July 5, 1955 E. A. NEUGASS 2,712,188

INSTRUMENT PANEL

Filed April 13, 1953

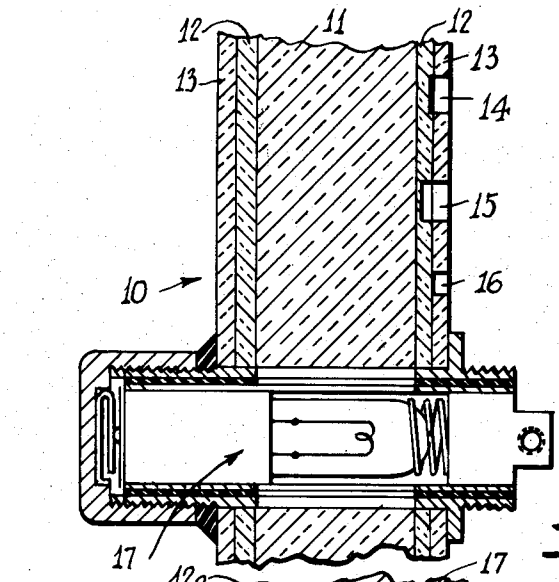


Fig. 1.

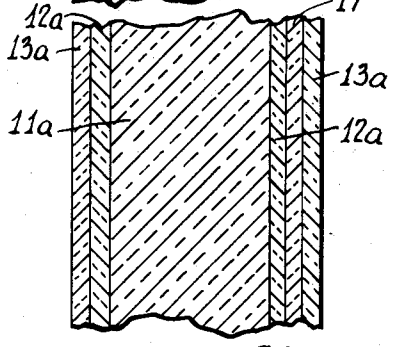


Fig. 2.

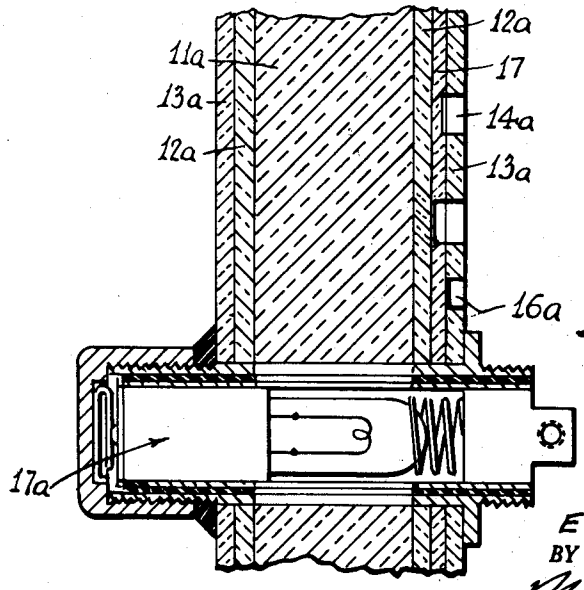


Fig. 3.

INVENTOR.
EDWIN A. NEUGASS
BY
ATTORNEY

United States Patent Office 2,712,188
Patented July 5, 1955

2,712,188

INSTRUMENT PANEL

Edwin A. Neugass, Port Chester, N. Y.

Application April 13, 1953, Serial No. 348,349

4 Claims. (Cl. 40—130)

The present invention relates generally to improvements in panels, and is particularly directed to internally illuminated instrument panels of the type disclosed in United States Letters Patent No. 2,518,726, issued to Charles N. Shlenker on August 15, 1950.

Panels of the kind referred to above include a core or body formed of a light transmitting material and having a layer of white translucent material covering at least the front face thereof, and an outer layer of black or dark colored opaque material superposed upon the translucent layer. Openings are formed through the outer opaque layer to expose the underlying portions of the translucent layer, and a light source is associated with the panel to admit light to the light transmitting core so that the exposed portions of the translucent layer are transilluminated to make the indicia, defined by the openings in the opaque outer layer, readily visible in a glareless manner. In producing such panels, a lamination of the core and the translucent and opaque layers is first formed, and then the openings are cut through the opaque outer layer by a suitable engraving operation. However, during the engraving operation, it is impossible to control with complete accuracy the depth to which the engraving tool cuts and, in ensuring that the opaque layer is completely penetrated, the tool on occasion cuts into the underlying translucent layer to reduce the thickness of the translucent layer at such locations. Therefore, the exposed portions of the translucent layer are not of a uniform thickness and the intensity of the transillumination will vary accordingly.

An object of the present invention is to provide a panel of the described character wherein the transillumination is uniform at all of the indicia.

