

Aug. 28, 1951

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2,566,026

BACK ILLUMINATION DEVICE FOR TRANSLUCENT INDICATORS

Filed Nov. 26, 1945

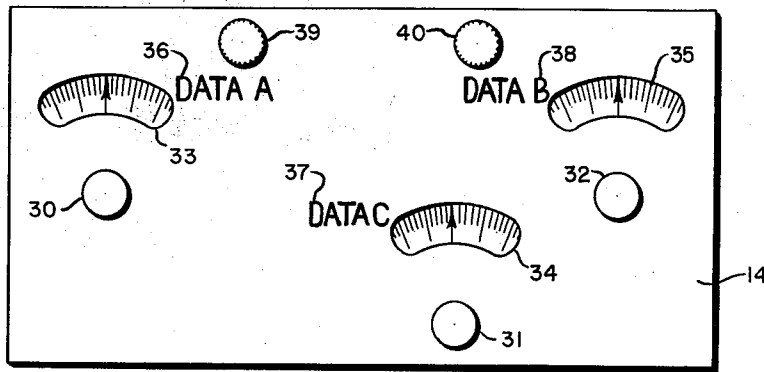


FIG. 1

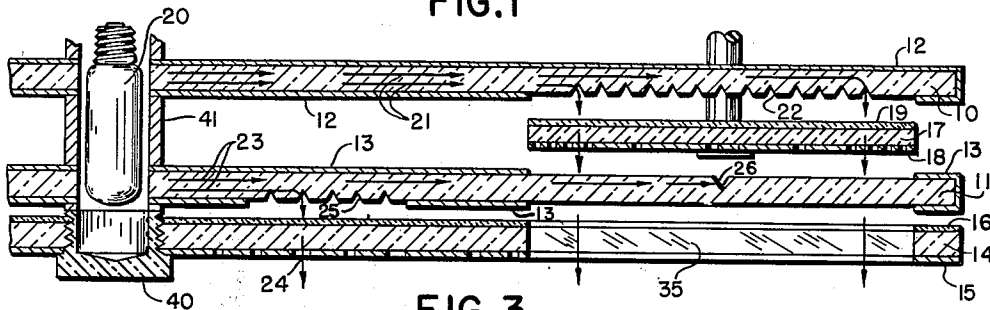


FIG. 3

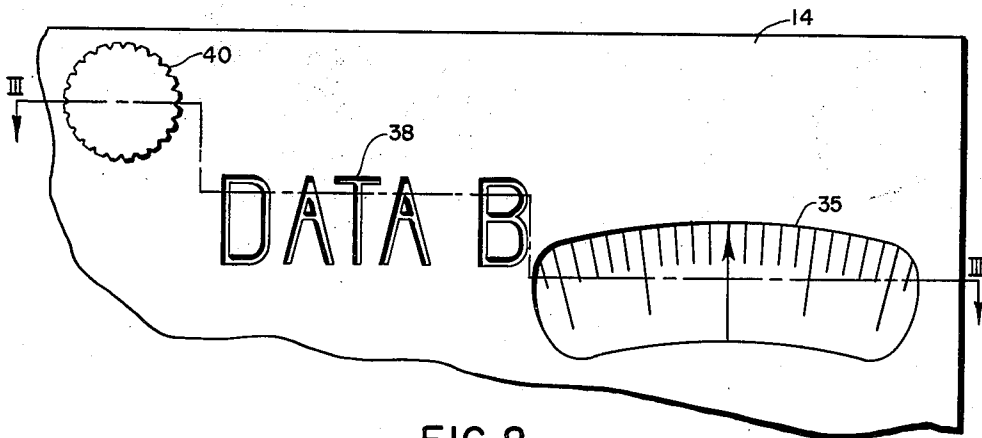


FIG. 2

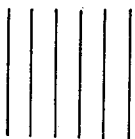


FIG. 4

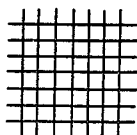


FIG. 5

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2,566,026

BACK ILLUMINATION DEVICE FOR
TRANSLUCENT INDICATORS

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Application November 26, 1945, Serial No. 630,945

7 Claims. (Cl. 116—129)

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This invention relates to illuminating devices, and more particularly to an illuminating device comprising coated panels of transparent materials so disposed and lighted as to release illumination at desired spots.

Heretofore the methods of producing illumination on certain portions of large surfaces, such as panels on airborne equipment have involved the use of a considerable number of lamps. Usually such systems used a separate lamp for each dial or illuminated area and if a lamp burned-out, considerable time was necessary before that particular lamp could be replaced and normal illumination restored. In the case of an aircraft in flight, such a delay could be serious.

Other systems involved the use of plastic rods, through which light was "piped" and released at desired spots from the ends of the rods. This method involved a complicated physical structure where there were a number of areas to be illuminated, since a separate rod was needed for each illuminated spot.

The general object of the present invention is to overcome the foregoing difficulties.

