Oct. 5, 1971 J. C. ALEXANDER ET AL 3,609,899

DAY-NIGHT PRISM DISPLAY DEVICE

Filed March 17, 1970 2 Sheets-Sheet 1

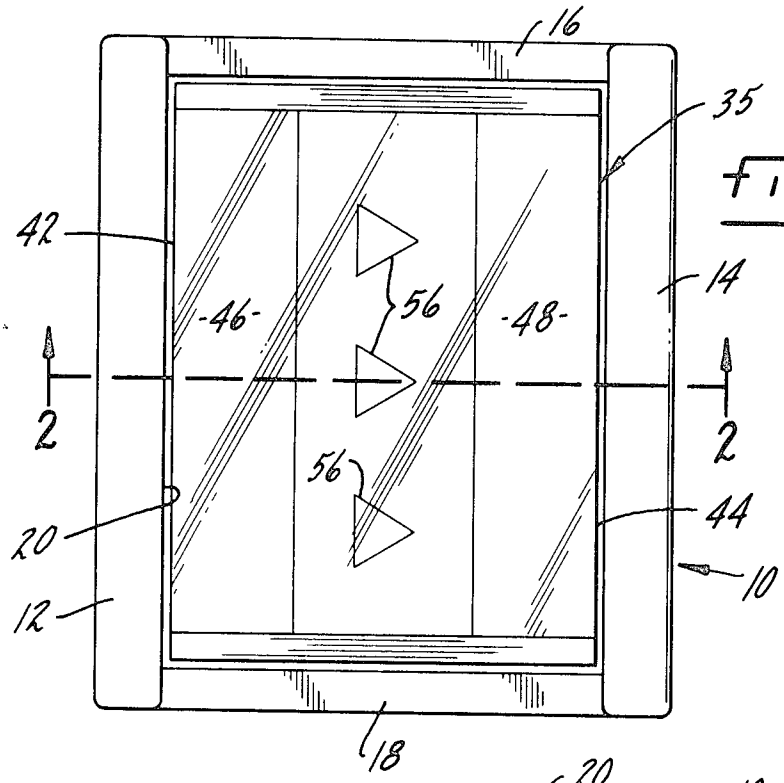


Fig. 1.

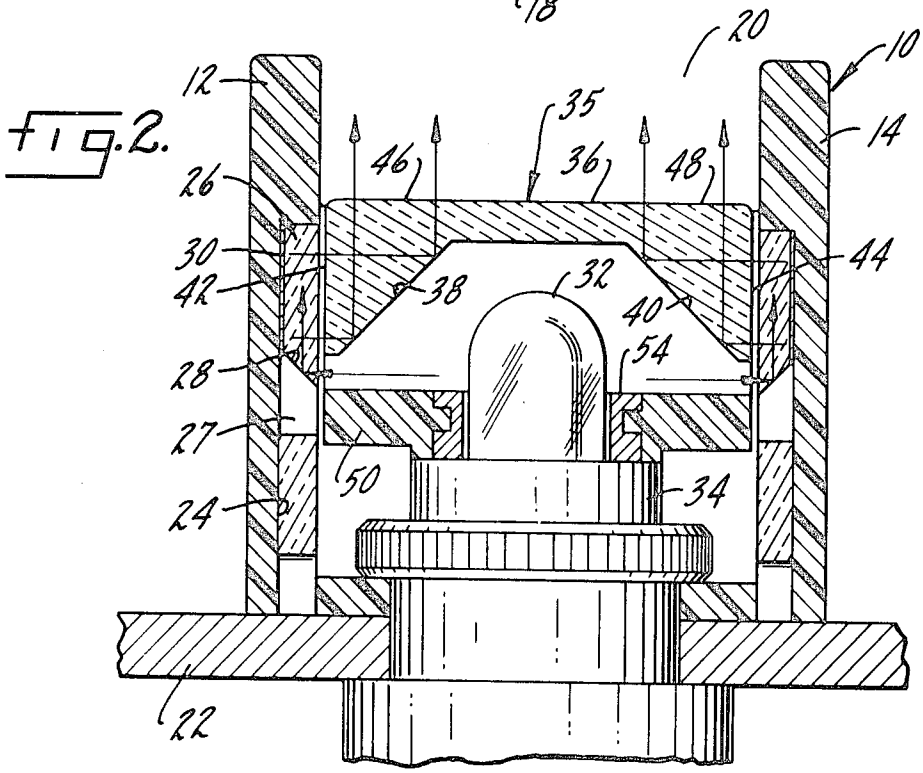


Fig. 2.

