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Pulles

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[54] EDGE-LIGHTED PANEL ARRANGEMENT

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[52] **U.S. Cl.** ..... **240/1 EL**; 240/2.1; 350/96 R
[51] **Int. Cl.** **F21**
[58] **Field of Search** ..... 240/1 EL, 2.1, 6.43, 2.17; 350/96 R

[56] **References Cited**
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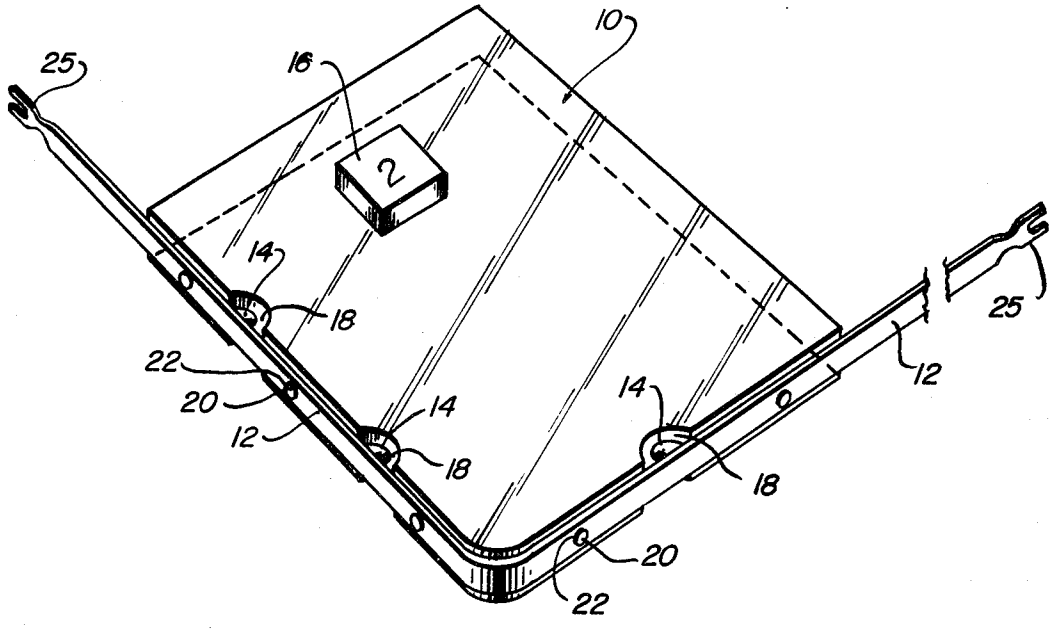
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Primary Examiner—Richard L. Moses
Attorney, Agent, or Firm—Robert J. Black

[57] **ABSTRACT**

An edge-lighted panel having a number of light sources coupled to a length of flexible wiring which is arranged to be removably affixed about the peripheral edge of the panel, with the light sources disposed within light receiving cavities in the marginal portion of the panel.

