June 4, 1940. E. F. BACON 2,203,514

SPEEDOMETER

Filed Aug. 26, 1937 2 Sheets-Sheet 1

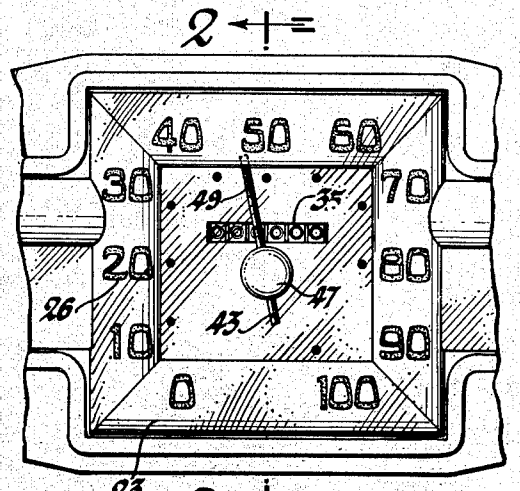


Fig. 1

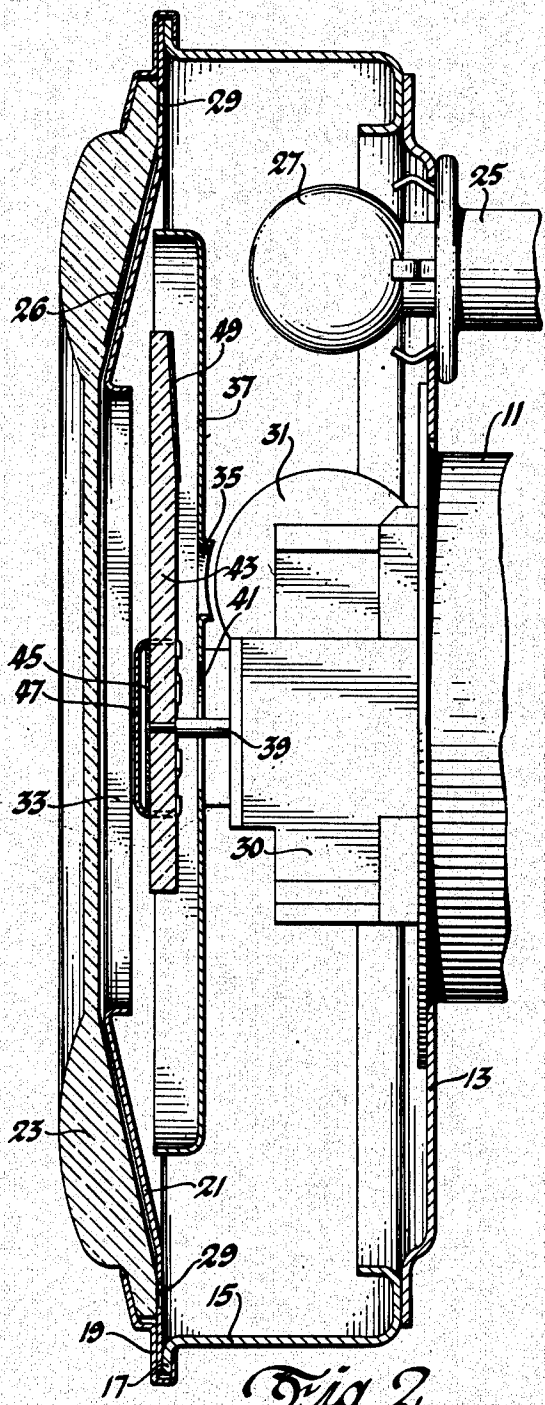


Fig. 2

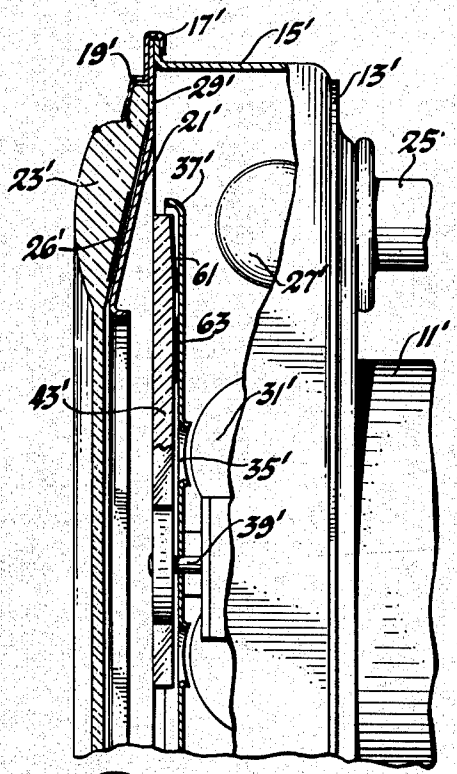


Fig. 3

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SPEEDOMETER

