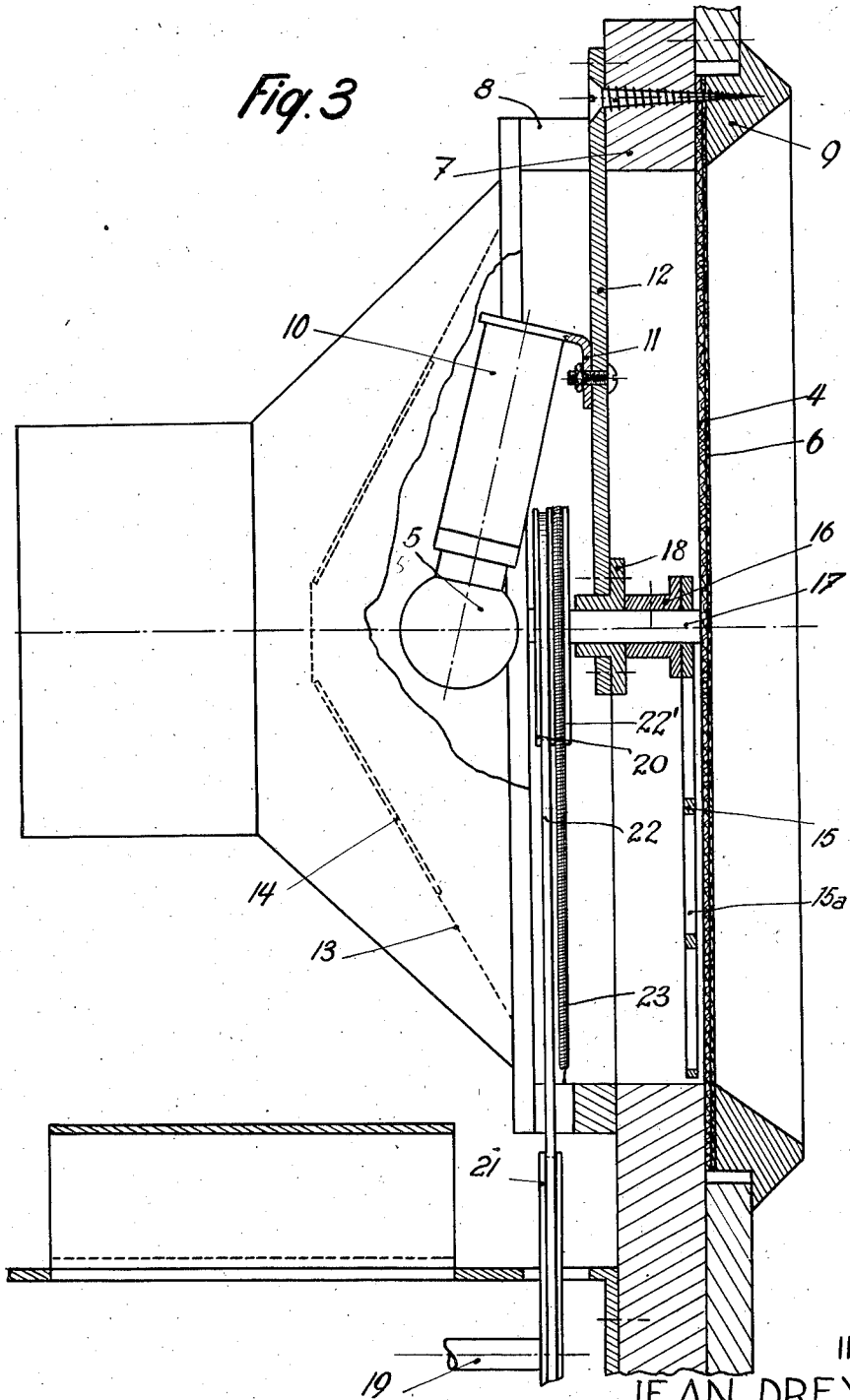
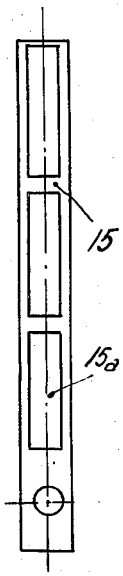


