Dec. 12, 1961 R. A. BOYD 3,012,378

LIGHT TRANSMITTING BLOCKS

Filed Dec. 28, 1956

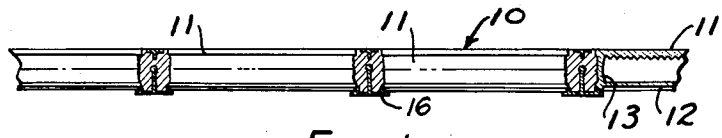


FIG. 1

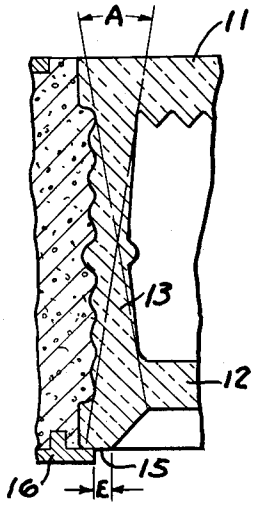


FIG. 2

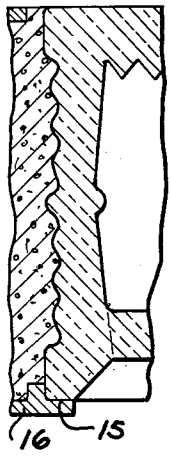


FIG. 3

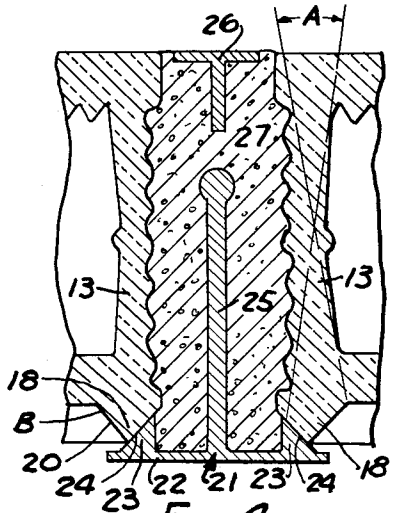


FIG. 4

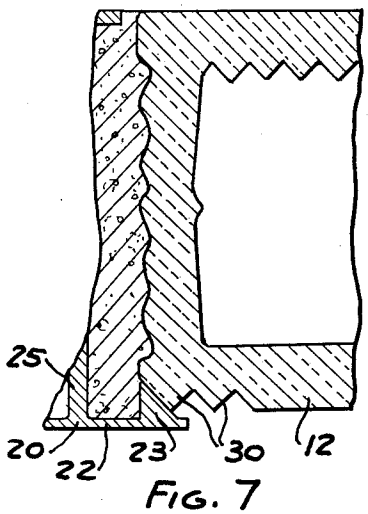


FIG. 7

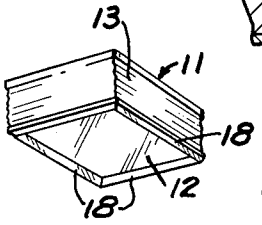


FIG. 8

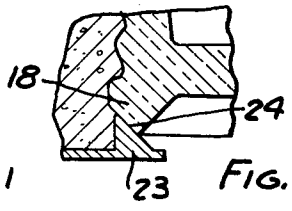


FIG. 5

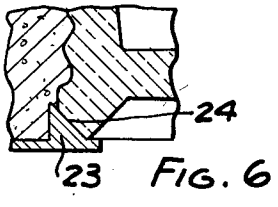


FIG. 6

INVENTOR.
ROBERT A. BOYD
BY W. A. Ochsich
&
Leonard S. Sorbin
ATTORNEYS.

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LIGHT TRANSMITTING BLOCKS

Robert A. Boyd, Ann Arbor, Mich., assignor to Owens-Illinois Glass Company, a corporation of Ohio

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This invention relates to hollow light-transmitting blocks and particularly to hollow glass blocks which are used to illuminate the interior of a room by being interposed in an opening in a ceiling.

In utilizing daylight to illuminate the interior of a room, a plurality of hollow blocks are mounted in the opening through which the light is to be transmitted. Such blocks are made of a light-transmitting material which may be glass and comprise parallel spaced face walls joined by edge walls. The face walls of the block may be formed with prisms, ribs and the like to control the transmission of the light. However, the light passing through the edge walls tends to form bright strips around the periphery of each block which produce a glare. In addition to producing a glare, a bright line is provided around the periphery of the block, resulting in a non-uniformity of illumination.

