Feb. 24, 1959 G. I. RATNER 2,874,653

SKYLIGHT FRAME CONSTRUCTION

Filed Aug. 23, 1954 3 Sheets-Sheet 1

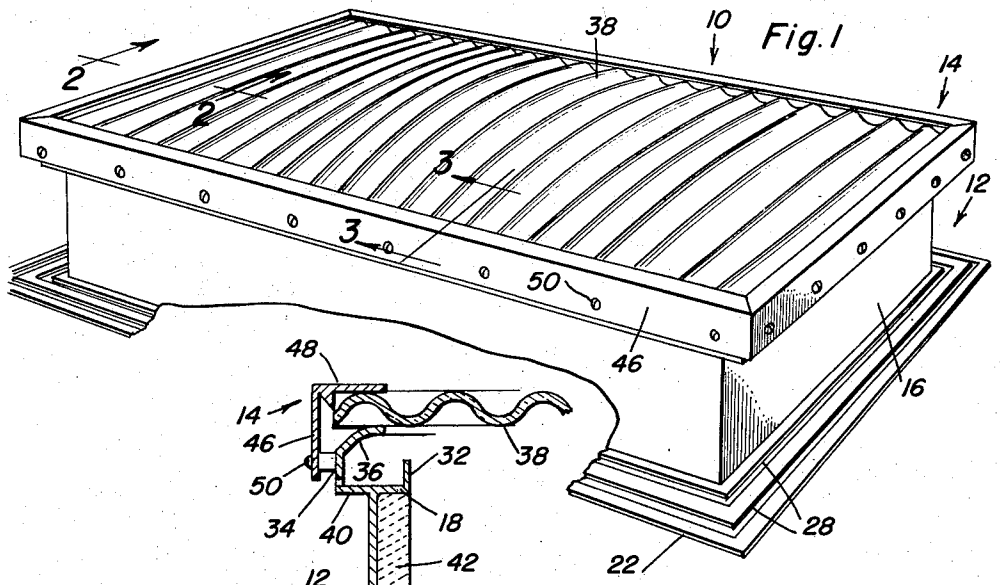

Fig. 1

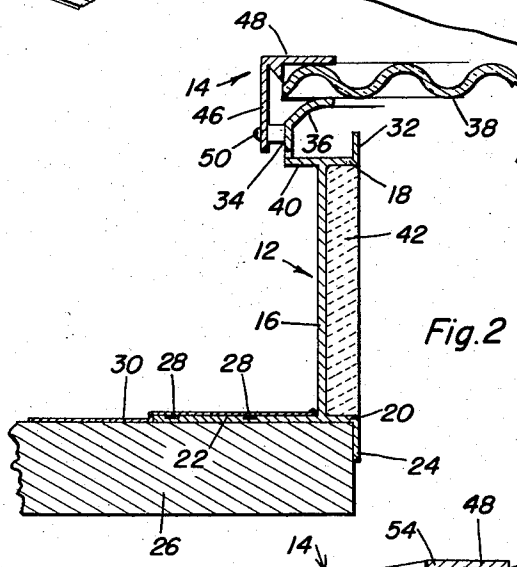