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DAY-NIGHT PRISM DISPLAY DEVICE

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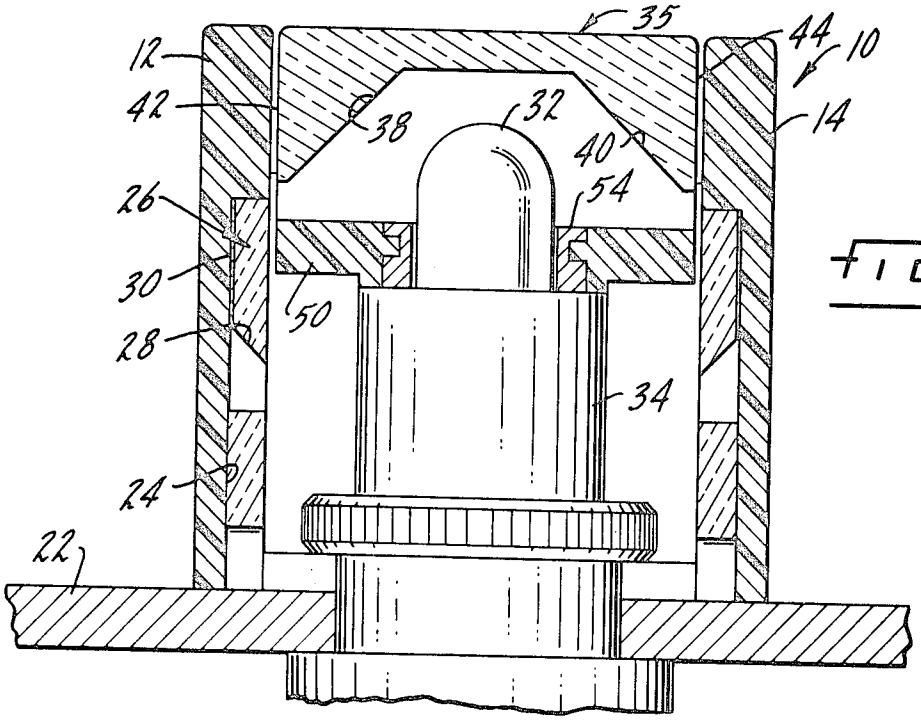


Fig. 3.

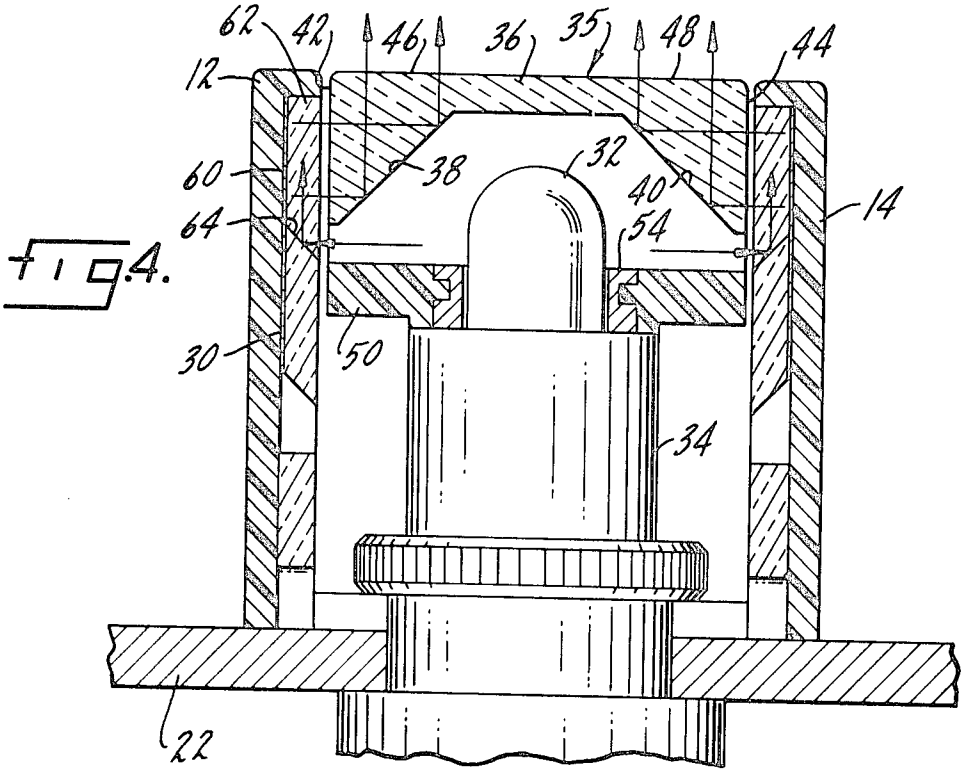


Fig. 4.