When the blocks are mounted in a grid, such as, for example, when the blocks are used in an opening in the ceiling of a room, the grid sometimes overlies the edge walls and helps to eliminate the glare caused by the direct transmission of light through the edge walls. However, due to the dimensional inaccuracies and variations in manufacturing the glass block and the grid, the grid does not always prevent the direct passage of light through the edge walls into the interior, and therefore the problem of glare and non-uniformity of illumination continues to exist.

It is therefore an object of this invention to provide a hollow light-transmitting block construction wherein the problem of edge glare is eliminated.

It is a further object of this invention to provide such a hollow block including a novel grid structure for further insuring that the problem of edge glare will be eliminated.

In the drawings:

FIG. 1 is a part sectional elevational view of a prefabricated glass block panel embodying the invention.

FIGS. 2 and 3 are fragmentary sectional elevationl views, on an enlarged scale, of prefabricated glass block panels of the prior art.

FIG. 4 is a fragmentary sectional elevational view of a portion of the panel shown in FIG. 1, on a greatly enlarged scale.

FIG. 5 is a fragmentary sectional view of a portion of the panel shown in FIG. 4, on an enlarged scale.

FIG. 6 is a sectional view similar to FIG. 5 showing the parts in a different position.

FIG. 7 is a view similar to FIG. 4 showing a modified form of the invention.

FIG. 8 is a perspective view of a glass block embodying the invention.

Referring to FIG. 1, a prefabricated panel **10** comprises a plurality of hollow blocks made of light-transmitting material such as glass mounted in a grid structure which is hereinafter described. Each of the hollow blocks includes parallel spaced sheets or face walls **11, 12** connected by edge walls **13** joining face walls **11, 12** at generally right angles around the periphery thereof. The surfaces of face walls **11, 12** may be formed with ribs or prisms in order to obtain control of the light transmitted therethrough. For example, when the glass blocks are utilized in a wall, the inner faces of face walls **11, 12** may be formed with horizontally extending prisms as shown in my Patent No. 2,768,556, issued October 30, 1956,

titled "Control of Daylighting." When the glass block is utilized in an opening in the ceiling, it is desirable that some of the sunlight from the higher sun altitude angles be rejected, and accordingly, the inner face of the wall **11** is formed with unsymmetrical prisms extending in an east-west direction as disclosed and claimed in my copending applications, titled "Skylights," Serial No. 295,730, filed June 26, 1952, now Patent No. 2,812,690, and Serial No. 358,277, filed May 29, 1953, now Patent No. 2,812,691.

Referring to FIGS. 2 and 3, in the prior art glass blocks the outer surface of face wall **12**, which is nearest the interior, has customarily been formed with the portion **15** thereof lying in a plane generally perpendicular to the edge walls **13**. As a result of this construction, light rays which pass directly through edge walls **13** have been transmitted to portion **15**. These light rays are represented in FIG. 2 by the angle A. When such a block is mounted in a wall without the use of a grid, the light transmitted to portion **15** is refracted directly into the interior of the room, producing a bright band around the block and resulting in a glare and a non-uniformity of illumination.

When a grid **16** is used to support such a prior art block, if the dimensions of the block and the grid are proper, the grid will entirely overlie portion **15** and thus prevent the transmission of light directly into the interior of the room and eliminate the glare and the non-uniformity of illumination. However, it is rarely the case that the dimensions of the grid and block are correct and the workman assembling the panel is precise so that it is more likely than not that grid **16** will overlie only a small part of portion **15** as shown in FIG. 2. In this case, the exposed part E of portion **15** will permit the light transmitted directly through edge wall **13** to be refracted into the interior of the room, causing the band of bright light.

According to the invention, the peripheral edge portion of the outer face of face wall **12** is formed with one or more prisms in the area overlying edge wall **13** to provide a plurality of surfaces forming an angle with the plane of face wall **12**. As shown in FIG. 4, a prism **18** is formed along the edge of wall **12** with its axis generally parallel to the plane of edge wall **13**. Prism **18** comprises surfaces **20, 24** which are inclined to the plane of wall **12**. The inclination of the surfaces is such that the light rays transmitted through the edge wall are reflected by the surfaces rather than being transmitted. Each prism **18** is preferably symmetrical.