Fig. 2

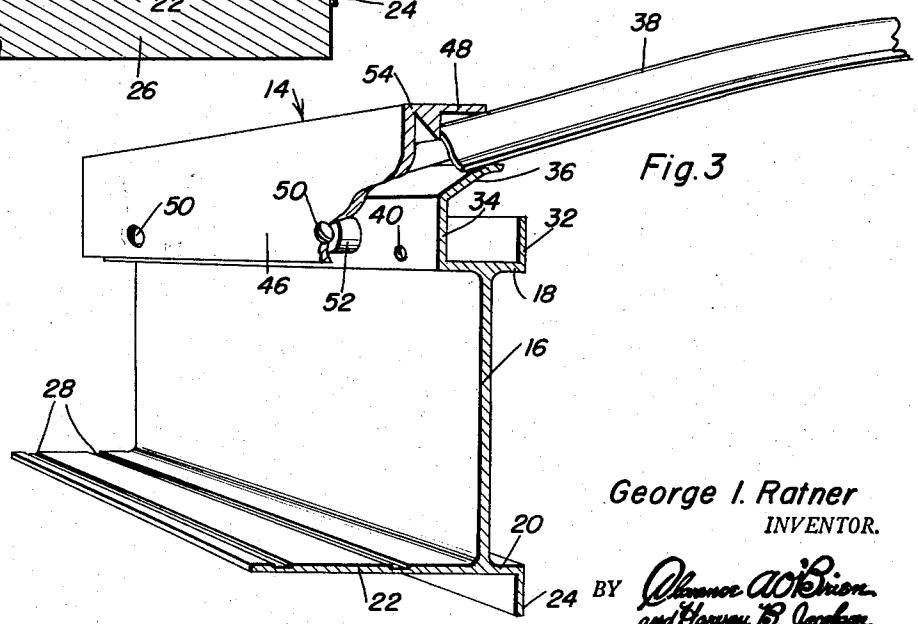

Fig. 3

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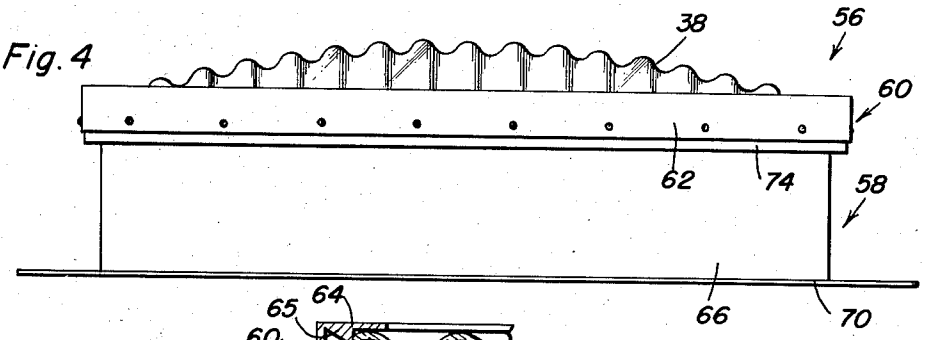
Fig. 4