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DAY-NIGHT PRISM DISPLAY DEVICE

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U.S. Cl. 40—331 10 Claims

ABSTRACT OF THE DISCLOSURE

An indicating device including an open-ended outer housing with light producing means within the housing. A cap is axially movable within the housing and covers the light producing means. There are indicia bands along the inner sides of the housing and a reflecting surface adjacent each of the indicia bands for directing interior light to the indicia. The movable cap is transparent and includes prism areas. The indicia bands are illuminated both from the interior light source and from ambient light passing through the transparent cap. In one position of the cap the indicia bands will be visible at the exterior of the cap which is the image surface of the prism area. In the second position of the cap, in which it is positioned away from the indicia bands, there will be no indicia display at the cap outer surface.

SUMMARY OF THE INVENTION

The present invention relates to indicating devices and in particular to indicating devices utilizing a prism having an object surface, an image surface and a reflecting surface.

A primary purpose of the present invention is a prism type of indicating device in which indicia is illuminated both by interior light, for example from an electrical light source, and from exterior ambient light.

Another purpose is an indicating device of the type described in which indicia in the form of colored bands is utilized to indicate the position of a switch, solenoid or the like.

Another purpose is an indicating device of the type described in which different bands of indicia, illuminated both interiorly and exteriorly, are utilized to show the condition of an operating member.

Another purpose is an indicating device of the type described in which indicia in the form of a colored band is illuminated from an interior light source and from exterior ambient light, with the interior light being directed by a reflecting surface to the indicia band, and with the exterior ambient light being directed by a second reflecting surface to the indicia band.

Other purposes will appear in the ensuing specification, drawings and claims.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is illustrated diagrammatically in the following drawings wherein:

FIG. 1 is a top plan view of one form of indicating device described herein,

FIG. 2 is a section along plane 2—2 of FIG. 1,

FIG. 3 is a section, similar to FIG. 2, but showing the indicating device in a second position, and

FIG. 4 is a section, similar to FIG. 3, but showing a modified form of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The present invention utilizes prisms formed of a transparent material to provide an indication of the condition of a switch, solenoid or other electrical or mechanical operating device. Such prisms, which may be made of a

variety of transparent plastics, have an object surface, an image surface and a reflecting surface. The reflecting surface may be a highly polished surface formed of the transparent plastic material, or it may be silvered or otherwise made to have a high degree of reflection.

The structure shown in FIGS. 1, 2 and 3 includes an outer housing, indicated generally at **10**, formed of side walls **12**, **14**, **16** and **18**. The housing **10** has an open end **20** and the bottom of the housing may be closed by a plate or the like **22** which may, for example, be an instrument panel or the like.

The housing walls may preferably be formed of an opaque plastic material, or any other material which will not pass light. Walls **12** and **14** are identical and only one will be described in detail. Considering wall **12**, there is a groove indicated at **24** within which is mounted a reflector plate **26**. The reflector plate **26** has a longitudinal slot **27**, the upper surface of which is slanted, as at **28**, to form a reflecting surface. Indicia, in the form of a band of colored tape or the like indicated at **30**, may either be attached to the exterior wall of the reflector plate or to an interior wall of the groove **24**. In either event, the indicia **30** is so positioned that it is accessible to light coming in through the transparent reflector plate **26**.

Mounted within the housing **10** is a light **32** which is movable with a push-button switch plunger **34**. The push-button plunger **34** is in the "in" position in FIG. 2, and in the "out" position in FIG. 3.

A cap indicated generally at **35**, generally the same in size and shape as the opening **20** in the housing, is movable within the housing, generally on the housing axis. The cap has a transparent outer portion **36** with a pair of reflecting surfaces **38** and **40**. Reflecting surfaces **38** and **40** are part of a pair of prisms, having object surfaces **42** and **44** and image surfaces **46** and **48** which are co-planar with the exterior surface of the cap. The cap **35** may include an opaque plastic member **50** which extends about light **32** and is keyed to a sleeve **54**. The entire cap structure is movable with the push-button plunger **34**. Thus, movement of the cap in and out of the housing **10** will move the light **32** and the opaque member **50**.

