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3,435,579

THERMALLY INSULATED WALL CONSTRUCTION

Filed Nov. 22, 1966

Sheet 1 of 2

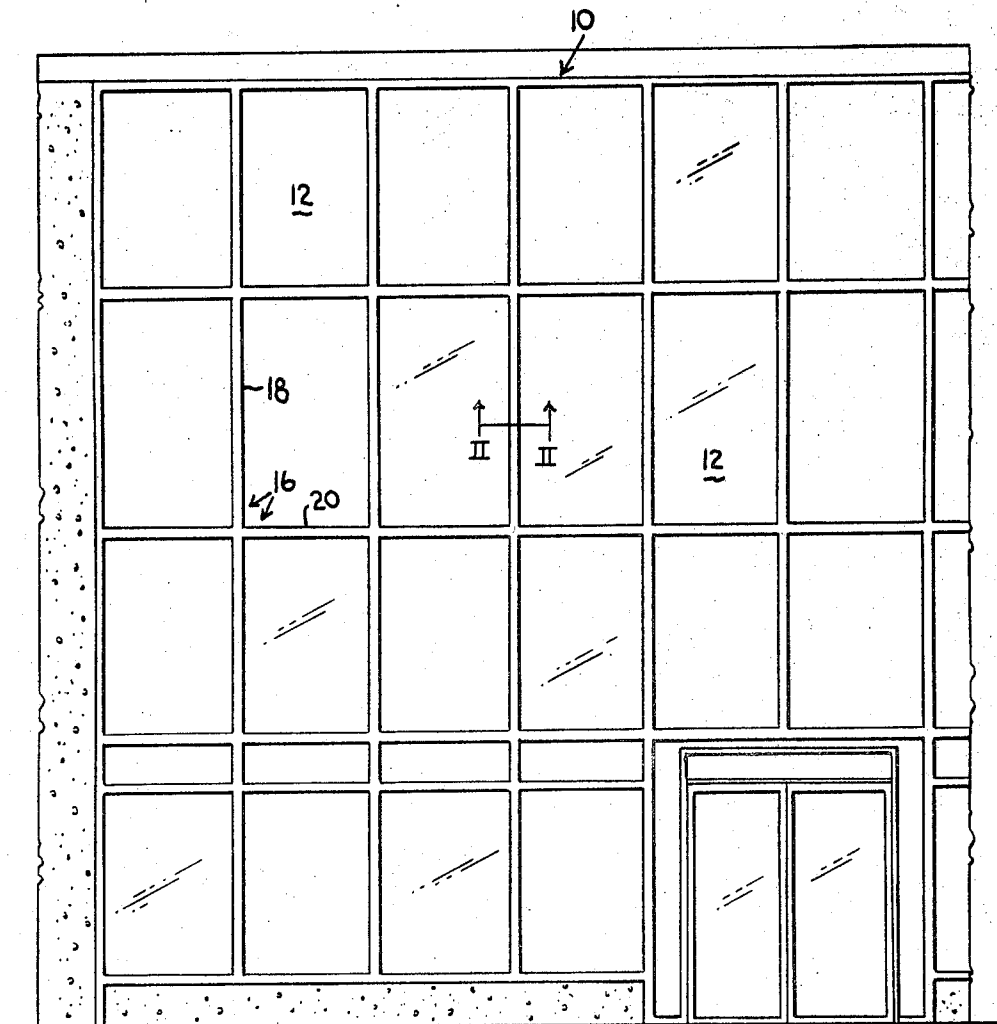


FIG. 1

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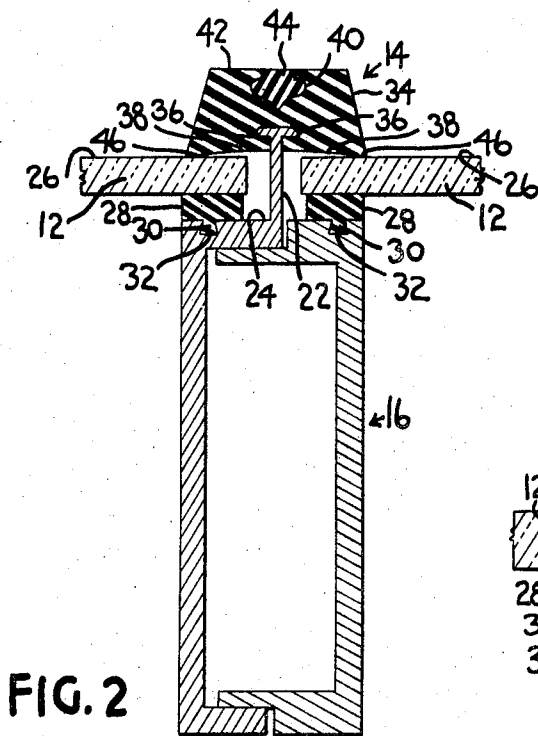


FIG. 2

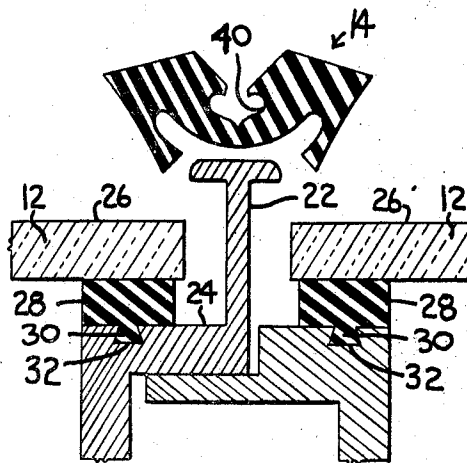


FIG. 3

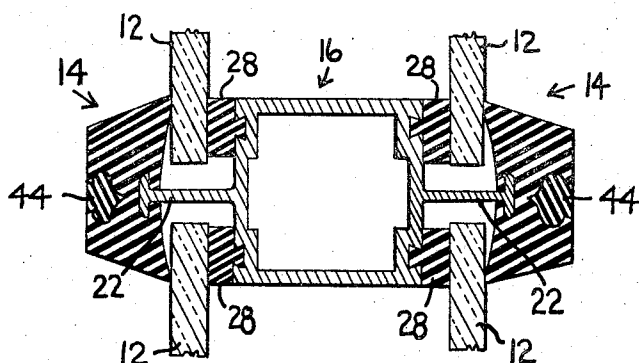


FIG. 4

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THERMALLY INSULATED WALL CONSTRUCTION
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11 Claims

ABSTRACT OF THE DISCLOSURE

A curtain wall or partition wall construction having a structural rubber gasket and rubber panel backing strips that thermally and acoustically isolate supported panels and associated metal stiffening members.

This invention relates to a wall construction, and in particular to an improved curtain wall or partition wall construction employing a novel elastomeric structural glazing gasket.

In copending application Ser. No. 417,127, filed Dec. 9, 1964, now U. S. Patent 336,707, by the present inventor, there is disclosed a novel curtain wall system for mounting panels on a frame or grid structure comprising a T-shaped elastomeric structural glazing gasket having the leg portion of the gasket received in an inwardly directed mounting groove in a frame member and wherein gasket engagement means supported within said groove engage the leg portion of the gasket to lock the assembly together. To the present inventor's knowledge, the above construction represents the first fully insulated building wall system of its kind.

In known forms of wall construction prior to the above invention, various attempts had been made to provide a thermal grid barrier, i.e., a thermal break in the grid or frame members as well as a thermal break between the panel members and the grid or frame members to prevent heat transfer from one member to the other. However, none of these known forms of construction completely succeeded in attaining the foregoing objective.

The present invention, like that disclosed in the aforementioned copending application Ser. No. 417,127, combines all of the best features of known types or forms of curtain wall construction and provides a novel curtain wall system that is relatively easy and inexpensive to install, that inherently possesses a complete thermal grid barrier, and that is comparable or lower in cost to any known form of construction.

In addition, the curtain wall system of the present invention provides a clean sight line, particularly when viewing directly into the curtain wall. This is important both aesthetically and functionally where the system employs the use of transparent panels.

Furthermore, the curtain wall system of the present invention can be completely reversed and thus can accommodate mounting of the panels either from the interior or the exterior of the building for maximum freedom in design and installation. Also, the present invention provides a novel structure for the horizontal and vertical panel framing members or stiffening members that are employed to anchor the structural gaskets in their installed position.