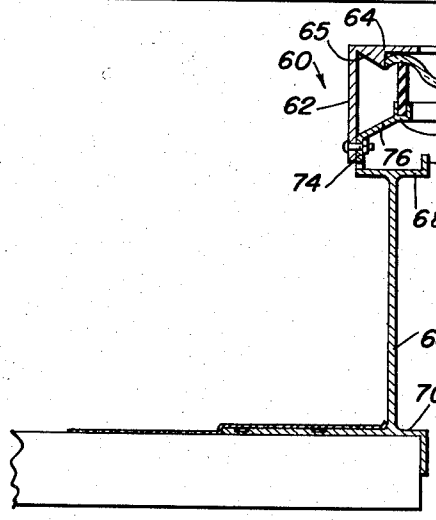


Fig. 5

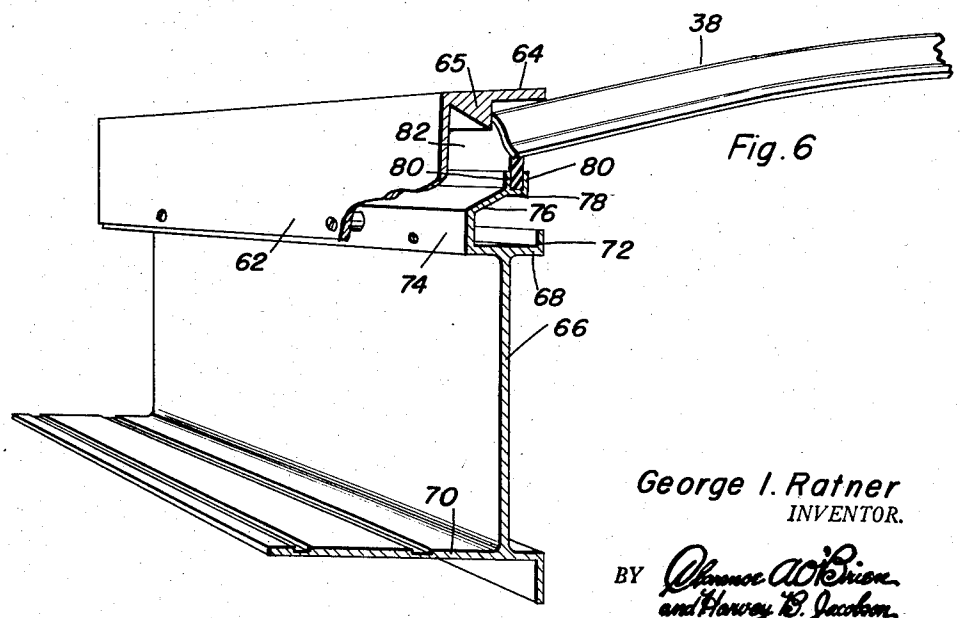


Fig. 6

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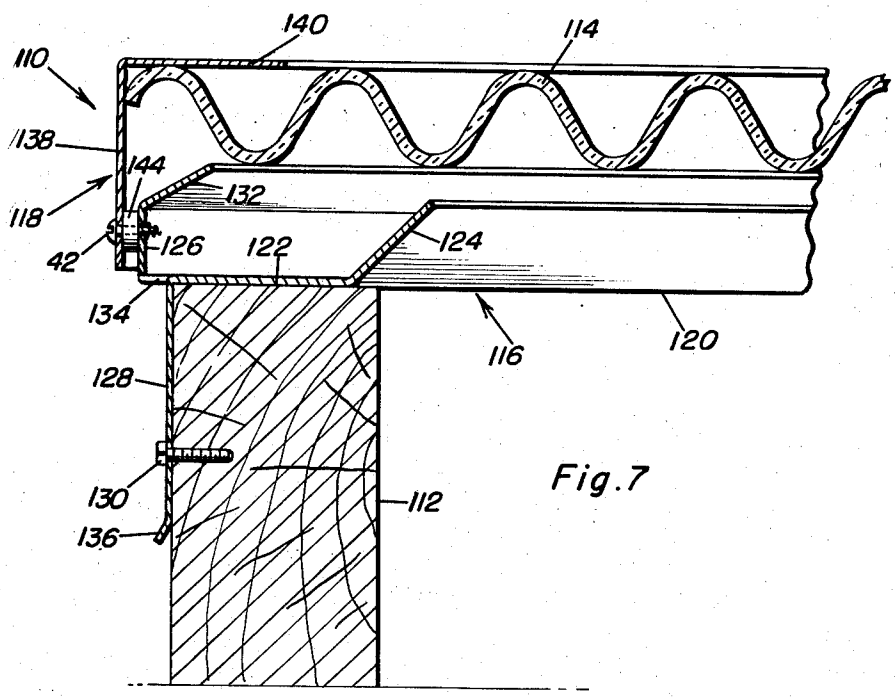

