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TRANSPARENT LIGHT AND HEAT INSULATING WINDOW PANES AND SHIELDS

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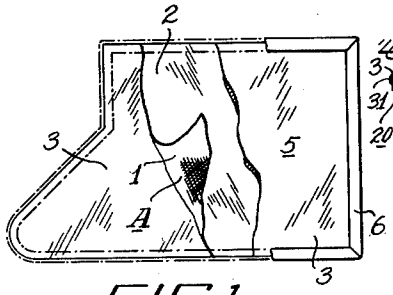


FIG. 1.

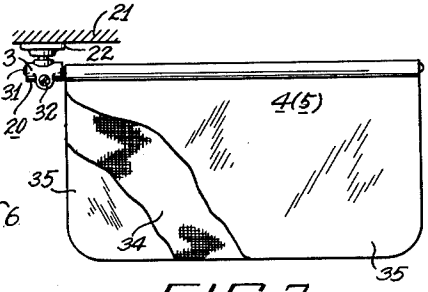


FIG. 2.

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TRANSPARENT LIGHT AND HEAT INSULATING WINDOW PANES AND SHIELDS

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The present invention relates to transparent light and heat insulating window panes for buildings, rolling stock, ceiling windows for roofs, panes for show cases and for various other applications. Such light and heat insulating window panes are especially useful for motor cars, and one embodiment of the invention is a transparent glare shield which may be moved as desired within the motor car.

In order to exclude light, such as the glare from the sun and resulting heat from an inclosure, it has heretofore been the practice to employ opaque, translucent or transparent colored window panes or shields. While such panes or shields have the virtue of excluding the sun's glare and a portion of the resulting heat, they present certain disadvantages. Opaque window panes obstruct the view, and opaque shields may obstruct the view in certain desired positions of the shields. Such obstructions are undesirable, and are dangerous in the case of motor cars. The same may be said of translucent panes or shields. Transparent colored panes or shields give an unnatural light within the enclosure and do not permit one within the inclosure to observe satisfactorily shading effects beyond the enclosure. This is undesirable and may be dangerous in operating motor cars.

For eliminating the above-mentioned disadvantages, the present invention provides a light and heat insulating, transparent window pane or shield, characterized in that a thin fabric having its warp and woof threads coated on one face of the fabric with a thin metallic film, is affixed to a well-known transparent sheet. The fabric may be, for example silk, nylon, or the like, and the metallic film may be a thin film of aluminum which has especially high reflectivity. The well-known transparent sheet is glass, acrylic or other synthetic resins, or the like. With the metallic film surface being directed outwardly the glare and heat of the sun is reflected outwardly of the inclosure.

The invention is illustrated by way of example in the accompanying drawings, in which:

FIG. 1 is a broken elevation of a window, such as a side window of a motor car, constructed and arranged according to the invention, and

FIG. 2 is a broken elevation of a pivoted glare shield embodying the invention.

In the embodiment of the invention illustrated in FIG. 1, there is shown a pane **5** according to the invention, especially adapted for use in a motor car. The pane **5** is broken to illustrate the various layers of which it is composed. Thus, there is shown a layer **1** of a thin fabric, as silk, nylon or the like. The warp and woof threads of the fabric layer are coated on one face of the fabric with a thin film **2** of a metal having high reflectivity, as aluminum. For simplicity, this coating is illustrated as an unbroken sheet of the metal. It is to be understood, however, that this coating is, in reality, a coating of each individual warp thread and a coating of each individual woof thread on the indicated face of the fabric. Emphasis is placed upon the fact that the meshes between the threads are not clogged by the thin metal film.

It is preferred to coat the warp and woof threads by means of the vacuum vaporization method wherein the fabric is moved over a crucible containing the molten metal under vacuum.

The prepared metal coated fabric is designated A. The coated fabric is laminated with a transparent sheet to form the pane or shield. Thus, the fabric A may be inserted between two commercially available transparent sheets **3** and **3** to form the final pane. Alternatively, the fabric A may be applied to a single sheet **3** and a known molten transparent material may be applied to the other face of the fabric A, the outer surface of this transparent material being then given a plane outer surface. Transparent adhesives may be optionally employed to attach the fabric to the sheets **3**.

It may be here noted that, although the direction of the threads of the fabric A may be variously chosen with respect to the outline of the sheet **3**, it is preferred to apply the fabric A with its threads on the bias. With this arrangement there are more opportunities for both warp and woof thread to receive rays of light.

In the form of the invention illustrated in FIG. 1, the pane is hermetically sealed peripherally by means of a frame **6**. This affords protection to the metallic films **2**, protecting them from deterioration due to the atmosphere. On the other hand, a protective film may be applied to the metal coated fabric by another vacuum vaporization process.

The glare shield illustrated in FIG. 2 is similarly formed. However, the glare shield is formed without the frame **6**. Furthermore, it is pivoted in known manner within the inclosure for suitable positioning to prevent glare and directly radiated heat.

From the foregoing, it will be apparent that window panes and shields constructed according to the invention are transparent because the threads of the thin fabric are coated with a film of metal which does not clog the meshes between the threads. At the same time, both heat and light are reflected by the aluminum film on each thread of the fabric, so that little of either will enter the enclosure through the novel pane or shield.

By use of the invention, it is therefore possible to preserve a cool, glare-proof inclosure from which the external surroundings may be clearly viewed.

What I claim is:

1. A light reflecting, heat insulating transparent laminate comprising at least a lamina of metal pre-coated formanious, thin, woven, non-metallic fabric and a lamina of transparent glass sheet material bonded thereto wherein the threads of said fabric have been individually pre-coated with metal by vacuum vaporization of said metal over and through the threads of said fabric causing deposition thereon thereby increasing the light reflecting and heat insulating qualities thereof while maintaining the foraminous character of said woven non-metallic fabric.

2. The laminate of claim 1 wherein the metal is aluminum.

3. The laminate of claim 1 wherein the coated fabric is laminated between two sheets of transparent glass sheet material.

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