Fig. 4



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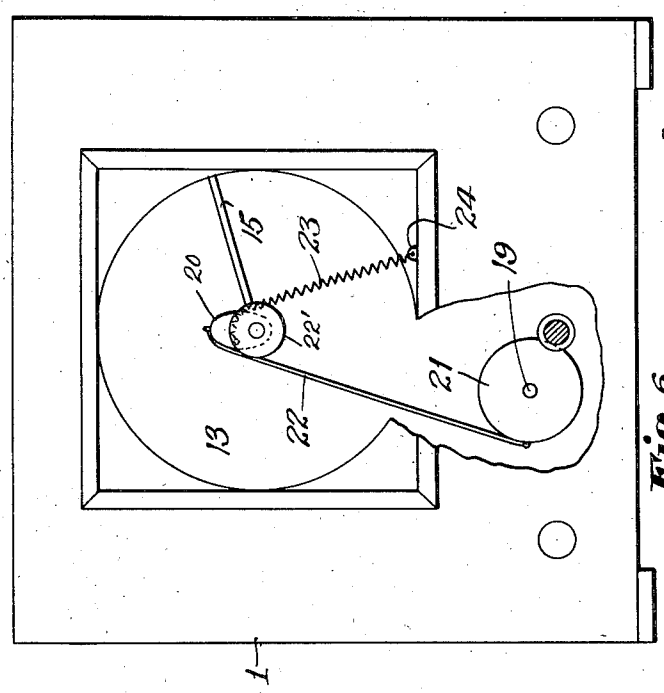


Fig. 6.

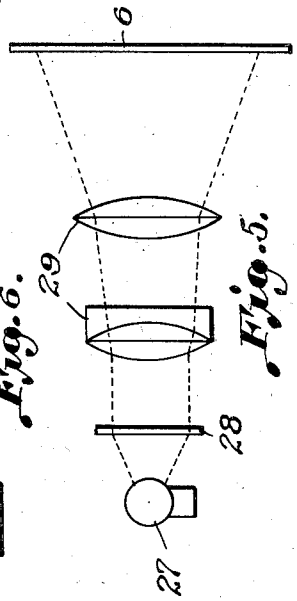


Fig. 5.

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Patented June 16, 1936 2,044,759

UNITED STATES PATENT OFFICE

2,044,759

RADIO RECEIVER

Jean Dreyfus, Paris, France

Application August 10, 1934, Serial No. 739,211
In France April 16, 1934

10 Claims. (Cl. 250—14)

Radio receiving sets are normally provided with a tuning dial which makes it easy to note the particular broadcasting stations that are received, and with a loud speaker for reproducing the sounds transmitted by the electric waves.

In receiving sets heretofore constructed, the place of the dial was always distinct from the mouth of the loud speaker. The object of the present invention is to provide a receiver in which the dial is positioned in the mouth of the loud speaker so as to better utilize the space occupied by the radio set. In this manner it is possible to increase the space available for the dial, and therefore, to render the indications on the dial more legible, while reducing the total space occupied by the set.

In constructing an arrangement of this character, it is necessary to make the dial of a substance which is permeable to sound, or to use a dial provided with suitable apertures. As long as this requirement is complied with, any kind of dial or indicating device and any kind of loud speaker can be used in connection with the invention. The dial may be either movable or stationary, and visible either wholly or in part only; it may carry figures, station names or technical characteristics. The indicating member may be either stationary or movable and may include a pointer which may be either mechanical or luminous. The loud speaker may be of any construction such as electrodynamic, electromagnetic, a permanent magnet speaker, or speaker of the electrostatic type.

Preferably, however, according to the present invention, I provide between the dial and the tuning member a transmission device including a cable connected with elastic return means, and a pulley of a suitably calculated outline, which device permits of disposing the tuning parts at a suitable distance from the operating members to prevent interference with the transmission of sound and to obtain a ratio of transmission that varies according to any desired predetermined law.

The dial itself may be either opaque or translucent and illuminated by transparency. In the latter case, the inscriptions are preferably applied to the rear face of the dial in such manner as to be invisible when the dial is in its dark or unilluminated condition.

The axis of the pointer cooperating with the dial can be disposed in any position with respect to the axis of the loud speaker. Moreover, the pointer can be disposed either in front of or behind the dial. In the latter case only the shadow of the pointer will be visible, when the dial is illuminated. Finally, the pointer may be of an optical nature and to this end may consist of a neon tube in a known manner.

These and other characteristic features of the present invention will be better understood from the following detailed description taken with reference to the accompanying drawings in which I have illustrated by way of example a preferred embodiment of the invention. In the drawings:

Figure 1 is an elevational view of a device embodying the invention;

Figure 2 is a sectional view taken on the line II—II of Figure 1;

Figure 3 is a partial view of Figure 2 on an enlarged scale;

Figure 4 is a further detail view;

Figure 5 is a modification showing an optical system for a special form of tuning dial;

Figure 6 is a partial front view illustrating a suitable transmission mechanism for moving the pointer.

Similar reference numerals identify similar parts throughout the different views of the drawings.

The apparatus shown in Figures 1 and 2 of the drawings essentially comprises a casing 1, made of wood or any other suitable material, housing a frame 2 carrying or enclosing the receiver or parts such as tubes, coils, etc., including a variable tuning element and a loud speaker 3 electrically connected with the receiver.