Fig. 7

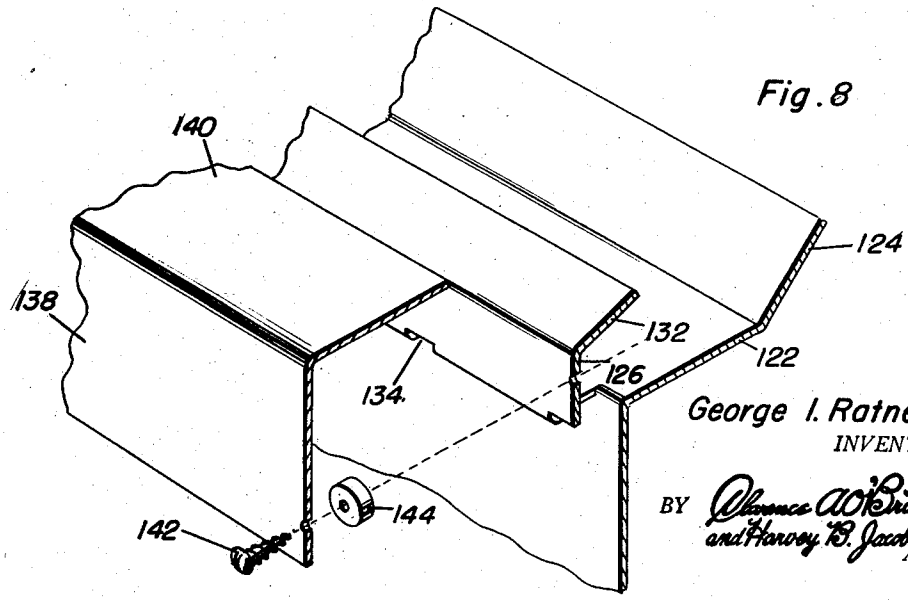

Fig. 8

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2,874,653

SKYLIGHT FRAME CONSTRUCTION

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Application August 23, 1954, Serial No. 451,538

11 Claims. (Cl. 108—16)

The present invention relates to a skylight construction for roofs and the like, and more particularly relates to a novel skylight mounting frame construction for mounting a translucent or transparent panel in overlying relation to a skylight opening.

A primary object of this invention is to provide a dome mounting frame that provides a novel and improved condensation and liquid drainage arrangement that facilitates the drainage of collected moisture and which will seal the skylight opening from the ingress of fluids.

It is also an object of this invention to provide a dome mounting and retaining frame which is easily mounted on the skylight curb and which permits the removal and replacement of the skylight dome in a simple and efficient manner which requires no displacement of the curb frame.

An additional object of this invention is to provide a curb frame and dome retaining frame arrangement that consists of a minimum number of parts, that is specifically adapted for ease and simplicity of manufacture and which is inexpensive but durable.

Another object of this invention is to provide a skylight panel supporting structure which eliminates the necessity for providing the customary curb around a skylight opening and which will attach directly to the roof or other surface surrounding the skylight opening without modification of the surrounding surface.

A further object of the invention, ancillary to the preceding object, is in the provision of a skylight panel supporting structure which may be applied directly to the roof surface surrounding an opening directly upon cutting of the opening without the necessity for any auxiliary mounting structure.

A further object of the invention is in the provision of a skylight panel attaching frame which clamps the skylight panel on a supporting frame, which attaching frame includes means for spacing the edges of the skylight panel from the edges of the attaching frame to provide a clear overflow drainage passage from the edges of the skylight panel through the space between the attaching frame and the supporting frame.

A still further object of the invention is in the provision of a skylight panel attaching frame for clamping a skylight panel on a supporting frame which enables removal and replacement of the skylight panel in a simple and efficient manner requiring no displacement of the supporting frame.

A highly important object of the invention is in the provision of a novel weather sealing construction on the skylight supporting frame for sealing the frame against the ingress of air beneath the skylight panel.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof,

wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a perspective view of the skylight frame construction constituting the present invention;

Figure 2 is a cross-sectional view of the frame construction taken substantially along the plane of section line 2—2 of Figure 1;

Figure 3 is an enlarged cross-sectional view with parts being broken away for clarity of detail, shown somewhat in perspective, taken substantially along the plane of section line 3—3 of Figure 1;

Figure 4 is a side elevational view of a modified skylight panel supporting frame;

Figure 5 is an enlarged cross-sectional view of the modified frame construction substantially the same as Figure 2;

Figure 6 is a view of the modified frame construction substantially the same as Figure 3; and

Figures 7 and 8 show a modification suitable for mounting on a conventional skylight curb.

The present invention is a continuation-in-part of my copending application, Serial No. 366,648, filed July 8, 1953, for Skylight, and now abandoned.

In Figures 1–3 of the drawings, the numeral **10** designates the skylight mounting frame construction in its entirety.

This construction consists of a skylight panel supporting frame **12** and a skylight clamping or attaching frame **14**.