7 Claims, 3 Drawing Figures



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OR IN 240/1EL

FIG. 1

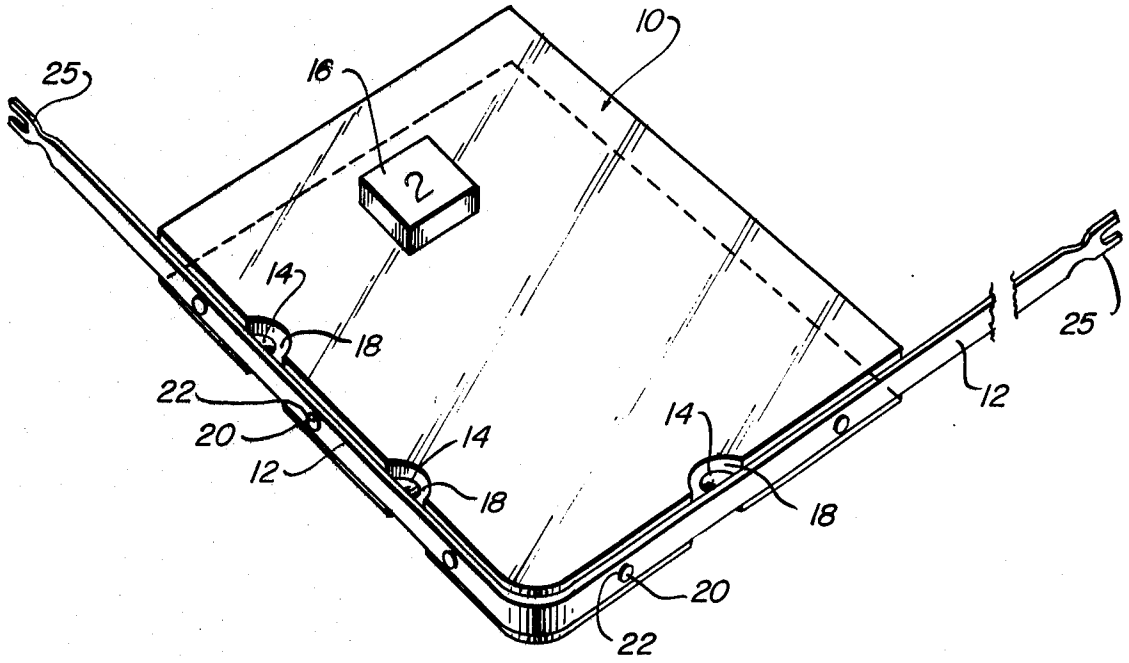


FIG. 2

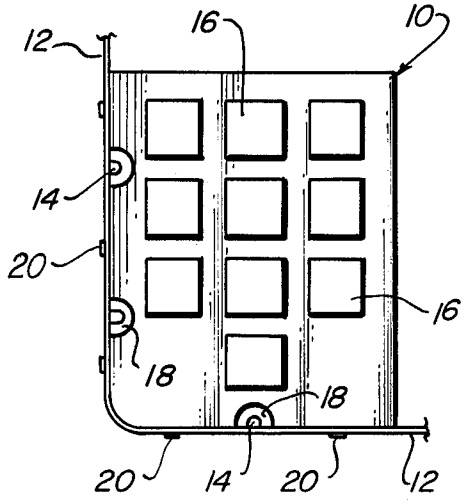
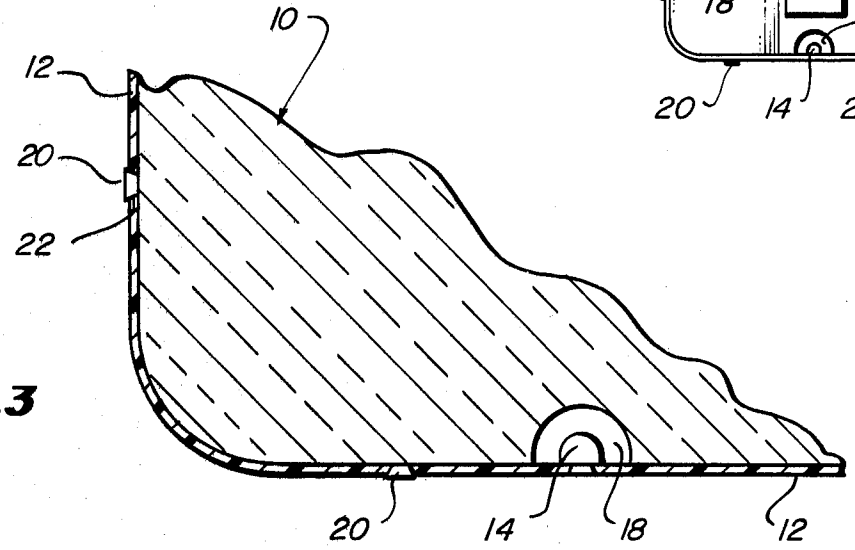


FIG. 3



EDGE-LIGHTED PANEL ARRANGEMENT

This invention relates to an improvement in edge-lighted panels.

Edge-lighting has been used for illuminating instrument dials, panels, plotting boards for shipboard and aircraft as well as other similar purposes. The illumination of such devices generally is by means of one or more light sources located at the edge of a transparent panel and light rays introduced into the panel for trans-illumination thereof and indirect illumination thereby. Various arrangements for edge-lighting various types of panels are disclosed in U.S. Pat. Nos. 3,027,669; 3,070,913; and 3,356,839. The edge-lighting in these prior disclosures are attached to the panels by means of frame members adapted to support therein a number of lamps or by means of light sockets affixed in some suitable fashion to the panel.

In accordance with the present invention, a convenient, low-cost method of lighting a panel using contemporary components and techniques is provided. A piece of flexible wiring or circuit snaps onto the panel to be lit, and the terminals form an integral part of the flexible wiring strip. Light emitting diodes are mounted on the flexible wiring and fit within recesses formed in the panel.

Accordingly, it is an object of the present invention to provide a convenient, low-cost method of edge-lighting a panel.

The invention, together with the above and other objects and advantages thereof, is set forth in more detail in the following description when considered in connection with the accompanying drawings wherein like reference numerals designate like parts throughout the several views thereof, and wherein:

FIG. 1 is a perspective view of an edge-lighted panel exemplary of the invention;

FIG. 2 is a top plan view of the edge-lighted panel of FIG. 1; and

FIG. 3 is an enlarged view generally illustrating the snap-on feature of the flexible wiring.