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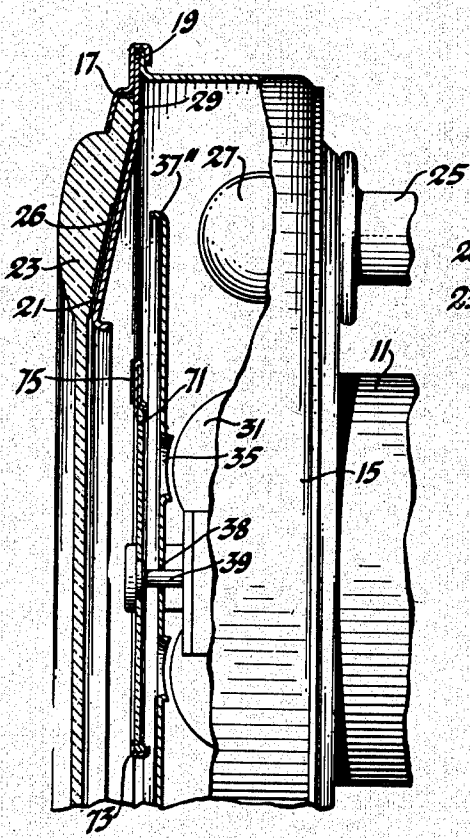


Fig. 4

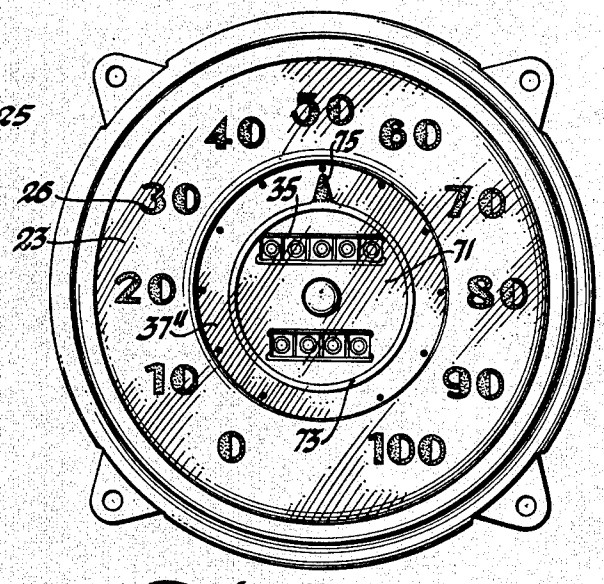


Fig. 5

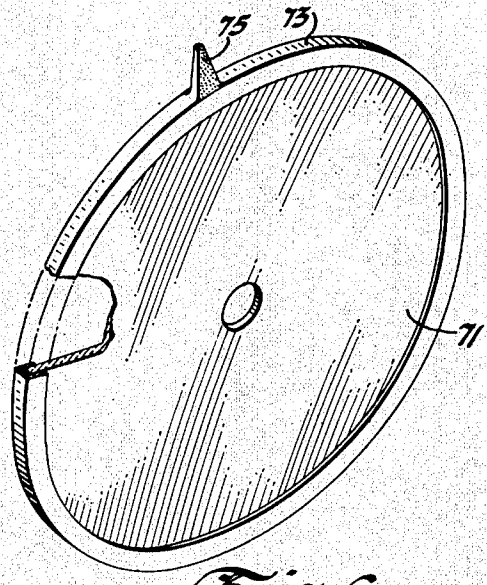


Fig. 6

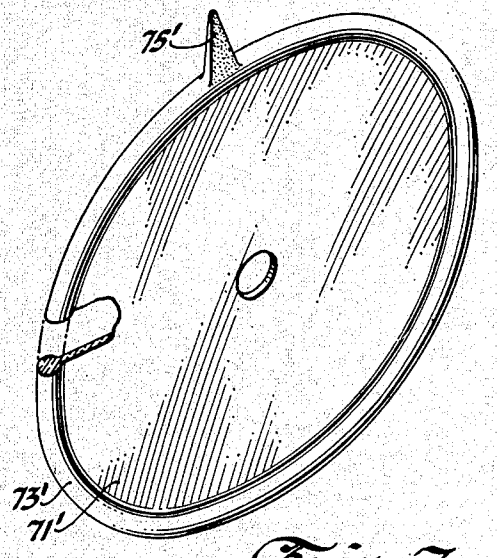


Fig. 7

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Patented June 4, 1940 2,203,514