In the case of the conventional glass block of present-day manufacture, having an edge wall thickness of approximately three-eighths inch and an edge wall width of approximately three inches, the angle A through which light rays may be directly transmitted through edge wall **13** is about 20°. The preferred prism size for such a glass block is where the included angle between the surfaces **20** and **24** is approximately 90° and the angle B between said surfaces and the plane of wall **12** is approximately 45°.

When the glass blocks are to be mounted in a prefabricated panel, a grid **21** is used including a supporting strip **22** and a centrally disposed, upstanding strip **25**. Strip **22** is provided at its edges with wedge-shaped portions **23** having surfaces inclined at the same angle as surface **24** so that the block will rest on grid **21** with surface **24** in contact with the inclined surface of wedge **23**. The inclined surface of wedge **23** contacting the inclined surface **24** of the block and overlying edge wall **13** further insures that light will not be transmitted directly through edge wall **13**.

In addition, as shown in FIGS. 5 and 6, the inclined surfaces insure a proper positioning of the glass block and, because of the wedging relation between surface **24**

and the inclined surface of wedge **23**, result in a rigid panel even when the dimensions of the glass block or grid vary. As shown in FIG. 5, the relative dimensions of the glass block and grid are such that surface **24** rides on the upper portion of the inclined surface of wedge **23**. In FIG. 6 the dimensions of the block and grid are such that the entire area of surface **24** of the block rides on the inclined surface of wedge **23**.

It is, of course, understood that a grid **21** extends along each edge of each block in the panel, with suitable structure being provided to complete the prefabricated panel in the usual manner. For example, as shown in FIGS. 1 and 4, strengthening strips **26** are provided between the blocks, and cement **27** or other filling material is used to fill the area between the blocks, all as well known in the art and as shown, for example, in the patents to Richards 2,099,534, issued November 16, 1937, and Lenke 2,419,-267, issued April 22, 1947.

A modified form of the block is shown in FIG. 7, wherein the single prism **18** has been replaced by a plurality of identical prisms **30** of smaller size. Prisms **30** are symmetrical and, in the preferred form, each prism **30** has the same included angle, namely, 90°, and the surfaces of each prism have the same inclination to the plane of face wall **12**, namely, 45°, as the block shown in FIGS. 4 and 6.

It can thus been seen that I have provided a glass block which prevents the direct passage of light through the edge walls, thereby eliminating the problem of edge glare and the non-uniformity of illumination which occurs when light is transmitted through the edge walls. I have also provided a novel grid structure which further insures that light will not be transmitted directly through the edge walls and, in addition, provides a rigid mounting for the glass block which is not affected by variations in the size of the glass block or the grid.

I claim:

1. In a construction for utilizing daylight to illuminate the interior of a room or the like, the combination comprising a block of light-transmitting material having spaced generally rectangular parallel face walls and edge walls joining said parallel walls, one of said face walls

having an inclined surface along each edge thereof overlying the corresponding edge wall, each said surface extending inwardly from the periphery of said face wall, and a grid structure of opaque material for supporting said block in an opening in a room through which daylight may pass, said grid structure comprising a member extending along each edge of said block, each said member having a surface with the same inclination as the corresponding inclined surface of said block and contacting said inclined surface, whereby said grid structure rigidly positions said block due to the wedging relation of said inclned surfaces on said block and said grid structure, the width of said inclined surface on each said member being greater than the width of the corresponding inclined surface of said block.

2. In a construction for utilizing daylight to illuminate the interior of a room or the like, the combination comprising a block of light-transmitting material having spaced generally parallel face walls and edge walls joining said parallel walls, one of said face walls having an inclined surface along each edge thereof overlying the corresponding edge wall, each said surface extending inwardly from the periphery of said face wall, and a grid structure of opaque material for supporting said block in an opening in a room through which daylight may pass, said grid structure comprising a member extending along each edge of said block, each said member having a surface with the same inclination as the corresponding inclined surface of said block and contacting said inclined surface, whereby said grid structure rigidly positions said block due to the wedging relation of said inclined surfaces on said block and said grid structure, the width of said inclined surface on each said member being greater than the width of the corresponding inclined surface of said block.

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