Referring now to the drawing, a panel or light transmitting member **10** made of glass or a highly transparent plastic is edge-lighted by a length of flexible wiring or circuit **12** having light emitting diodes **14** mounted thereon which is removably secured about the peripheral edge of the panel. In the illustrated embodiment, the panel **10** may form a part of a lighted touch calling telephone, and functions to illuminate a push button, such as the push button **16.**

The panel or light transmitting member **10** comprises a relatively flat, highly transparent plate, having its front and back surfaces in parallel relation to each other and preferably polished to provide smooth optical surfaces. It is preferably fabricated from an acrylic resin or methyl methacrylate plastic material of the thermal plastic type such as, for example, commercial "Plexiglas" or "Lucite." The bottom surface of the panel or light transmitting member **10** preferably is made reflective, by some suitable means, such as a coating with mirror silver. The coating should be opaque so that no light escapes from the bottom surface of the panel, and all is reflected upwardly. The upper surface should be formed to be translucent and diffusing, and non-transparent, so as to minimize spots of excessive brilliance and achieve a softly diffused pool of light over the upper surface. A number of recessed cavities **18** which may be semi-circular in shape as illustrated are formed in spaced relationship about the peripheral edge of the panel **10** and, with the exception of these cavities, the edges of the panel **10** are sandblasted or painted to make them opaque so that no light escapes.

A length of flat flexible wiring or circuit which may be, for example, a length of flat flexible plastic material having an electrical conductor or conductors imbedded therein has a number of light emitting diodes **14** affixed to it and electrically coupled with the conductor or conductors so as to be energized when the flexible wiring or circuit is connected to an appropriate power source (not shown). The light emitting diodes **14** are positioned on the flexible wiring or circuit **12** to fit within the cavities **18** in the edge of the panel **10,** when the flexible wiring or circuit **12** is affixed to the panel, as described more fully below.

The flexible wiring or circuit **12** preferably is removably affixed to the panel **10,** and this can be accomplished in various different manners, using snap-fasteners or the like. A preferred manner of doing so, because of its simplicity and inexpensiveness is to form a number of projections **20** on the peripheral edge of the panel **10,** and to provide the flexible wiring or circuit with a number of openings **22** which are formed and positioned to receive therethrough these projections **20.** The shape of the projections **20** and the openings **22** in the flexible wiring or circuit may vary, but preferably both are shaped and proportioned to provide a snap-on feature.

For the purpose of establishing a connection with the power source (not shown) the flexible wiring or circuit can have a terminal **25** on each of its opposite ends, as illustrated, or two terminals can be provided on one end thereof.

From the above description of the edge lighted panel arrangement, it can be seen that the flexible wiring or circuit **12** can be easily and quickly affixed to the panel **10,** simply by snap-fitting the projections **20** on the edge of the panel through the openings **22** in the flexible wiring or circuit. By properly positioning these projections and the openings, as well as the light emitting diodes **14** thereon, the light emitting diodes will be disposed within the cavities **18** formed in the edge of the panel **10.** Thereafter, the terminals **25** on the end or ends of the flexible wiring or circuit is connected to the power source to energize the light emitting diodes. The lighting can be easily and quickly removed and replaced, simply by removing the flexible wiring or circuit and snap-fitting a new length of it onto the panel **10** in the manner described.

It will thus be seen that the objects set forth above, among those made apparent from the preceding description, are efficiently attained and certain changes may be made in carrying out the above method and in the constructions set forth. Accordingly, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

Now that the invention has been described, what is claimed as new and desired to be secured by letters Patent is:

1. In combination, a transparent light-transmitting panel having front and rear surfaces arranged for specular reflection of light therebetween and a marginal portion for receiving light, said marginal portion being

provided with a plurality of spaced openings for receiving light sources and with a plurality of spaced fastening means, a length of flexible material carrying electrical conductor means and having a plurality of complimentary fastener means for fastening with the fastening means on said marginal portion of said panel, a plurality of light sources carried by said length of flexible material and electrically connected with said electrical conductor means so as to be energized when said electrical conductor means is connected to a source of power, said length of flexible material being affixed about said marginal portion of said panel by mating together said fastening means, said plurality of light sources being positioned on said length of flexible material so as to be disposed within said spaced openings when said flexible material is affixed to said panel, whereby edge-lighting for said panel can be provided simply by affixing said flexible material to said panel and coupling the electrical conductor means to a source of power.

2. The combination of claim 1, wherein said fastening means on said panel comprises a plurality of projections and wherein said fastening means on said flexible material comprises a plurality of openings in said flexible material proportioned to receive said projections to permit said flexible material to be affixed to said panel.

3. The combination of claim 1, wherein said flexible material has connector means on one end thereof for coupling said electrical conductor means to a source of power.

4. The combination of claim 1, wherein said flexible material has connector means on each of the opposite ends thereof for coupling said electrical conductor means to a source of power.

5. The combination of claim 1, wherein said plurality of light sources comprise light emitting diodes.

6. The combination of claim 1, wherein said length of flexible material is a plastic material having said electrical conductor means imbedded therein.

7. The combination of claim 1, wherein said length of flexible material is a plastic material having a metallic conductor deposited thereon to provide said electrical conductor means.

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