

July 9, 1963

E. E. MAGNUSON ET AL
MULTIPLE-LEVEL LIGHT-REFLECTIVE SIGN

3,096,596

Filed Jan. 20, 1958

FIG. 1

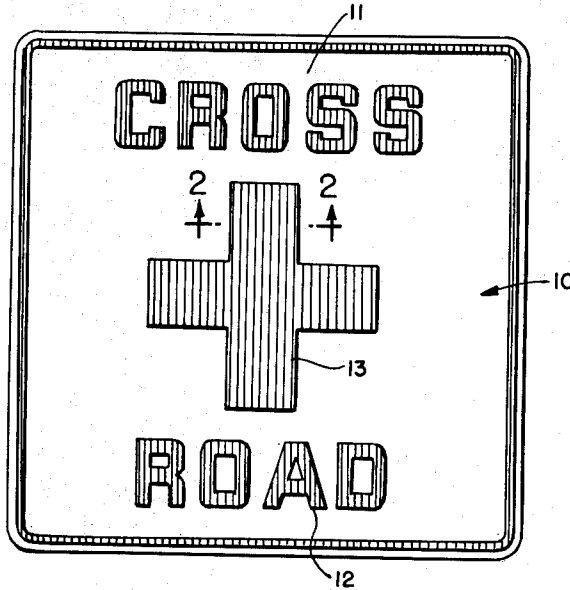


FIG. 2

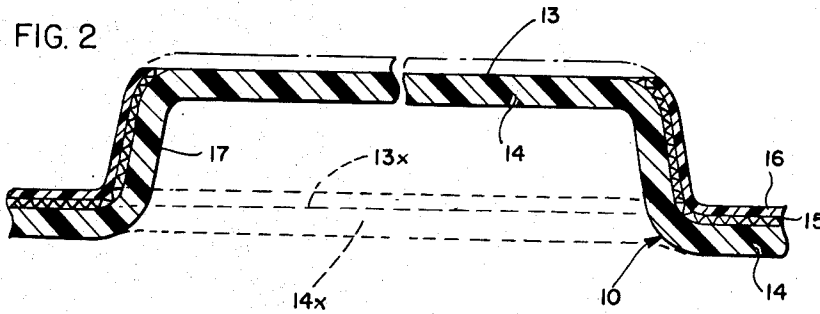
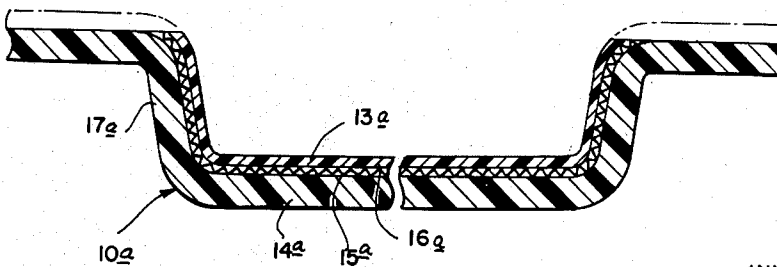


FIG. 3



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MULTIPLE-LEVEL LIGHT-REFLECTIVE SIGN

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Filed Jan. 20, 1958, Ser. No. 709,883
3 Claims. (Cl. 40—135)

The present invention relates generally to signs, show cards and markers, and more particularly to reflective signs which appear to be illuminated when exposed to an outside source of light.

The word "sign" as used in the present context is intended to include visual displays, articles having intelligence indicia thereon, guide lines such as used in directing traffic and pedestrians, danger signals of recognized color or shape, etc. By way of example, the invention is described in connection with one of its embodiments comprising a highway sign indicating some road condition such as a curve.

Heretofore, signs have been made with portions raised to accommodate contrasting colors at the two levels, with the color on the raised portion applied by rollers. These signs are hard to clean, and catch and retain obscuring quantities of dirt and snow. Moreover, the coloring ages and loses its effectiveness through use, especially when exposed to the ravages of climate. Furthermore, many signs are ineffective at night when viewed from the side thereof at an acute angle with respect to the face.

In the present invention, an object is to provide a reflective sign which has a weather resistive flat transparent protective covering that washes clean with rain or a wet sponge, and which has all of the elements thereof employed for visual effects protected and sealed from the atmosphere.

Another object of the invention is to provide a sign having offset indicia defined by fillet walls oriented substantially perpendicularly to the plane of the sign and equipped with light-reflective material along the margins of the indicia so that the sign reflects light to anyone on the indicia side thereof regardless of the viewing angle. This also provides an added sense of depth to the indicia.