UNITED STATES PATENT OFFICE

2,203,514

SPEEDOMETER

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Application August 26, 1937, Serial No. 161,089

6 Claims. (Cl. 240—2.1)

This invention relates to the illumination of indicating instruments and has been designed more particularly as an improved provision for the illumination of a speedometer and odometer combination for use on vehicles.

An object of the invention is to improve the illumination of the speed and distance markings of such a device for use at night.

Another object is to provide such illumination as will conceal the light from a source except such light as is directed to the parts which need to be illuminated.

Another object is to accomplish the above objects by a construction wherein one of the two parts of the combined instrument is visible through a transparent member associated with the other part of the instrument.

Other objects and advantages will be understood from the following description.

On the drawings:

Figure 1 is a view in elevation of a combined speedometer and odometer.

Figure 2 is a vertical section substantially on line 2—2 of Figure 1.

Figure 3 is a similar section but showing a modified form.

Figure 4 is a vertical half section through another form of the invention employing a somewhat different method of illumination.

Figure 5 is a view in elevation of the instrument shown in Figure 4 as seen facing the front.

Figure 6 is a perspective of one of the parts used with the mechanism shown in Figure 4.

Figure 7 is a perspective of a part which may be used in place of the part shown in Figure 6.

Referring by reference characters first to Figures 1 and 2, numeral 11 represents a cup-shaped member carrying operating mechanism not shown. This cup-shaped member is secured in any desired way to a metal plate 13. To the latter is fastened a housing 15 having a flange 17. A bezel 19 is used to secure in position relative to housing 15 and other parts of the instrument a metal plate 21 and a glass cover 23. Secured to and extending through an opening in plate 13 is fitted a socket 25 carrying a conventional light bulb 27. Light from this bulb obviously illuminates the interior of the housing. Suitable openings such as 29 in plate 21 permits the passage of light from within the housing to the glass 23. Etched or otherwise formed on the glass are markings 26 which take the form of numerals to represent the speed at which the vehicle is traveling. The light transmitted to the glass through openings 29 is interiorly reflected through the glass and refracted and then reflected from the markings 26. At night the glass as a whole is not visible, only the etched regions being visible to the observer.

The degree of light entering the glass and its color can be controlled by painting the front surface of the glass opposite openings 29 either white or some other desired color. The white or painted surface aids in dispersing the light through the glass thereby improving the lighted appearance of the numerals.

At 31 is represented more or less conventional odometer mechanism, this mechanism being associated with the speedometer frame marked 30. The odometer comprises a plurality of figure wheels as best shown in Figure 1. These figures are seen by the observer through glass 23, through the large opening 33 within plate 21 and through openings 35 in another plate 37, this plate 37 being suitably secured by fastening means not shown on the front of the frame 30 of the combined instrument. The plate 37 covers the operating parts of the instrument and together with plate 21 prevents the direct light from the bulb 27 from reaching the observer. To accomplish this result it will be seen that the outer margin of plate 37 is considerably beyond the opening 33 of plate 21.

The speedometer mechanism is provided with a rotating spindle 39 extending through an enlarged central opening 41 in plate 37. Stem 39 has secured at its end the pointer 43 of "Lucite" or other transparent material. At its center the surface of the pointer facing the observer is painted white as shown at 45 and clamped to this central part of the pointer is a metallic opaque shield 47. This shield prevents the transmission of any light from the central part of the pointer to the observer. On the outer extremity of the pointer and on the side remote from the observer is a second painted region 49. That part of the pointer between the two painted regions is unpainted and as seen in Figure 2 it is the unpainted and therefore transparent part which passes over the odometer figures. The light from bulb 27 illuminates the pivoted part of the pointer at 45, the light coming through opening 41. After being reflected from painted surface 41 the light is internally reflected through the pointer to the painted surface 49 from which it is reflected to the observer. It will be understood that the position of the painted surface 49 relative to the markings on the glass plate 23 indicate the rate of travel of the vehicle. At the same time the observer may read the mileage

traveled not only through the parts heretofore mentioned but through the unpainted part of the pointer which passes over the figures of the odometer mechanism. By the use of the construction above described no direct light reaches the observer from the bulb 27 within the housing. Of the speedometer mechanism the observer sees only the illuminated figures and the tip of the pointer. He reads the odometer by the light within the housing reflected from the odometer wheels and transmitted through openings 35.