The supporting frame **12** is constructed in such a manner that it eliminates the necessity for a curb customarily utilized around skylight openings for attaching the skylight covering panel thereto. Each base frame member of the supporting frame **12** is shaped in cross-sectional configuration like an I-beam, including a vertical web **16**, top plate **18** and bottom plate **20**. As will be noted in the drawings, the top and bottom plates or flanges **18** and **20** are horizontally disposed or perpendicular to the vertical web **16** and are integral therewith. Further, the plates or flanges **18** and **20** are attached to the web **16** intermediate their edges.

Bottom plate **20** is in the nature of a flat, relatively wide base portion **22** having a downturned flange or skirt **24** formed on the inner edge thereof, the base portion **22** resting flat against the top surface of a roof or the like **26** with the downturned flange **24** abutting the side edge of the roof defining the skylight opening to position the supporting frame around the periphery of this opening. The upper surface of the base portion **22** extending around the periphery of the supporting frame outside of the confining area of the web **16** is provided with transversely spaced, longitudinally extending notches or grooves **28**.

To mount the supporting frame, the same is simply placed on the surface of the roof or the like with the base portion **22** in abutment with the roof surface and the downturned flange in abutment with the side edges of the roof surface defining the skylight opening. Then, the top surface of the base portion **22** including the notches **28** are coated with a suitable roof sealing composition, and the roofing paper **30** or the like overlies the top surface of the base portion **22** and is sealed thereto, the notches **28** providing a water-tight seal when filled with the sealing composition.

The top plate or flange **18** forms the web or bottom of a channel having an upturned inner side flange **32** and an upturned outer side flange **34**. The free edge portion of the outer side flange **34** is upwardly and inwardly bent to overlie a portion of the web **18** of the channel, as at **36**, and forms a support for the side edges of the skylight panel **38**.

In addition to its supporting function, the channel consisting of the web 18 and flanges 32 and 34 comprises a condensate gutter, outer side flange 34 being provided with longitudinally spaced apertures at the juncture of this flange to the web 18 to drain condensate from the gutter onto the roof surface 30.

The portions of the top plate 18 and the bottom plate 20 extending inwardly from the web 16 of the I-member provide a hollow space for the reception of insulating panels, such as that shown at 42 in Figure 2, if desired.

The attaching frame 14, by means of which the corrugated skylight panel 38 is clamped onto the upper inturned flange portion 36 of the supporting frame 12 spacedly surrounds the supporting frame 12.

This attaching frame is, as shown in Figures 2 and 3, in the shape of an angle iron in cross-section, including first and second right angularly related legs 46 and 48. Leg 46 lies parallel to the outer side flange 34 of the channel top plate 18 and is spaced therefrom. Fasteners 50 join leg 46 to the outer side flange 34 and spacing members or collars 52 on each fastener 50 maintain the leg 46 in fixed, spaced relation to the outer side flange 34.

Leg 48 extends inwardly transversely of leg 46 and overlies the inturned flange portion 36 and clamps the edges of the skylight panel 38 within the space between the second or transverse leg 48 and the inturned portion 36 of the side flange 34.

At the juncture of the legs 46 and 48, the angle members comprising the attachment frame 14 is formed with an enlargement in the form of an undercut triangular block 54 which serves as an abutment stop for the peripheral edges of the skylight panel 38 to space them from the first leg 46 of the attachment frame. The depth of this abutment stop which is formed integrally with the frame 14 is substantially equal to the space between the leg 46 of the attachment frame and the outer side flange 34 of the supporting frame in order to ensure proper drainage from the surface of the skylight panel 38 which, as shown in the drawings, is in the form of a corrugated translucent, preferably plastic plate. This construction serves to automatically space the peripheral edges of the skylight panel from the leg 46 of the attachment frame, permitting free drainage in the space between the attachment frame and the supporting frame while comprising an extremely strong panel.

In the modified skylight structure 56 as shown in Figures 4–6 of the drawings, provision is made for weather stripping the corrugated skylight dome or panel 38 against the passage of air between the dome and its supporting frame.

