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EDGE LIGHTED DISPLAY

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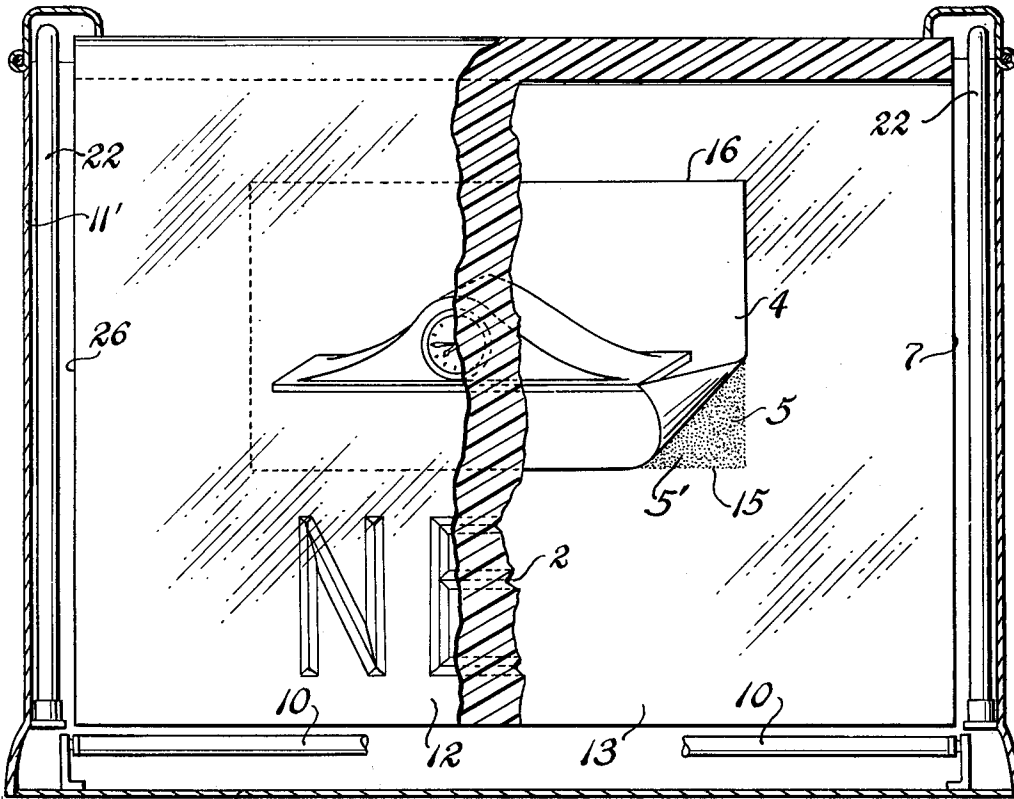


Fig. 2.

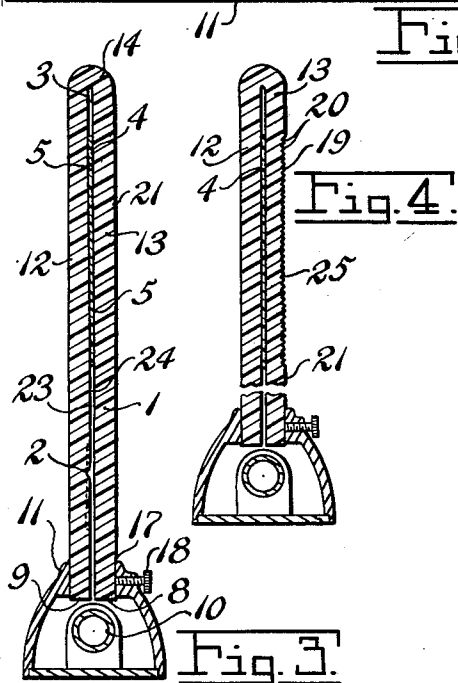


Fig. 4.

Fig. 3.

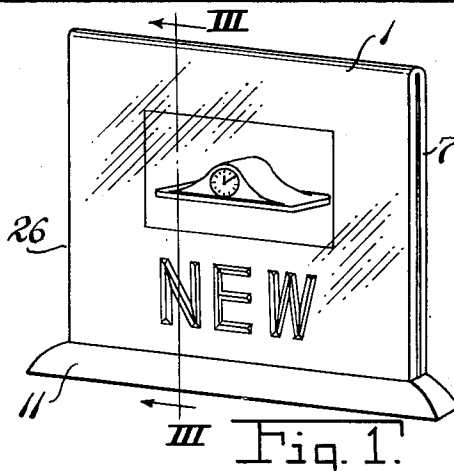


Fig. 1.