A further object is to provide a sign which displays recessed indicia, thereby protecting the same against the effects of weather and harm arising from other causes.

Still a further object is in the provision of a multiple-level light-reflective sign, wherein the elevated areas thereof have limited light-reflective properties, and wherein the recessed areas including the wall portions connecting the same with the elevated areas have excellent light-reflective properties, whereby the contrasting areas of the sign form a structure that is readily readable from substantially all positions in front thereof.

Yet a further object is that of providing a sign of the character described, defined by a composite structure comprising a planar sheet of material having relatively poor light-reflective properties, a light-reflective layer laminated to a surface thereof, and a light transmitting protective film laminated to such layer—the sheet having offset areas defining elevated surfaces from which the light-reflective layer and film coating are removed to define a multiple-level sign having contrasting light-reflective properties. Additional objects and advantages of the invention will become apparent as the specification develops.

Embodiments of the invention are illustrated in the accompanying drawings, in which—

FIGURE 1 is a front view in elevation of a sign embodying the invention; FIGURE 2 is a greatly enlarged, broken sectional view taken along the line 2—2 of FIGURE 1; and FIGURE 3 is a greatly enlarged, broken

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sectional view substantially identical to that of FIGURE 2, but showing a modified sign.

As indicated hereinbefore, the term "sign" is used broadly to define in a generic sense structures and materials of various types which convey intelligible indicia to one viewing the same. An exemplification thereof are the well known road signs or markers such as the one illustrated in the drawing, and which in FIGURE 1 is designated generally with the numeral 10. The sign 10 has multiple indicia thereon, both in the form of word and pictorial legends. For purposes of identification, the word legends are denoted respectively with the numerals 11 and 12, while the pictorial legend which is in the form of a cross is identified with the numeral 13. Although the sign 10 is of square-shaped configuration, it may have any other suitable or desirable perimetric form. For example, as a road sign it may be octagonal, which is the form generally employed to designate a stop, triangular, diamond-shaped, or any of the other forms adopted by custom or made mandatory by legal requirements in the various states.

Referring now to FIGURE 2 in particular, it will be apparent that the sign 10 is of multiple-level character, and the structural composition thereof comprises a plurality of laminations 14, 15 and 16. The lamination 14 is a generally planar sheet of material having sufficient thickness so that it is relatively rigid and will maintain the shape thereof in the absence of reinforcing or backing members, although such members could of course be provided. Preferably, the sheet 14 is made of plastic; and as a specific example, polystyrene may be set forth. Desirably, a high impact polystyrene is used so that the sign is not readily fractured. The material from which the sheet 14 is made will ordinarily have relatively poor or selective light-reflective properties. That is to say, it may be black so that substantially no light is reflected therefrom, or it may be colored (yellow, for example) so that when light impinges thereon, a yellow coloring will be observed.

The lamination 15 is defined by a layer selected to have good light-reflective properties. For this purpose, various metal foils may be used such as aluminum and, if desired, the metal foil may be anodized to protect the same from oxidation, give color characteristics thereto, etc.

The reflective layer 15 may be bonded or otherwise secured to the surface of the sheet 14 by any suitable means, such as adhesives. In order to increase the light-reflective properties of the layer 15, the foil may be etched or embossed to maximize the surface area thereof as by providing it with a raised pebbled or diamond surface design.

The lamination 16 is defined by a film having good light transmitting properties. The film is preferably transparent although thin translucent materials could be employed.

The film may be plastic, and is preferably a polyester resin such as Videne made by the Goodyear Company, or Mylar which is made by the DuPont Company. The film 16 is bonded or otherwise secured to the foil layer 15 by means of an adhesive or any other suitable method.

In the formation of a sign, the sheet 14 is initially planar and the reflective layer 15 and protective film 16 are laminated thereto while the sheet is in such flat configuration. Thereafter, one or more areas of the sheet 14 are offset, and such offsetting may be accomplished in any well known manner as, for example, by heating and then vacuum forming or by pressing the same in a heated die, etc. to a depth varying from that shown in full lines to that indicated by broken lines 13x and 14x. Then indicia surfaces of the sheet will be elevated as a consequence of the offsetting, as is the face of the cross 13 shown both in FIGURES 1 and 2. Such elevated surfaces or areas are integrally connected with the plane of the sheet by

wall portions 17 which, it will be noted, are generally normal to the plane of the sheet and also to the plane of the elevated surface areas. The amount of the offset will depend upon the environment intended for the sign, and the use to be made of the sign.