The essential characteristic of the present invention resides in the fact that the dial 4 carrying the marks that permit of identifying the emitting stations received, is mounted in the mouth of the loud speaker, thus occupying a space which is usually wasted.

This dial should, therefore, be made of material which is permeable to sound waves and does not distort them, while, permitting a legible printing of the indications the dial has to carry. As already stated, the dial is preferably illuminated by transparency by means of a lamp 5 in such manner that the inscriptions are visible only when the dial is illuminated. The material of which the dial is made should be such as to distribute evenly the light coming from the lamp and furthermore it should not be affected by the heat produced by the lamp nor by variations of the humidity content of the surrounding atmosphere. Experiments have shown that fabrics such as percale or organdie, or the like, give satisfactory results. The opacity of the indications carried by the dial may be increased by a deposit

of a layer of metallic dust, or by the application of a suitable coloring powder.

In order to render the inscriptions completely invisible when the dial is not illuminated, I have shown a veil 6 provided in front of the dial which veil remains opaque as long as the lamp is disconnected and will become translucent when the lamp is lit. Experiments have shown that fabrics such as crepe Georgette, Roman crepe or crepe de Chine fully satisfy this double requirement. As the legibility, when the dial is illuminated is the better the finer the fabric of the veil, it is advantageous to deposit the layer of typographic colouring matter on the inner surface of the dial 4, the printing being reversed. The surface of the printed dial may be divided, in known manner, into as many concentric annular sections as there are different ranges of wave lengths for which the receiver is constructed such as three ranges in the example shown in the drawings.

The parts already described may be arranged in the following manner:

The loud speaker 3 is mounted against a suitable opening in the panel 7 of the casing 1 and supported by an annular element 8. The two fabrics 4 and 6 referred to are clamped against the edge of this opening by means of a frame shown at 9. The lamp 5, which preferably has a frosted bulb, is arranged in the axis of the loud speaker and has its base 10, mounted either on the core of the loud speaker or on a bracket 11 mounted in turn upon a support 12 which may be carried by the frame 7 or by the casing. The lamp may be placed at any desired point close to the dial.

Moreover, the diaphragm 13 of the loud speaker may act as a light reflector. To this end its concave face is metallized or coated with a light colouring matter 14 capable of reflecting light evenly on to the dial and preventing the formation of sharp shadows of the parts placed between the lamp and the dial excepting the indicating pointer, as it will be hereinafter explained. All these parts including the pointer with its transmission mechanism, to be described, can be fitted in the casing and fixed thereto by screws or similar means.

The pointer 15 may be disposed either in front of or behind the dial, preferably in the latter position so as to be invisible when the receiver is not in operation. In order to render the pointer clearly visible through the translucent dial when the lamp is lit, it should be arranged in close proximity behind the screen 4.

In the embodiment shown in the drawings, the pointer is mounted at the center of the reflector and turns, together with the annular element 16 and spindle 17 in a bearing 18 carried by the support 12.

The pointer serves to mark the indications carried by the dial either by superimposition or by framing them, by the provision of apertures 15*a* provided in the pointer as shown in Fig. 4. The same pointer may serve to mark the indications of several groups of wave lengths by the provision of a plurality of apertures 15*a* (three of which are shown in the embodiment according to the drawings) cooperating with three zones as wave length ranges a_1, a_2, a_3 on the dial, as shown in Figure 1.

With the arrangement of the dial as described, it is advisable to provide between the pointer and tuning members a transmission mechanism which is both simple and of light weight and which does not cause interfering projecting shadows on the screen and does not distort or absorb the sound waves emitted by the loud speaker. Moreover, the ratio of transmission should vary according to a non-linear law, that is to say, the ratio between the angles of rotation of the driving shaft and the driven shaft should not be constant but should vary according to a predetermined law. In this manner it is possible to dispose the various marks carried by the dial at regular intervals, regardless of the law of variation of the tuning member, that is regardless of the angle of the corresponding rotation of the shaft 19 by which the tuning member is operated.

A mechanism satisfying these conditions is shown in Figure 5, and comprises a pair of pulleys 20 and 21, keyed on shafts 17 and 19 respectively, at least one of these pulleys, 20 for instance, having a non-circular outline determined in accordance with the law of variation of the ratio of transmission that it is desired to obtain.

Owing to this arrangement, the cable 22 does not form an endless or closed band, but has one end fixed at a point on the periphery of the pulley 21 and the other end at a point of the periphery of pulley 20, which latter is urged in one direction by a return spring. For instance a pulley 22' fixed to pulley 20 is connected with a coil spring 23 secured at a fixed point 24 of the casing as seen from Figure 5.