The supporting frame is designated by the numeral 58 and the skylight panel attaching frame by the numeral 60. The attaching frame 60 is identical to the previously described attaching frame and is, as shown in Figures 5 and 6, in the shape of an angle iron in cross-section, including first and second right angularly related legs 62 and 64, the angle between the legs being partially occupied by an integrally formed, triangular-shaped abutment block or stop 65 for the skylight panel 38.

The supporting frame 58 distinguishes from the previously described supporting frame 12 although being of substantially the same cross-sectional configuration, namely, that of an I beam. Each frame member consists of a vertical web 66, top flange or plate 68 and bottom flange or plate 70.

The bottom plate 70 and the web 66 are identical to those of frame 12.

The top plate 68 forms the bottom or web of a channel having an upturned inner side flange 72 and an upturned outer side flange 74. The free edge portion of the outer side flange is upwardly and inwardly bent forming a lip or inclined flange 76 overlying a portion of the web of channel 68. The free edge portion 78 of the lip 76 is disposed substantially parallel to the web of the channel and spaced, vertically extending legs 80 rising from the free edge portion 78 form a sealing strip receiving channel.

A resilient strip of sponge rubber or other suitable material 82 is received between the legs 80 and projects thereabove around the supporting frame.

Thus, the skylight panel 38 rests directly on the sealing strip 82 which readily conforms to the undulations of the corrugated panel and prevents the ingress of air between the panel and the supporting frame.

With either form of the invention as above described, where the panel is domed as shown, there is no necessity for spacing the leg 62 of the attaching frame 60 from the flange 74 of the supporting frame 66 on the sides of the supporting frame parallel to the direction of the corrugations on the panel 38 since no drainage will occur on those sides, the leg 62 and flange 74 being shown in abutment in Figure 5.

The skylight supporting frame, as described, provides a simple and effective means of mounting the skylight panel over a skylight opening which necessitates the formation of no surrounding curb for the skylight opening, which assures proper drainage onto the roof from the skylight panel and proper drainage of condensate forming underneath the skylight panel, and which is capable of simple and quick attachment to a roof surrounding the skylight opening.

In the modification of Figs. 7 and 8 a construction suitable for mounting on a conventional curb comprises in the mounting frame 110, a curb frame 116 and a frame 118 for retaining between this frame and the curb frame 116 the dome or panel 114.

The curb frame 116 provides a continuous gutter 120 of channel shape including bottom or web 122 and inner and outer upstanding flanges 124 and 126, respectively. Integrally depending from the lower surface of the web 122 between the inner and outer flanges 124 and 126 is an apron 128 which extends throughout the length of the curb frame 116. The lower surface of the web 122 between the inner flange 124 and apron 128 rests upon the top of the curb 112 while the apron 128 itself lies flat against the outer side surface of the curb 112. Suitable fasteners 130 secure the apron 128 to the curb 112 and constitute the means for securing the curb frame 116 to the curb 112.

The inner flange 124 extends upwardly at an obtuse angle to the web 122 of the channel shaped condensate gutter to increase the condensate collecting area of the condensate gutter.

The outer flange 126 of the condensate gutter 120 in the embodiment being described rises vertically from the web 122 and has its upper flange portion inwardly turned as at 132 to overlie a portion of the web 122. In this embodiment the web 122 and the outer flange 126 overhang the curb somewhat.

Weep holes 134 are provided in the web 122 between the outer flange 126 and the apron 128 to allow condensate within condensate gutter 120 to drip down over the outer surface of the apron 128. The bottom edge of the apron 128 is out-turned as at 136 to provide a drip flange to direct the condensate away from the curb 112 to fall upon the roof.

The retaining frame 118 spacedly surrounds the curb frame 116 and is generally L-shaped in cross-section including a first vertical leg 138 and a second transverse leg 140.

The first leg 138 lies parallel to and spaced outwardly from the outer flange 126 and is secured to the outer flange 126 by means of preferably self tapping screws 142. Spacers 144 provided on these screws 142 are interposed between the outer flange 126 and the first leg 138 of the retaining frame 118 to maintain these members in spaced relation to one another.