Next, the elevated surfaces of the sheet have the reflective layer 15 and protective film 16 removed therefrom, and such removal may be accomplished by grinding or other abrading actions. Therefore, the elevated areas of the sign have light-reflective characteristics that contrast sharply with the remaining portions thereof; and in the sign shown in FIGURES 1 and 2, all of the elevated areas (namely, the word legends 11 and 12 and pictorial legend 13) will have poor or selective light-reflective properties, while the remaining surfaces of the sign will be highly reflective.

The modified sign shown in FIGURE 3 has substantially the same composition as that of the sign heretofore described, and for that reason is denoted in its entirety with the numeral 10a, the laminations thereof with the numerals 14a, 15a and 16a, and the pictorial legend which is also a cross with the numeral 13a. In this form of the sign, however, the legends are depressed, and as a result the elevated areas or surfaces of the sign comprise the plane of the sheet 14a. The various laminations are secured to the sheet, the sheet is thereafter offset or depressed throughout certain portions thereof, and the laminations 15a and 16a removed from the resultant elevated areas, all in a manner heretofore described. However, the light-reflective portions of the sign comprise the legends, in contrast to the sign shown in FIGURES 1 and 2 where the legends are relatively non-reflective.

In either form of the sign, however, the reflective portions thereof are recessed and therefore are protected from various causes for damage thereto, and are also somewhat protected from weathering action. It is also to be noted that the elevated areas have the reflective and protective laminations thereof removed.

Since the fillet walls which connect the plane of the sheet with the elevated areas thereof are generally vertical or normal to the plane of the sheet, and further since these walls are covered with the light-reflective layer 15, they reflect light. Therefore, the sign is readily seen by anyone positioned forwardly thereof irrespective of his viewing angle thereto. This, of course, is an advantage where it is not always possible for the viewer to be directly in front of the sign, as is the case with road markers.

The protective film 16 forms a sheath over the reflective surface 15 and thereby tremendously increases the useful life thereof, particularly since the film is laminated thereto throughout its entire length. The sign washes clean easily, and as a result a usual rainfall will accomplish this cleaning.

While in the foregoing specification embodiments of the invention have been set forth in considerable detail for purposes of making an adequate disclosure thereof, it will be apparent to those skilled in the art that numerous changes may be made in those details without departing from the spirit or principles of the invention.

We claim:

1. A sign member having a front and back and comprising a substantially rigid layer of opaque material, a layer of light reflective material laminated to the front of said rigid layer, a light transmitting protective material laminated to the front of said light reflective material, said member having areas offset with the front surface of said

opaque material disposed in front of the front surface of said protective material and exposed to view above said light reflective and protective materials over predetermined coplanar surface areas which provide configurations defining intelligible indicia to a viewer thereof, said opaque material being concealed from view by said light reflective material over its remaining planar area around said offset areas with opaque layer portions interconnecting said exposed and concealed areas being covered by said layer of light reflective material in turn covered by said protective material with said reflective material exposed edgewise at its edges between said exposed opaque material and the protective material bordering same.

2. A sign member having a front and back and comprising a substantially rigid self-supporting planar layer of opaque polystyrene, a layer of light reflective material bonded to the front of said planar layer, a light transmitting protective polyester resin bonded to the front of said light reflective material, said member having areas offset with the front surface of said polystyrene planar layer disposed in front of the front surface of said polyester resin and exposed to view thereabove over predetermined coplanar surface areas which provide configurations defining intelligible indicia to a viewer thereof, said polystyrene planar layer being concealed from view by said light reflective material over its remaining front area around said offset areas with said exposed polystyrene being integrally connected to said concealed remaining front area by polystyrene walls covered by said layer of light reflective material in turn covered by said polyester resin with said reflective material exposed edgewise at its edges in the plane of said coplanar surfaces between said exposed polystyrene area and the polyester resin bordering same.

3. A sign member having a front and back and comprising a planar substantially rigid layer of minimal light reflective opaque plastic material, a layer of light reflective material laminated to the front of said rigid layer, a transparent protective film of plastic material laminated to the front of said light reflective material, said member having areas offset from the plane of said opaque layer with the front surface of said offset areas being of said opaque material and disposed in front of the front surface of said film and exposed to view above said light reflective layer and said protective film over predetermined coplanar surface areas in configurations defining intelligible indicia to a viewer thereof, said opaque material being concealed from view over its remaining front area around said offset areas by said light reflective material, said offset areas being connected with the planar opaque layer by wall portions generally normal thereto, said wall portions being covered by said layer of light reflective material in turn covered by said film with said reflective material exposed edgewise at its edges between said exposed opaque material and the film bordering same and readily seen from a multiplicity and angularly from the normal to positions forwardly of the front face of said member.

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