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EDGE LIGHTED DISPLAY

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4 Claims. (Cl. 40—130)

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This invention relates to illuminated signs or displays and more particularly to edge illuminated signs or displays.

An object of this invention is the production of illuminable signs, advertising and display structures characterized by novelty and simplicity of construction.

Another object is to overcome the shadow effect of large light-releasing areas in edge illuminable signs, advertising and display structures.

Another object is to provide a structure in which matter to be displayed, such as a full color photographic transparency, may be illuminably displayed and protected from exposure to the atmosphere.

A further object is the provision of illuminable sign, advertising and display structures in which matter displayed may be easily changed by one unskilled in the sign art.

These and other objects are attained by the means described herein and illustrated in the accompanying drawings, in which:

Figure 1 is a perspective view of an edge lighted sign embodying a form of the invention;

Fig. 2 is a front view in elevation of a modified form of edge lighted sign, embodying a plurality of sources of illumination for illuminating the sign from a plurality of edges, a part of the structure being broken away;

Fig. 3 is a view in section taken on line III—III of Figure 1; and

Fig. 4 is a view in section taken on a line corresponding to III—III of Figure 1 showing a still further modified form of the invention.

Edge-lighted signs and displays have had, in the past, one glaring defect in that whenever the illumination of a broad area was attempted, a shadow effect was experienced, the term shadow effect being used to describe the distribution of intensity of illumination, for example, the single light source will result in the highest intensity of illumination of a broad light releasing area nearest the light source and a rapid decrease in intensity of illumination as the distance from the same increases, for which reason edge-lighted signs have been rather limited to the use of narrow line-like illuminated areas, which practice avoided the shadow problem.

By means of our invention we have overcome the shadow defect of the prior art edge-lighted signs and displays, and have made it possible to uniformly illuminate relatively large areas, providing substantially uniform light intensity over the entire area illuminated.

In Figs. 1 and 3 we have illustrated a form of

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the invention in which the source of illumination is applied to only one edge of the sign. The sign comprises a folded sheet of material 1, such as glass or plastic, of the type sold to the trade under the trade-mark "Plexiglas" and "Lucite" these being methyl methacrylate resins. We prefer the "Plexiglas," "Lucite" type resins as sheets of these materials are relatively easy to work with. We form the folded sheet 1 from a flat sheet of the plastic material by bending along a median line over a straight edge such as a thin round wire or rod while the material is in a softened condition due to heat previously applied at the line of the fold 14. When so folded the sheets are then in the form of two substantially flat superposed panels 12 and 13 joined at the fold 14. The exterior surfaces of panels 12 and 13, and the fold 14 are in effect one continuous surface, and the interior surfaces thereof are also a continuous surface. The edges 8 and 9 of the panels are opposite the fold and edges 26 and 7 are adjacent the fold.

Upon the interiorly disposed surface prior to the folding operation, the following operations may be performed. The rear face 24 of the front panel 12 may have engraved therein numbers, letters or other characters such as indicated at 2, and on the front face 23 of the rear panel 13, a portion 5 may be roughened by sand-blasting, engraving, embossing, or other means, for bleeding light to illuminate matter such as a color transparency which may subsequently be placed thereover. Thus it may be seen that the major exteriorly disposed surface of the member is smooth and the roughened surfaces are upon the inwardly disposed major surface. The two panels 12 and 13 disposed to either side of the fold 14 lie in close spaced parallel relation to each other so that there is a space 3 between them. The synthetic resin is somewhat flexible and resilient when once it has cooled and hardened after the bending operation. This quality permits the two panels to be pulled into angularly spaced relation to each other in order to permit insertion of display matter, such as a color transparency 4, in a position overlying the frosted area 5, and after said transparency is positioned the panels may be permitted to close toward each other and resume their normal relation. In the normal relation the color transparency is clamped between the interiorly disposed faces of the panels of the element, a location in which the faces of the transparency will be protected in a fashion which will keep them substantially dust-free and protected from scratches and other injury.