Another object is to provide a panel of the described character wherein the portions of the translucent layer registered with the openings of the opaque outer layer are all of the same thickness so that the intensity of the transillumination at these portions of the translucent layer will be uniform.

A further object of the present invention is to provide a method of producing a panel of the described character wherein engraving of the openings cut through the opaque outer layer may be carried out without cutting into the registered portions of the translucent layer thereby avoiding irregularities in the thicknesses of said registered portions.

In accordance with the present invention a panel of the described character is provided with a layer of transparent or clear material interposed between the translucent layer and the outer opaque layer so that, when the outer layer is engraved, the unavoidable variations in the depth of the engraving merely result in occasional cutting into the transparent layer and the translucent layer is undisturbed to prevent any variation in the intensity of the transillumination by reason of varying thicknesses of said translucent layer.

In order to facilitate complete understanding of the present invention, an illustrative embodiment thereof will be

described in detail in connection with the accompanying drawing wherein:

Fig. 1 is a transverse sectional view of a panel of the described character as constructed prior to the present invention;

Fig. 2 is a view similar to Fig. 1, but showing a panel embodying the present invention, but before the openings have been cut-through the outer opaque layer of the panel; and

Fig. 3 is a view similar to Fig. 2 and showing the panel embodying the present invention with openings cut-through the outer opaque layer.

Referring to the drawing in detail, and initially to Fig. 1 thereof, a panel of the kind disclosed in United States Letters Patent No. 2,518,726, issued to Charles N. Shlenker on August 15, 1950, is there illustrated and identified generally by the reference numeral **10**. The panel **10** includes a sheet or core **11** of clear, transparent light-transmitting material which is preferably plastic, such as, for example, methyl methacrylate. A layer **12** of translucent material, which is preferably plastic, such as, for example, cellulose acetate or vinyl, covers at least the front face of the core **11**, and in the illustrated embodiment a translucent layer **12** covers each of the faces of the transparent core. A layer **13** of suitable opaque material, which is also preferably plastic, such as, for example, vinyl in either the rigid or flexible form, is superposed on each translucent layer **12**. The outer layer **13** and translucent layer **12** was preferably of sharply contrasting colors, for example, black and white, respectively, to promote the visibility of the indicia defined by openings in the outer layer **13**, as hereinafter more fully described.

The core **11** and layers **12** and **13** may be laminated together either by a suitable adhesive interposed therebetween, or by subjecting the sandwich or lamination to heat and pressure. The panel **10** is fabricated to suitable size and shape and the opaque layer **13**, at the front of the panel, is cut-through, as at **14**, **15** and **16**, to expose the underlying portions of the translucent layer **12** with the cut-outs **14**, **15** and **16** being in the shape of the desired illuminated indicia or figures. When light is admitted to the transparent core **11** from a source **17**, which may be of the kind referred to in the above identified Letters Patent, the exposed portions of the translucent layer **12** registering with the cut-outs **14**, **15** and **16** are transilluminated to provide glareless illumination of the indicia or figures defined by the cut-outs. However, the opaque layer **13** at the front of the panel is cut-through by an engraving operation, and the depth of the cutting action of the engraving tool is unavoidably variable. Since the engraving tool must completely penetrate the outer opaque layer **13** in all portions of the defined indicia or figures, the variation in the depth of the cutting action results in occasionally cutting into the translucent layer **12**. Thus, as seen in Fig. 1, the engraving tool may cut through the opaque layer **13** and slightly into the underlying translucent layer **12**, as at the opening **14**; or the engraving tool may cut through the opaque layer and penetrate deeply into the translucent layer, as at the opening **15**; or the engraving tool may cut through the outer opaque layer and leave the underlying translucent layer undisturbed, as at the opening **16**. It is apparent that such action on the part of the engraving tool causes the portions of the translucent layer registering with the several openings or parts of the latter to have different thicknesses. For example, the portion of translucent layer **12** registering with the opening **16** has a thickness which is equal to the thickness of the sheet material forming the layer **12**, while the thickness of the portion of layer **12** aligned with opening **14** is less than the thickness at opening **16** and greater than the thickness at opening **15**. Further, the different thicknesses of the portions of translucent layer

12 registering with the openings 14, 15 and 16, respectively, cause such portions to be transilluminated with different intensities.