Another object of the present invention is to provide a panel, illuminated at desired spots throughout its surface by one or two lamps so located as to be easily accessible.

An additional object is to provide approximately equal intensities of illumination at spots on a panel which are at different distances from a single source of illumination.

A further object is to minimize the drain caused on the system power supply for illuminating a panel.

A still further object is to provide an illuminated panel, the indicia of which are back illuminated by light of some color easy on the eyes of the observer.

These and other objects will be apparent from the following specification when taken with the accompanying drawings, in which:

Fig. 1 is a front view of a representative embodiment of the invention;

Fig. 2 is an enlarged view of a portion of the front panel illustrated in Fig. 1;

Fig. 3 is a section taken in the plane of line 3—3 of Fig. 2; and

Figs. 4 and 5 are explanatory of a detail of the invention.

The invention is here shown applied to a control panel for apparatus, such as airborne radar apparatus. In Fig. 1, a panel 14 carries control handles 30, 31, and 32. These handles control dials having indicia visible through windows 33, 34 and 35, respectively. The kind of data indicated by the dials is given in illuminated letters at 36, 37 and 38, respectively. All these parts may be illuminated from a single lamp, but for safety 5 two lamps are employed, which in this case are located behind covers 39 and 40.

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A portion of panel 14 is shown to enlarged scale in Fig. 2. A section through this is shown in Fig. 3.

Referring to Fig. 3, the cross section of three collaterally disposed panels is shown, panels 10 and 11 being transparent plastic having metal, in this case silver, coating 12 and 13 respectively, on sides and edges, and panel 14 being translucent plastic having an opaque film 15 on the face and a colored translucent film 16 on the back. A dial 17 is disposed between panels 10 and 11 and is composed of translucent plastic having an opaque film 18 on the face and a colored translucent film 19 on the back. A lamp 20 is placed in aligned holes in the two panels 10 and 11, preferably within a metal cylinder 41, said cylinder being cut away at the inner periphery of the holes in panels 10 and 11 so that light beams from the lamp can enter the panels. Light beams are reflected back and forth in panel 10 between the inner surfaces of the silver coatings 12, and in panel 11 between the inner surfaces of coatings 13, and light becomes distributed within the panels in intensities dependent on the distance from the lamp. This distributed light is used to illuminate various indicia as will be hereinafter described.

Light beams 21 traveling within panel 10 are released at interruptions in the silver coating 12 opposite dial 17. The surface is preferably scored or scratched, as indicated at 22, and the light is released with an intensity dependent on the number and depth of the scratches. These light beams 21 pass through the colored film 19 and translucent plastic of dial 17, and illuminate in color the indicia on the face of dial 17, where the opaque coating 18 is cut away or engraved. The silver coating 13 is interrupted on both sides of panel 11 at this spot, and the panel 14 is completely cut away at this spot, thus forming the window 35 through which dial 17 and its indicia are observed. Panel 11 at this spot forms in addition a dust cover and protector for dial 17.

Light beams 23 traveling within panel 11 are released opposite the indicia 24 forming "data B" in an intensity dependent on the number and depth of scratches 25.

Fig. 4 and Fig. 5 illustrate two forms the scratches may take, the form in Fig. 4 being used to illuminate indicia relatively close to a lamp,

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such as those associated with dial 35 in Fig. 1, and the form in Fig. 5 being used to illuminate indicia farther away from a lamp, such as those associated with dial 34 in Fig. 1. The same applies to the scratches behind the windows 33, 34, and 35, there being more scratches for window 34 than for window 35.

Referring to Figs. 1 and 3, the light beams pass through the colored film 16 and panel 14 and illuminate in color the indicia engraved in the opaque film 15 on the face of panel 14. The light beams 23 in panel 11 also escape at a fiducial line 26 scratched in the rear surface of panel 11 opposite dial 17.

In one particular case the panels 10 and 11 were made of a material known commercially as "Plexiglas" and in another case of "Lucite."

The dial 17 and panel 14 were made of a laminated plastic material known commercially as "Lamicaid."

This illuminating device solves many of the problems heretofore associated with the lighting of aircraft instrument panels and associated airborne equipment. By using only two lamps to light a large panel having many indicia, a saving in power is effected. Also, if one lamp burns out, there is still enough illumination to read all the panel indicia, and the diminution of intensity warns that a lamp should be replaced. Protection is also given the dials and indicators from dust and damage. The indicia are observed in red light which is the best way of avoiding the temporary blindness caused by looking at too bright an indicator, and by varying the number and depth of the scratches where light is released, any desired intensity of illumination is had for each particular indicator.

By mounting the lamps behind readily removable caps 39 and 40 at the front of the panel, a burned out lamp may be replaced from the front. Even better, a modern type of lamp may be used in which the lamp and cap are integral, and are replaced as a unit.

The invention described in the foregoing specification need not be limited to the details shown, which are considered to be merely illustrative of one form the invention may take.