It is understood that it is necessary to polish

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edges 7, 8 and 9 in order that the escape of light introduced through edges 8 and 9, as hereinafter described, will be minimized. A light source 10 which may be of the fluorescent, incandescent, or other satisfactory type, is located in base 11. A slot 17 in base 11 is adapted to receive the free edges of the panels 12 and 13 in close spaced parallel relation to the light source 10 so that light rays will be conducted away from the light source through the panels 12 and 13 of the plastic element 1. In the material, such as methyl methacrylate synthetic resin, the light loss is low and effective piping of the light rays is accomplished by such a structure. Any engraved surfaces such as 2 generated in the rear face of the panel 12 will reflect outwardly from the panel a portion of the light rays conducted there-through from the light source. One viewing such a sign will experience the well known phenomenon of apparent illumination of the engraved characters. These characters, however, do not begin to intercept all of the light being piped upwardly through the front panel 12. Light rays which pass the characters cut or engarvel in the rear face of this panel will reach the edge of the panel, opposite to the light source, whereat is disposed the bend 14. The high refractive characteristics of the materials mentioned before, are such that these light rays are refracted, reflected, or in other ways conveyed, conducted, guided, or piped around this bend from the upper edge of the front panel 12 downward into the upper portion of the rear panel 13 through which they will then travel. The light source also is disposed so as to result in the passage of light from source 10 through edge 8 of the rear panel and this light will flow upward through the rear panel 13. The forward face 23 of the rear panel 13 has a large frosted area 5, which, like the engraving 2 in front panel 12, will cause the refraction and reflection of light rays outward toward the viewer, causing the frosted surface 5 to appear to be illuminated much as a light source appears to be illuminated. The greatest intensity of illumination due to the light rays introduced through the edge 8 will be at the edge 15 of the frosted area nearest to the light source. The intensity of illumination due to light from edge 8 will gradually decrease as the distance from the light source increases. This gradual fading of light is referred to as shadow effect, the phenomenon which has precluded use of large areas of illumination in edge-lighted signs in the past. However, in and by our novel structure the light rays introduced through edge 9 will be conducted upwardly through the front panel 12 around the bend or fold 14, and down through the rear panel 13 will illuminate the frosted area 5 most intensely at the edge 16 and the intensity of illumination due to this stream of light rays will gradually decrease along their path toward 15. This dual application of light from opposed edges 15 and 16 of the frosted or light-bleeding area 5 gives a quite uniform illumination thereof. By placing matter such as a color transparency 4, containing information or illustrations which are desired to be displayed, over this frosted area 5, it is possible to accomplish even illumination thereof. This structure permits a compact, aesthetically pleasing sign which is not bulky as would be necessary in the case where a light source was enclosed in a housing to the rear of the transparency. The resulting sign is much more desirable commercially as a result of this compactness.

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As will be noted in Fig. 3, the display element edges 8 and 9 inserted in slot 17 are clamped therein by means of set screws such as 13. While the engraved material 2 on the rear face of panel 12 is not readily changeable, the transparency is, and the clamping of the transparency may be accomplished as before described, by virtually anyone, skilled or unskilled.

By using the engraved legend 2 for permanent matter such as trade-names, trade-marks or other marks, and slogans, and the color transparency for the matter to be changed from time to time, illuminated color displays may be accomplished artistically with relative economy, simplicity, and convenience.

In Fig. 4 we have shown a modification of the folded plastic member 1 which adds to the intensity of illumination of the transparency 4. The frosted area 5 is supplemented by a roughened area 19 on the exteriorly disposed face of the rear panel 13. Roughening may be accomplished by engraving, V-shaped grooves, by sand-blasting, by embossing, or other means. In the event that horizontal V-shaped grooves, as shown at 25 in Fig. 4, are cut in the rear face of the rear panel 13 in back of the area 5, the frosted area on the front face of said panel 13, we prefer that the grooves 25 be parallel to the light source for the sign. The surfaces 20 of the engraved grooves 25 may be made reflective by silvering or other similar treatment of the roughened area 19 of the rear or exterior face 21 of the rear panel 13, so that the light will be reflected through the transparency 4 instead of bleeding outwardly through roughened surface area 19. This series of horizontal grooves with a silvered or similar backing, will cause more light to pass outwardly through area 5 than will a smooth face or surface, as shown at 21 in Fig. 3. The result achieved by the engraved grooves may also be accomplished by brushing, rough grinding, die cutting, embossing, or otherwise roughening the surface. Treatment of the roughened surface portions of the rear panel may be modified in that the roughening thereof may be varied in degree in various portions of the roughened area 19, or areas 5 and 19. An example of such variation is shown at 5' in Fig. 2 where sand blasting has produced fewer pits per unit area of surface. This may be done in order that the illumination of area 5 may be corrected to an even or flatter illumination intensity, or for the purpose of producing uneven illumination of portions of the roughened area 5. It is to be understood that in the event that the operation is performed to accomplish high-lighting it also may be simultaneously used to flatten out high-lighting in other portions of the roughened area, as desired.