In accordance with the present invention, a layer of clear transparent material is interposed between at least the opaque outer layer at the front of the panel and the related translucent layer so that, when the engraving tool cuts beyond the inside surface of the opaque outer layer, the tool merely cuts into the layer of clear transparent material and does not vary the thickness of the translucent layer at the portions aligned with the indicia or figure defining openings. Thus, as seen in Figs. 2 and 3, a panel 10*a* embodying the present invention includes a transparent core or body 11*a*, a translucent layer 12*a* covering at least the front face of the transparent core and an opaque outer layer 13*a* at least at the front of the panel, these parts of the panel being the same as the correspondingly numbered parts of the panel in Fig. 1, with the addition of a clear, transparent layer 18 which is preferably plastic, such as, for example, clear vinyl in either the rigid or flexible form, and is interposed between at least the opaque outer layer 13*a* at the front of the panel and the related translucent layer 12*a*. The layer 18 may be included in the preliminary lamination or sandwich and is secured to the confronting surfaces of the layers 12*a* and 13*a* either by a suitable adhesive or by being subjected to heat and pressure.

When the openings 14*a*, 15*a* and 16*a* are cut through the outer opaque layer 13*a* at the front of the panel by an engraving operation, and the depth of the engraving occasionally reaches beyond the inside surface of the outer opaque layer 13*a*, as at the openings 14*a* and 15*a* (Fig. 3), the engraving tool merely cuts into the clear transparent layer 18 so that the portions of the translucent layer 12*a* aligned with the openings 14*a*, 15*a* and 16*a* are of a uniform thickness. Thus, while some variation in the depth of the engraving is unavoidable, in panels embodying the present invention, such variation in the depth of engraving does not influence the thicknesses of the transilluminated portions of the translucent layer and the transillumination is of uniform intensity at all of the openings cut-through the outer opaque layer. Being clear and transparent, the variations in the thicknesses of the portions of layer 18 registered with the several openings cut through the opaque outer layer do not affect the uniformity of the transillumination.

It has been found that a clear, transparent layer having a thickness of .005" to .015" is sufficient to serve the purposes of the present invention since the variation in the depth of the engraving may conveniently be contained within such dimensions. Further, a clear, transparent layer 18 of that thickness does not interfere with the normal operation of panels of the described character in providing glareless illumination of indicia or figures from a source within the panel.

While an illustrative embodiment of the invention has been shown in the drawing and described in detail, it is to be understood that the invention is not limited to precisely this embodiment, and that various changes and modifications, obvious to one skilled in the art, may be effected in the illustrated embodiment without departing from the scope or spirit of the invention as defined in the appended claims.

What is claimed is:

1. In a panel including a core of transparent material with a next adjacent layer of translucent material superimposed thereon and an outer layer of opaque material having at least one opening therethrough, said panel having means for admitting light to the transparent core to transilluminate the translucent layer at the opening in the opaque layer; a layer of clear, transparent material interposed between said translucent layer and said opaque outer layer so that the opening through the opaque outer layer may extend beyond the inner surface of the latter without varying the thickness of the translucent layer at the opening.

2. In a panel including a core of transparent material with a next adjacent layer of translucent material superimposed on at least the front surface of the core and an outer layer of opaque material forming at least the front surface of the panel and having at least one opening therethrough, said panel having means for admitting light to the transparent core to transilluminate the translucent layer at each opening in the opaque outer layer; a layer of clear, transparent vinyl laminated between the translucent layer and the opaque outer layer at the front of the panel so that the openings through the opaque outer layer may extend inwardly beyond the inner surface of the latter without varying the thickness of the translucent layer at the openings.

3. A panel of the described character; comprising a core of transparent light transmitting material with a next adjacent layer of translucent material superimposed on at least the front face of said core, a layer of clear, transparent material superimposed on at least said translucent layer in front of said core, and an outer layer of opaque material superimposed over said layer of clear, transparent material, said outer layer having at least one opening therethrough to a depth ranging between the thickness of said outer layer and the combined thicknesses of said outer layer and the underlying transparent layer, said panel having means for admitting light to said transparent core to transilluminate said translucent layer at the portion of the latter registering with each opening in said outer layer.

4. A panel of the described character according to claim 3; wherein a layer of translucent material is superimposed on each of the opposite faces of said core and a layer of opaque material forms the outside of the panel at both the front and back of the latter, and wherein said transparent layer is interposed only between the opaque outer layer at the front of the panel and the translucent layer on the front face of said core.

References Cited in the file of this patent

UNITED STATES PATENTS

1,707,965	Scantlebury	Apr. 2, 1929
1,816,220	Hotchner	July 28, 1931
2,128,246	Hardesty	Aug. 30, 1938
2,133,914	Burke	Oct. 18, 1938
2,400,079	Ducey	May 14, 1946
2,518,726	Shlenker	Aug. 15, 1950
2,595,973	Neugass	May 6, 1952