A novel feature of the present invention which makes the above advantages possible involves the use of an elastomeric structural glazing gasket constructed and arranged to be securely mounted on a flange extending from one face of a frame or grid structure in a manner that permits it to fully insulate, structurally support, resiliently retain and weather seal the curtain wall panels in their installed position.

A structural gasket, as the term is herein employed, means an elastomeric member which is so integrated with the structural members of the system and so associated with the curtain wall panels as to become literally an essential part of the panel supporting structure. In other words, an essential function of a structural gasket member is to provide structural support for the curtain wall panels. However, the gasket may also have other functions, such as insulating, resiliently retaining and weather sealing the curtain wall panels in their installed position.

Elastomeric gasket strips have been used in the past to sealingly retain and cushion panels, such as plate glass or window glass, when mounted in the walls of a building or in automobile bodies. Such gasket strips generally comprise an elongated elastomeric body having grooves therein for receiving the edges of glass and/or other rigid sheets to be joined. The gasket strip may also include a wedge-shaped member insertable in a wedge-receiving recess in the body of the strip, whereby the elastomeric material is crowded to cause the groove to engage the glass and/or other rigid sheets more tightly. Other forms employ a cylindrical wedge insertable in a cylindrical groove for the same purpose.

Such known gasket strips provide a resilient weather seal around the periphery of the panel. When wedges are employed, the wedge helps to force the strip material into tight engagement with the panel, thereby positively preventing air or water from passing around the edge of the panel.

However, prior to the present invention, the use of such gasket strips in curtain wall construction has been severely limited by various design, installation and performance considerations. It was thus left for the present invention to provide a fully insulated curtain wall system that offers complete freedom of design and provides superior performance under all normal conditions of exposure, while employing elastomeric structural glazing gaskets in combination with metal stiffening members that provide an anchor flange for the structural gaskets.

Other features and advantages of the invention will be better understood when reference is had to the accompanying drawings, wherein similar parts are usually designated by the same numeral and in which:

FIG. 1 represents an outside elevation of a typical curtain wall constructed in accordance with the present invention;

FIG. 2 is a typical cross-section along a line such as II—II of FIG. 1 showing the details of a preferred embodiment of the elastomeric structural glazing gasket, in conjunction with a preferred form of metal frame or stiffening member which may be employed;

FIG. 3 is a cross-section of the preferred elastomeric structural glazing gasket of the present invention and a portion of a preferred form of metal stiffening member. The gasket member is shown deformed or bent back on itself to facilitate mounting the gasket member on or about a companion flange member carried on said stiffening member; and

FIG. 4 is a cross-section of a portion of a typical partition wall constructed in accordance with the present invention illustrating the preferred elastomeric structural glazing gasket of this invention in combination with a preferred form of metal frame or stiffening member which may be employed.

The curtain wall 10, depicted in FIG. 1, is composed of a plurality of panels 12, which are separated and supported along their peripheral edges by an elastomeric structural glazing gasket 14 securely mounted on metal frame or grid members, indicated generally at 16, and comprising vertical and horizontal stiffening members 18, 20 of substantially identical cross-section. The frame member shown in FIG. 2 is a split member. Split mem-

bers are frequently employed to accommodate expansion in the walls of a building. For the purpose of the present invention, however, the frame member 16 may also be a one-piece extrusion or it may be a sectionalized member of cross-sectional configuration somewhat different than that shown in FIG. 2. In addition, unitary and/or sectionalized frame members can be used in any desired combination. Notwithstanding the above, the essential details of the vertical and horizontal members 18, 20 of the present invention are identical, and thus for the purpose of the following description, reference may be had to FIG. 2 for details that are common and essential to both members.

Although FIG. 1 is intended to show elastomeric structural glazing gaskets supporting a plurality of panels covering a complete wall section, it will be appreciated from the following description that the present invention is equally well adapted to single or multiple panel constructions. The panels 12 may be of an insulating or noninsulating type and of any suitable material or construction.