As is understood the device described is given merely by way of example, and various changes may be made in the construction and arrangement of parts without departing from the spirit of the invention. Thus, the dial may be either movable or stationary, it may be wholly or partly visible, it may carry figures, the names of the emitting stations, or technical characteristics, disposed according to any system, etc., The indicating member may be either stationary or movable. The relative movement of the dial with respect to the pointer may be circular, or rectilinear, or of any other kind.

Besides the aforementioned fundamental requirements, the insignia carried by the dial could be capable of reproduction in an inexpensive manner by a suitable industrial method of printing, such as by a typographic, lithographic, photographic process, by photogravure, off-set, phototype, and any other suitable process.

Basically the dial may have two general forms, (*a*) in the form of a semi-rigid plate, such as of celluloid, provided with suitable apertures, and (*b*) in the form of a sheet of porous material such as a fabric.

The first solution has the advantage of providing a dial on which the indications are very accurate while the second solution permits a more complete utilization of the available surface in front of the loud speaker.

As regards the lighting device, it is to be observed that, in order to mark the different kinds of wave lengths, the indicating pointer may act as a support for one or more lamps projecting one or more luminous spots onto the dial corresponding to the different wave length ranges.

Finally, the dial may carry no material mark, the necessary indications being applied to a separate transparent plate of smaller dimensions and being projected on to said dial by the luminous system disposed in the loud speaker. This is diagrammatically shown in Figure 5, wherein lamp 27 projects the transparent dial plate indications at 28 by means of a projecting lens system 29 upon the sound permeable fabric 6.

While I have described what I deem to be a

practical and efficient embodiment of the present invention, it should be understood that I do not wish to be limited thereto as various changes may be made in the arrangement, disposition and form of the parts without department from the principle of the present invention as comprehended within the scope of the claims hereunto annexed.

What I claim is:

1. A radio receiver which comprises in combination, a loud speaker, a sound pervious tuning dial occupying a sound emitting orifice in the front of said radio receiver and carrying tuning inscriptions upon the rear surface thereof, and a source of light disposed behind the tuning dial capable of rendering the tuning inscriptions upon said tuning dial visible by the translucent character of the latter.

2. A radio receiver which comprises in combination, a loud speaker, a dial disposed in front of the mouth of said loud speaker, means for illuminating said dial from the back thereof, said dial carrying inscriptions arranged to be visible only when said means are illuminating said dial, and a veil disposed in front of said dial and made of such a material as to be opaque when not illuminated from behind and transparent when illuminated from behind.

3. A radio receiver according to claim 1 further including a movable pointer disposed behind the tuning dial in order to be normally concealed thereby and so that only its shadow is visible on the tuning dial when the latter is illuminated.

4. A radio receiver according to claim 1 further comprising a light diffusing surface means for illuminating the tuning dial by reflection.

5. A radio receiver according to claim 1 further including a membrane for said loud speaker acting as a light diffusing surface for illuminating the dial by reflection.

6. A radio receiver which comprises in combination, a loud speaker, a sound pervious tuning dial disposed in the path of sound produced by the loud speaker and translucent when illuminated, a source of light behind said dial, and a transparent plate carrying the tuning inscriptions to be seen on the dial interposed between said source and said dial, whereby said inscriptions are projected onto said dial.

7. In a radio receiver, the combination of a loud speaker terminating in an orifice and a sound permeable fabric screen disposed across the front of the loud speaker having tuning indicia thereon arranged within the circumferential edge of the orifice of the loud speaker.

8. In a radio receiver, the combination of a loud speaker terminating in an orifice, a sound permeable screen disposed across the front of the loud speaker having tuning indicia thereon arranged within the circumferential edge of the orifice of the loud speaker, and lighting means behind said screen to cause light to appear through the screen and reveal the tuning indicia thereon.

9. In a radio receiver as claimed in claim 8, a pointer movable with respect to said screen, a control member for said pointer, and a transmission device between said member and said pointer, said device being constructed so as to offer no substantial resistance to the passage of sounds and being arranged to give a ratio of transmission between said control member and said pointer which is variable in accordance with the position of said pointer.

10. In a radio receiver as claimed in claim 8, a pointer rotatably mounted with respect to said screen, a control member for said pointer, a pulley connected to said member, a further pulley angularly connected with said pointer, at least one of said pulleys having a profile outline corresponding to a predetermined decrease of relative movement of the pointer and its pulley toward one end of the range of movement of said pointer with respect to the movement of the other pulley, a cable wound around said pulleys and fixed at one end to the periphery of the first pulley and at the other end to the periphery of the other pulley, and elastic means for urging at least one of said pulleys in one direction.

JEAN DREYFUS.