The above described modifications may be used together in numerous ways, for example, the grooves 25 in the rear face of the panel 13 may be vertical in a sign which is illuminated from the edges 7, 8, 9, and 26, the light received from the lateral edges 7 and 26 being used as the primary source of illumination acting upon the grooves 25 in the rear face of panel 13. When grooves are used their greatest effectiveness is realized, when they extend parallel to the light source and perpendicular to the path of the light rays. In this modification the primary light source illuminating the vertical grooves would be source 22 shown in Fig. 2, and said source may be variable in intensity.

The structure shown in Fig. 2 would be mounted in a suitable frame such as 11' enclosing the

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bottom and vertical edges 7, 8, 9 and 26 of the display member, the light sources being housed therein in a manner similar to that shown in Fig. 3. The referred to light sources would be such as shown in Fig. 2 identified by the characters 10 and 22, the latter being in close, substantially parallel relation to the lateral edges of the resin element. Sources 22 and 10 may be used either alone or in conjunction with the other indicated source or sources. As previously explained herein, the fold 14 will conduct light from the front panel 12 into the top edge of the rear panel 13 to accomplish the reinforcing illumination feature. Simultaneously, additional light may be introduced through the lateral edges from sources such as 22. The light sources 22 may be of incandescent, fluorescent, or any other type of light-producing means.

In the foregoing detailed description and the drawing, a sign has been described and illustrated which may be an advertising sign or the like, but it is to be understood that other forms of signs and displays of various sorts may be constructed in accordance with this invention and the invention is not intended to be limited by the foregoing detailed description and the drawing except as set forth in the appended claims.

Therefore, what we claim as new and desire to secure by Letters Patent is:

1. A sign which comprises a U-shaped main member of resilient transparent light piping material having two panels connected by a return bend, the radius of said return bend being sufficiently great that light entering the edge of one of said panels remote from the return bend is piped around said bend, said panels being urged into face-to-face engagement by the resilience of the return bend, means for illuminating the edges of the panels remote from the bend, and a roughened surface on the inner opposed face of one of said panels illuminated by the light entering said edge of said one of the panels and by the light piped around the return bend from said edge of the other panel, the panels being adapted to urge their opposed faces to engage in face-to-face abutment, a transparency held therebetween, whereby the transparency is illuminated by the light at the roughened surface.

2. A sign which comprises a U-shaped main member of resilient transparent light piping material having two panels connected by a return bend, the radius of said return bend being sufficiently great that light entering the edge of one of said panels remote from the return bend is piped around said bend, said panels being urged into face-to-face engagement by the resilience of the return bend, means for illuminating the edges of the panels remote from the bend, a roughened surface on the inner opposed face of one of said panels illuminated by the light entering said edge of said one of the panels and by the light piped around the return bend from said edge of the other panel, and a reflective surface on the outside face of said first mentioned panel opposite the roughened surface to reflect light bled outwardly by said roughened surface back to said

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roughened surface to reinforce the lighting thereof, the panels being adapted to urge their opposed faces to engage in face-to-face abutment, a transparency held therebetween, whereby the transparency is illuminated by the light at the roughened surface.

3. A sign which comprises a U-shaped main member of resilient transparent light piping material having two panels connected by a return bend, the radius of said return bend being sufficiently great that light entering the edge of one of said panels remote from the return bend is piped around said bend, said panels being urged into face-to-face engagement by the resilience of the return bend, means for illuminating the edges of the panels remote from the bend, and a roughened surface on the inner opposed face of one of said panels illuminated by the light entering said edge of said one of the panels and by the light piped around the return bend from said edge of the other panel, the outside face of said first mentioned panel having a plurality of grooves parallel to the light receiving edges of the panels for reflecting light toward the roughened face to reinforce the illumination thereof, the panels being adapted to urge their opposed faces to engage in face-to-face abutment, a transparency held therebetween, whereby the transparency is illuminated by the light at the roughened surface.

4. A sign which comprises a U-shaped main member of resilient transparent light piping material having two panels connected by a return bend, the radius of said return bend being sufficiently great that light entering the edge of one of said panels remote from the return bend is piped around said bend, said panels being urged into face-to-face engagement by the resilience of the return bend, means for illuminating the edges of the panels remote from the bend, a roughened surface on the inner opposed face of one of said panels illuminated by the light entering said edge of said one of the panels and by the light piped around the return bend from said edge of the other panel, and means for illuminating the lateral edges of said panels to provide supplemental illumination of said roughened surface, the panels being adapted to urge their opposed faces to engage in face-to-face abutment, a transparency held therebetween, whereby the transparency is illuminated by the light at the roughened surface.

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