Referring to FIG. 1, vertical stiffening members 18 and horizontal stiffening members 20 are joined to form a rigid structural frame or framework. With particular reference being had to FIGS. 2 and 3, the vertical and horizontal stiffening members 18, 20 have, as a common essential feature, an anchor flange 22 that extends forwardly of the forward face 24 of each of the respective stiffening members, and at right angles thereto, for a distance greater than the distance from the forward face 24 of the stiffening members 18, 20 to the forward face or surface 26 of the panel to be mounted. In the embodiment shown, this anchor flange is T-shaped in cross-section.

The longitudinally extending resilient backing strips 28 that are employed in connection with the present construction may be composed of rubber or other insulating material and may be of any suitable configuration. In the embodiment shown, the backing strips 28 are generally rectangular in cross-section. The backing strips 28 have a dovetail portion 30 formed thereon for inserting and retaining the backing strips 28 in correspondingly shaped grooves 32 that flank flange 22 and are formed in the forward face 24 of the stiffening members 18, 20.

The structural glazing gasket 14 employed in the preferred embodiment of the present invention comprises an elongated strip made of natural or synthetic rubber or other resilient insulating material. The structural gasket has an elongated body portion 34 having a longitudinally extending T-shaped groove 36, corresponding in shape and size to T-shaped flange 22, formed in its panel-engaging face 38, and a wedge recess 40 formed in its opposite face 42.

As aforesaid, vertical and horizontal stiffening members 18, 20 are joined together to form a rigid frame or structural grid. Resilient backing strips 28 are fastened to the forward face 24 of the stiffening members 18, 20 by inserting the dovetail portion 30 on the resilient backing strips into the correspondingly shaped grooves 32 in the forward face 24 of the stiffening members. The panels are positioned on the thus-formed framework of resilient backing strips. The elastomeric structural glazing gasket 14 is folded back on itself to expand the T-shaped groove 36 and the T-shaped groove is snapped over the T-shaped anchor flange 22 carried on the forward face 24 of each of the vertical stiffening members 18 and each of the horizontal stiffening members 20. The elastomeric structural glazing gasket 14 extends completely around the periphery of each of the panels 12. A wedge 44 is inserted in wedge recess 40 in the forward face 42 of the gasket member to lock and retain the structural glazing gasket 14 on the forwardly extended T-shaped anchor flange 22 and to press the structural gasket member firmly against the adjacent panel 12.

In its installed position, the panel-engaging face 38 on body portion 34 of the structural glazing gasket extends laterally outwardly towards the panel 12 and at an acute angle to the T-shaped anchor flange 22 for a substantial distance on either side of said anchor flange. The face 38 terminates in a sealing lip 46, which is deformable upon mounting gasket 14 over the most forwardly extending portion of the anchor flange 22. Sealing lip 46 is maintained deformed in sealing engagement with the panel 12 by insertion of longitudinally extending wedge 44 into longitudinally extending wedge recess 40 formed on the opposite face 42 of the gasket 14 and, in addition, tongue or flange grip pressure is applied at the same time to secure the gasket 14 to the anchor flange 22.

It will be evident from the foregoing that the structure of this invention provides a simple means for installing and directly supporting glass or other building panels without the use of additional supporting structure, weather sealing and/or insulating material. Furthermore, the structural glazing gasket disclosed permits a single structural gasket to provide support for two panels while maintaining a clean sight line between the gasket, glass and metal members. Gasketed corners may be accomplished by the use of crosses, L's and T's having the same basic configuration as mentioned above. The crosses, L's and T's will then adjoin the straight runs of the basic gasket configuration to form completely gasketed openings. At outside corners and junctions or in single panel installations, a filler element of suitable thickness may be used to fill the space normally occupied by a panel.

In the embodiment of FIG. 4, there is shown a wall construction that has particular utility for sound attenuating partitions or the like. The basic construction of the gasket members and anchor flanges is the same as disclosed above. In this embodiment, however, there is shown a stiffening member 16 having anchor flanges 22 extending from two opposite sides thereof to accommodate mounting panels 12 in two spaced parallel planes. The use of resilient backing strips 28 and elastomeric glazing gaskets 14 complements the sound-deadening properties of a closed airspace to provide a partition structure having excellent sound-attenuating properties.