In Figure 3 is shown a slight modification. The parts of the housing shown in this figure which correspond with similar parts in Figure 2 are marked with similar but primed reference characters. In this second form of the invention the pointer 43' has two painted regions, one 61 immediately in front of the opaque wall 37' but behind the opaque wall 21', and the other 63 being radially inward from the region 61. In this form of the invention the light from bulb 27' passes between the outer edge of plate 37' and plate 21' and then through the end of the transparent pointer to the painted surface 61. By internal reflection the light is transmitted to surface 63 from which it is reflected to the observer as before through the opening in plate 21' and the glass 23'. The odometer is visible in precisely the same way as the form shown in Figure 2.

In Figures 4 to 6 another form of pointer is used. In these figures the housing is substantially like that shown in Figure 1 and the parts are similarly identified by reference characters. The opaque plate 37'' differs from plate 37 in that it lacks the large central opening for the passage of light, having merely a small aperture 38 for the passage of the speedometer spindle 39. Plate 37'' has an opening 35 through which the odometer is visible as before. The speedometer spindle 39 carries the modified form of pointer. The pointer is a transparent disc 71 circular in outline. About its periphery is a metal ring 73 U-shaped in section. This ring may be crimped over the marginal edge of the disc 71. At one point in the periphery the ring 73 has a painted tip 75. Light from the bulb 27 passes betwen the plate 21 and the outer edge of the plate 37'' and is reflected from the tip 75. The position of this tip relative to the figures etched in the glass 23 indicates car speed. The odometer figures are seen through glass 23, through the large opening in plate 21 and through the transparent disc 71.

In Figure 7 there is shown a slight modification of the pointer disc. It is marked by numeral 71'. Formed on its peripheral margin is a rim 73', the rim being of the same material as the disc and at one point on its periphery there is painted a tip 75'. It will be obvious that the light is transmitted from the source to illuminate the several parts just as in the case of the form shown in Figure 4.

I claim:

1. An indicating instrument comprising a housing, a light source therein, spaced inner and outer opaque plates having overlapping regions to prevent direct transmission of light from said source, the outer of said plates having an enlarged opening, a fixed transparent disc in front of said outer plate and having spaced reflecting markings adapted to receive light from said source, movable means between said opaque plates, said movable means being in part transparent and provided with a region to receive light from said source said movable means also constructed to reflect light to an observer through said first mentioned transparent disc, a second indicating device having movable elements located within said housing, the inner one of said opaque plates having an opening whereby said last named elements may be seen through said opening, said transparent movable means, the opening in the outer of said opaque plates and through said first mentioned transparent disc.

2. The invention defined by claim 1, the outer of said opaque plates having openings to receive light from said source for transmission to said markings on said first transparent disc.

3. An indicating instrument comprising a housing, a light source therein, spaced opaque plates within said housing and having overlapping regions to prevent the transmission of direct light from said source, a fixed transparent disc having spaced reflecting markings adapted to receive light from said source, movable means between said opaque plates, said movable means being in part transparent but provided with spaced painted areas, one of said areas positioned to receive light from said source and the other to reflect light to the observer through the transparent disc, a second indicating device having movable elements and located within said housing, the inner one of said plates having an opening whereby said last named elements may be seen through said opening, said transparent movable means, an opening through the outer opaque plate and through said first mentioned transparent disc.

4. The invention defined by claim 3, said areas being adjacent the radially outward part of said movable transparent means, the outermost of said areas being between the two opaque plates and the inner being opposite the opening in the outer plate.

5. The invention defined by claim 3, one of said areas being adjacent the center of rotation of said movable means, the inner of said opaque plates having an opening to transmit light from the housing to said central areas, the outer of said area being adjacent the outer margin of said movable means and opposite an opening in the outer opaque plate.

6. An indicating instrument comprising a member having scale markings, an opaque element having an opening therein, a register positioned to be visible through said opening, an elongated movable pointer on the side of the opaque element remote from the register, said pointer cooperating with said scale markings, a source of light to illuminate said register, said pointer and scale markings, said pointer having light receiving and light reflecting regions and a portion therebetween adapted to transmit light by internal reflection therein and between said regions and also to render said register visible therethrough.

ELBRIDGE F. BACON.