The second or transverse leg 140 of the retaining frame 118 overlies the inturned flange portion 132 extending up-

wardly from the outer flange **126** whereby the edge portions of the dome or panel **114** are clamped between the leg **140** and the flange portion **132**. The spacing between the first leg **138** and the outer flange **126** provides a convenient liquid removing passage throughout the periphery of the supporting frame **110** to carry away that water which would collect between the edges of the panel or dome **114** and the retaining frame **118**. The drip flange **136** on the bottom edge of the apron **128** will serve also to direct this discharge from the frame **110** away from the curb **112**.

The dome or panel **114** is preferably of corrugated plastic which may be completely transparent or tinted to any desired degree of opacity. The shape of the dome or panel **114** may be flat, arched or hemispherical as desired.

When the skylight panel **114** is arched as shown in Figs. 1, 2, 4 and 6, the length and curvature as well as the angular relation of the first and second legs **138** and **140** of the retaining frame **118** of Figs. 7 and 8 are varied accordingly.

Where the weight of the dome panel **114** warrants, spacers or spreaders not shown may be provided between the upper inturned portion **132** and the inner surface of the web **122** to support the inturned flange portion **132**. Further, for extremely large spans, simple aluminum trusses or the like may be fastened to these spreaders adjacent to the frame at the opposite sides of the frame structure to span the distance from one side of the skylight to the other.

The corrugations of the panel **114** provide draining channels for directing rain water from the dome through the space between the leg **138** of the retaining frame **118** and the flange **126** of the curb frame **116**. Any overflow of rain water or condensation on the panel will go into the condensation gutter **120** and will be carried out through the weep holes **134**.

From the foregoing, the construction and operation of the device will be readily understood and further explanation is believed to be unnecessary. However, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the appended claims.

What is claimed as new is as follows:

1. In a skylight including a curb, a panel and frame construction providing a gutter comprising a gutter bottom supported on and extending along the upper surface of said curb and projecting transversely of its length outwardly of said curb, said gutter having an outer vertical flange extending upwardly from and connected to said gutter bottom outwardly of said curb, said gutter having an inturned flange connected to the upper portion of said outer vertical flange and extending therefrom inwardly and upwardly over said gutter in inclined relation to the horizontal to an upper edge of said inturned flange, said inturned flange being continuous along the length of said gutter to provide a downwardly and outwardly inclined drainage surface on the upper face of said inturned flange and continuous along the length of said gutter, said panel at the edge portion thereof being supported on said upper face of said inturned flange, a frame member extending along said curb and having a vertical leg disposed outwardly of and in spaced relation to said vertical flange of said gutter, and means disposed in spaced relation along the length of said gutter and engaging said vertical flange and said leg to hold said frame member in place in said spaced relation of said leg to said vertical flange, said frame member having a transverse leg connected to said vertical leg thereof and extending therefrom inwardly over the edge portion of said panel to engage and secure said panel in place supported on said upper face of said inturned flange, said gutter providing means adjacent said bottom for draining said gutter outwardly of said curb.

2. A skylight unit adapted to be supported on a curb extending along an edge of a skylight opening comprising a base member including a gutter bottom adapted to be carried above and extend longitudinally with said curb, an outer generally vertical flange extending along and upwardly from and connected to an outwardly disposed portion of said gutter bottom, and an inturned flange connected to the upper portion of said outer vertical flange and extending therefrom inwardly and upwardly in inclined relation over said gutter bottom to an upper edge of said inturned flange, said inturned flange being continuous along the length of said gutter bottom to provide a downwardly and outwardly inclined drainage surface on the upper face thereof, and means for draining said gutter bottom outwardly of said curb; a skylight panel supported at its edge portion on said upper face of said inturned flange; and a retaining frame member including a generally vertical leg disposed outwardly of and in spaced relation to said vertical flange and extending lengthwise therewith, means disposed in spaced relation along the length of said vertical flange and said vertical leg to engage and hold said vertical flange and said vertical leg in position in spaced relation to one another, and a transverse leg connected to the upper portion of said vertical leg and extending therefrom inwardly over the edge portion of said panel to engage and secure said panel in position on said upper face of said inturned flange.