While the preferred embodiments of this invention have been illustrated and described, it will be understood that various changes and modifications may be made within the scope of the appended claims without departing from the spirit of the invention. For example, the longitudinal wedge-receiving recess and the longitudinal wedge shown in connection with elastomeric structural glazing gasket 14 of the present invention need not necessarily be located directly opposite the anchor flange 22. The gasket 14 could be of a different shape than that shown and one or more wedge members of a shape different than that shown could be inserted in corresponding recesses suitably located in the gasket in a manner that will permit locking the gasket to the anchor flange while pressing the gasket member firmly against an adjacent panel. Furthermore, flange member 22 may be an applied member or an integral portion of an applied member fastened onto a companion reinforcing or stiffening member, and it may or may not have dovetail grooves associated therewith to receive panel backing strips. In addition, the shape of the anchor flange is not considered critical, so long as it functions as a suitable anchor for the gasket. Also, other conventional components of standard wall construction not shown can be employed in connection with the present construction, such as setting blocks, anchor members, convactor covers and the like.

I claim:

1. An elastomeric structural glazing gasket for mounting a panel on a frame member comprising an elongated member having a panel-engaging face terminating in longitudinally disposed sealing lips that lie in substantially the same plane, a longitudinal groove formed in said face

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having an entrance portion and an enlarged portion inwardly of said entrance portion and at least one longitudinal wedge-receiving recess in said member.

2. The elastomeric glazing gasket as defined in claim 1, wherein said longitudinal wedge-receiving recess is located opposite said groove and a longitudinal wedge member is located in said recess.

3. A structural panel support comprising horizontal and vertical members interconnected to form a frame, each said frame member carrying a flange projecting in the same direction, an elastomeric glazing gasket mounted on said flange, said glazing gasket having a panel-engaging face terminating in longitudinally disposed sealing lips that lie in substantially the same plane, a longitudinal groove formed in said panel-engaging face having an entrance portion and an enlarged portion inwardly of said entrance portion, said gasket being mounted on said flange by said groove with said enlarged portion of said gasket in surrounding engagement with an enlarged portion on said flange, at least one longitudinal wedge-receiving recess in said gasket and a longitudinal wedge member in said recess.

4. The structural panel support of claim 3 wherein said longitudinal groove in said gasket is T-shaped in cross-section.

5. The structural panel support of claim 3 wherein each said frame member carries a second flange projecting in a direction opposite to the first-mentioned flange and a glazing gasket of the same construction as the first-mentioned glazing is mounted thereon in the same manner as said first-mentioned glazing gasket is mounted on said first-mentioned flange to thereby provide support for a pair of panels arranged in spaced parallel relation to each other.

6. The structural panel support of claim 3 wherein said panel-engaging face extends laterally outwardly for a substantial distance on either side of said groove.

7. The structural panel support of claim 6 wherein said gasket member is of generally trapezoidal cross-section and said longitudinal wedge-receiving recess is located directly opposite said groove.

8. A structural panel support comprising horizontal and vertical members interconnected to form a frame, each said frame member carrying a flange projecting in

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the same direction, an elastomeric glazing gasket mounted on said flange having a panel-engaging face with a longitudinal groove formed therein, said panel-engaging face extending laterally outwardly for a substantial distance on either side of said groove and terminating in longitudinally disposed sealing lips, said gasket being mounted on said flange by said groove and means for urging said panel-engaging face into sealing engagement with a panel.

9. The structural panel support of claim 8 which further includes an insulating panel backing strip carried by each said frame member in flanking relation to said flange.

10. An insulated wall construction comprising horizontal and vertical members interconnected to form a frame, each said frame member carrying a flange projecting in the same direction and an insulating panel backing strip flanking said flange, an insulating structural glazing gasket mounted around the free end of said flange and a panel supported between said backing strip and said gasket.

11. The insulated wall construction of claim 10 wherein said glazing gasket comprises an elongated member having a panel-engaging face terminating in longitudinally disposed sealing lips that lie in substantially the same plane, a longitudinal groove formed in said face for mounting said gasket around the free end of said flange and means forming a part of said gasket for urging said panel-engaging face into sealing engagement with said panel.

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U.S. Cl. X.R.

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