When the cap structure is in the "in" position of FIG. 2, the indicia **30** is visible at the image surfaces **46** and **48**. Light from the light source **32** will be reflected by the reflecting surface **28** into the reflector plate **26**. Light will be diffused within the reflector plate **26** such that the indicia **30** will be illuminated. This illumination will be displayed by reflecting surfaces **38** and **40** at the image surfaces **46** and **48**. Ambient light will pass inwardly through transparent cap **36** to the reflecting surfaces **38** and **40** and will also illuminate the indicia **30**. Thus in daytime, or in a lighted area situation, the primary illumination of the indicia **30**, to give an indication of switch position, will be from ambient light. In nighttime, or in a darkened area, the same indicia can be illuminated by the light **32**, which will be on at all times, but will be the primary source of light in the dark.

In the "out" position of the cap **35**, shown in FIG. 3, there can be no ambient light directed to the indicia **30** since it will be reflected onto walls **12** and **14** by surfaces **38** and **40**. No illumination from the light **32** will reach the indicia **30** as it will also be blocked by the opaque member **50**. Thus, in only one position of the cap **35** will the indicia **30** be illuminated. In order for there to be a display of the indicia **30** at the surface of the cap, the reflecting surfaces **38** and **40** forming a part of the two prisms in the cap must be positioned opposite the indicia.

The center section of the cap **36**, illustrated particularly in FIG. 1, may be used for a suitable legend. Three triangles, indicated at **56**, are illustrated in FIG. 1, but this is obviously merely an example of one possible type of legend display. The legend will always be visible because

of the light **32**, however, indicia will only be displayed in the structure of FIGS. 1, 2 and 3 when the cap is in the "in" position.

The structure of FIG. 4 is substantially the same, except that there are a pair of indicia bands. The second indicia bands are indicated at **60**. There is a second reflector plate **62** having a slanted reflecting surface **64**. In the structure of FIG. 4, when the cap is in the "out" position, there will be an indicia display at the surface of the cap. In one practical use of the invention, one color band may form indicia **30** and a second color band form indicia **60**. In this way one color can indicate an "on" or an in position of the cap, with the other color indicating an "off" or out position of the cap.

As disclosed herein, the light moves with the cap. In some practical applications both the light and cap may be stationary and the indicia may move.

Although the housing structure is shown as generally rectangular, obviously the invention should not be so limited. The housing structure may be a cylinder, in which case the indicia bands could extend all the way around or only partially around the cylinder. Other cross sectional configurations are equally satisfactory. There may be indicia only along one side of the housing instead of on both sides. In other applications, all four sides of the housing may include indicia bands and thus the cap would have an equal number of prisms.

Whereas the preferred form of the invention has been shown and described herein, it should be realized that there may be many modifications, alterations and substitutions thereto.

We claim:

1. In an indicating device, an open-ended outer housing, light producing means within the housing, a cap axially movable within the housing and having substantially the size and shape of the housing open end, a reflecting surface on said cap,

indicia positioned along an inner surface of said housing and adjaecnt the path of movement of said cap, a reflecting surface in said housing adjacent said indicia and positioned to direct light from said light producing means toward said indicia,

said cap being movable between at least two positions, in one of which said cap reflecting surface is adjacent said indicia whereby an outer surface of said cap displays said indicia, said indicia being illuminated by said light producing means and by such light as passes inwardly through said cap.

2. The structure of claim **1** further characterized in that said light producing means is movable with said cap.

3. The structure of claim **1** further characterized in that said cap has a transparent portion.

4. The structure of claim **1** further characterized in that said cap reflecting surface is part of a prism having an object surface and an image surface, with the image surface being generally co-planar with an outer surface of the cap, said object surface being positioned adjacent said indicia in said one cap position.

5. The structure of claim **1** further characterized in that said indicia is in the form of a band of color embedded within said housing and directly adjacent said housing reflecting surface.

6. The structure of claim **1** further characterized in that said cap is transparent, said light producing means being located generally centrally of said housing, and means for blocking light about said light producing means, and positioned to prevent light from the indicia area reaching the cap reflecting surface when the cap is positioned away from said indicia.

7. The structure of claim **1** further characterized in that said housing has a plurality of sides, a band of indicia along at least two sides of said housing, with there being a housing reflecting surface for each band of indicia.

8. The structure of claim **1** further characterized by and including second indicia positioned along the path of movement of the cap and spaced from said first indicia, a second housing reflecting surface adjacent said second indicia, said cap having two positions, in one position said cap reflecting surface being adjacent said first indicia, and in the second position said cap being adjacent said second indicia.

9. The structure of claim **8** further characterized in that said first indicia and said second indicia are different.

10. The structure of claim **8** further characterized in that said light producing means is movable with said cap.

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U.S. Cl. X.R.

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