3. A skylight unit as defined in claim 2 wherein said base member also includes an inner wall extending along and upwardly from and connected to an inner portion of said gutter bottom.

4. A skylight unit as defined in claim 2 wherein said means for draining said gutter bottom are weep holes extending through said base member near the connection of said vertical flange and said gutter bottom and disposed outwardly of said curb.

5. A skylight unit as defined in claim 2 wherein said retaining frame member also includes a lug engaging the edge of said panel in abutting relation and spacing said panel edge from said vertical leg of said frame member.

6. A skylight unit as defined in claim 2 which also comprises a channel element connected to and extending along the length of said upper edge of said inturned flange with the channel of said element open upwardly for receiving a sealing strip disposed in said channel and engaging the under surface of said panel.

7. A skylight unit as defined in claim 2 wherein said skylight panel is corrugated.

8. A skylight unit comprising a supporting member including a vertically disposed integral curb portion adapted to be disposed with its lengthwise extent along and adjacent an edge of a skylight opening, a base portion integrally connected to and extending outwardly from and transversely of said curb portion adjacent the lower portion thereof and adapted to engage a roof structure surrounding and defining said skylight opening, an outer generally vertical flange integral with and extending upwardly from the upper part of said supporting member, and an inturned flange integrally connected to the upper portion of said outer vertical flange and extending therefrom inwardly and upwardly to an upper edge of said inturned flange, said inturned flange being continuous along the length of said supporting member to provide on its upper face a downwardly and outwardly inclined drainage surface continuous along the length thereof; a skylight panel supported along its edge portion on said upper face of said inturned flange; and a retaining frame member extending along said supporting member and including a generally vertical leg disposed outwardly of and in spaced relation to said generally vertical flange, means disposed in spaced relation along the length of said frame member and engaging and holding said vertical flange and said vertical leg in position in said spaced relation to each other, and a transverse leg connected to the upper portion of said vertical leg

and extending therefrom inwardly over the edge portion of said panel and engaging and securing said panel in position on said upper face of said inturned flange.

9. A skylight unit adapted to be supported about an edge of a skylight opening comprising a supporting member including a vertically disposed web adapted to extend longitudinally with and upwardly from said edge of the skylight opening, a generally horizontal gutter bottom integral with and disposed above said web, an outer generally vertical flange extending upwardly from and integrally connected to an outwardly disposed portion of said gutter bottom, and an inturned flange integrally connected to the upper portion of said outer vertical flange and extending therefrom inwardly and upwardly in inclined relation over said gutter bottom to an upper edge of said inturned flange, said inturned flange being continuous along the length of said gutter bottom to provide a downwardly and outwardly inclined drainage surface on the upper face thereof, and means for draining said gutter bottom outwardly of said vertical web; a skylight panel supported at its edge portion on said upper face of said inturned flange; and a retaining frame member extending along said supporting member and including a generally vertical leg disposed outwardly of and in spaced relation to said vertical flange, means disposed in spaced relation, longitudinally along said vertical flange and said vertical leg to engage and hold said vertical flange and said vertical leg in spaced relation to one another, and a transverse leg connected to the upper portion of said vertical leg and extending therefrom inwardly over the edge portion of said panel and engaging and securing said panel in position on said upper face of said inturned flange.

10. A skylight unit as claimed in claim 9 wherein said supporting member also includes a horizontally disposed base member integrally connected to said vertical web adjacent the bottom thereof and adapted to engage a roof structure surrounding and defining said skylight opening, and a skirt integrally connected to said base member adjacent the inner portion thereof and depending therefrom so as to be adapted to be disposed within the skylight opening adjacent said edge thereof.

11. A skylight unit as defined in claim 9 which also comprises a channel element integrally connected to and extending along the length of said upper edge of said inturned flange with the channel of said element opening upwardly for receiving a sealing strip to be disposed in said channel and to engage the under surface of said panel.

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