What is claimed is:

1. An illuminated indicator device comprising first and second panels of transparent material, each panel being metal coated on both faces and edges, said panels being collaterally disposed and having aligned lamp holes, a lamp in said holes, the edge coating being interrupted in said holes, a dial of translucent plastic between said panels, said dial having an opaque film engraved with indicia, the coating on the front of said first panel being interrupted at said dial, the coating of said second panel being interrupted on both sides at said dial, a third panel in front of the aforesaid panels, said third panel being made of translucent plastic having a translucent colored film on the back and an opaque film on the face, said third panel having indicia engraved out of the opaque film, and the coating of said second panel being interrupted behind said indicia.

2. An illuminated indicator device comprising first and second collateral panels of transparent material having a metallic coating on both faces and edges, a lamp at an edge of said panels, the edge coating being interrupted where said lamp is located, a movable dial of translucent material located intermediate said panels, said dial having an opaque film on the face engraved with indicia, the coating and surface of said first panel being

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interrupted at said dial, the coating of said second panel being interrupted on both sides at said dial and its surface engraved to provide a reference marker, said indicia on said movable dial being illuminated by light beams released from the interruptions in the coating of said first panel.

3. An illuminated indicator device comprising first and second panels of transparent material, each panel being metallic coated on both faces and edges, said panels being collaterally disposed and having aligned lamp holes, a lamp in said holes, the edge coating being interrupted in said holes, a dial of translucent plastic between said panels, said dial having an opaque film engraved with indicia, the coating on the front of said first panel being interrupted at said dial, the coating of said second panel being interrupted on both sides at said dial, a third panel in front of the aforesaid panels, said third panel being made of translucent plastic having a translucent colored film on the back and an opaque film on the face, said third panel having indicia engraved out of the opaque film, the coating of said second panel being interrupted behind the indicia of said third panel, and means located in said third panel for exposing said lamp holes in said first and second panels whereby said lamp may be removed from the front face of said indicator device.

4. An illuminated indicator device comprising first and second collateral panels of transparent material having a metallic coating on both faces and edges, a lamp at an edge of said panels, the edge coating being interrupted where said lamp is located, a movable dial of translucent material located intermediate said panels, said dial having an opaque film on the face engraved with indicia, the coating and surface of said first panel being interrupted at said dial, the coating of said second panel being interrupted on both sides at said dial and its surface engraved to provide a reference marker, said indicia on said movable dial being illuminated by light beams released from the interruptions in the coating of said first panel, a third panel of similar material mounted in front of the aforesaid panels and having a translucent colored film on the back and an opaque film bearing appropriate engraved indicia on the face, and the coating of said second panel being interrupted behind said indicia.

5. An illuminated indicator device comprising first and second panels of transparent material, each panel being metal coated on both faces and edges, said panels being collaterally disposed and having aligned lamp holes, a lamp in said holes, the edge coating being interrupted in said holes, a dial of translucent plastic between said panels, said dial having an opaque film engraved with indicia, the coating on the front of said first panel being interrupted at said dial, the coating of said second panel being interrupted on both sides at said dial, a third panel in front of the aforesaid panels, said third panel being made of translucent plastic having a translucent colored film on the back and an opaque film on the face, said third panel having indicia engraved out of the opaque film, the coating of said second panel being interrupted behind said indicia, said third panel having an opening formed therein for the observation of said dial.

6. An illuminated indicator device comprising first and second panels of transparent material, each panel being metallic coated on both faces and edges, said panels being collaterally disposed and having aligned lamp holes, a lamp in

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said holes, the edge coating being interrupted in said holes, a dial of translucent plastic between said panels, said dial having an opaque film engraved with indicia, the coating on the front of said first panel being interrupted at said dial, the coating of said second panel being interrupted on both sides at said dial, a third panel in front of the aforesaid panels, said third panel being made of translucent plastic having a translucent colored film on the back and an opaque film on the face, said third panel having indicia engraved out of the opaque film, the coating of said second panel being interrupted behind the indicia of said third panel, and means located in said third panel for exposing said lamp holes in said first and second panels whereby said lamp may be removed from the front face of said indicator device, said third panel having an opening formed therein for the observation of said dial.

7. An illuminated indicator device comprising first and second collateral panels of transparent material having a metallic coating on both faces and edges, a lamp at an edge of said panels, the edge coating being interrupted where said lamp is located, a movable dial of translucent material located intermediate said panels, said dial having an opaque film on the face engraved with indicia, the coating and surface of said first panel being interrupted at said dial, the coating of said

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second panel being interrupted on both sides at said dial and its surface engraved to provide a reference marker, said indicia on said movable dial being illuminated by light beams released from the interruptions in the coating of said first panel, and a third panel of similar material mounted in front of the aforesaid panels and having a translucent colored film on the back and an opaque film bearing appropriate engraved indicia on the face, and the coating of said second panel being interrupted behind said indicia, said third panel having an opening formed therein for the observation of said dial.

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