United States Patent

Wright et al.

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[54] **SEALING STRIP**

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Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 759,314, Sept. 12, 1968, abandoned.

[52] **U.S. Cl.** **52/398,** 49/489, 52/400, 52/627

[51] **Int. Cl.**.....**E06b 3/62,** E04b 1/36

[58] **Field of Search**.....52/208, 397–400, 52/498, 627, 616; 49/488, 489, 498

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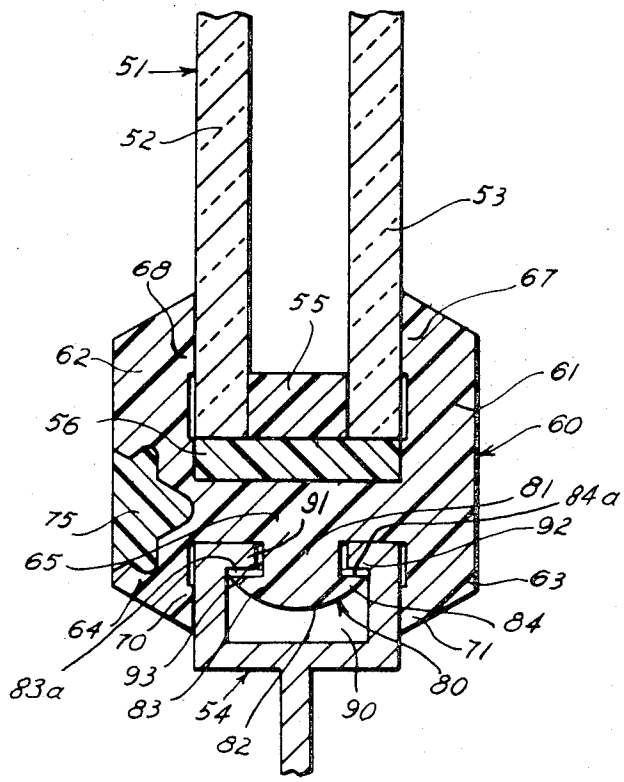
[57] **ABSTRACT**

An elongated elastomeric sealing member having a cross-section comprising generally parallel portions connected by a web portion and forming a channel therebetween. An elongated tongue portion projects from the web portion into the channel. The cross-section of the tongue portion comprises a head portion connected to the web portion by a shank portion. The head portion has oppositely directed lateral lips normally not engaging another member to which the sealing member is to be connected but adapted to engage the other member on a force being applied to said sealing member preventing both lateral movement and pull out of said sealing member relative to the other member.

11 Claims, 2 Drawing Figures



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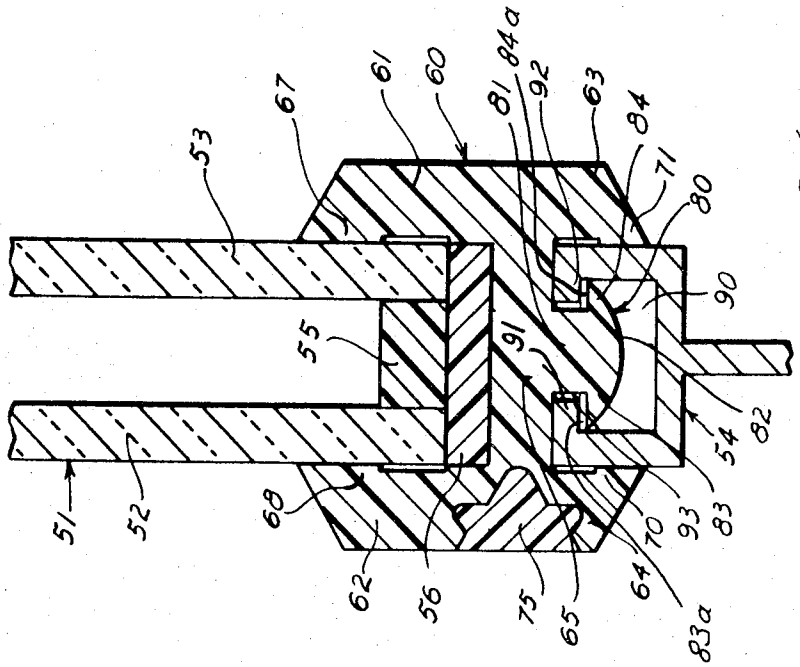

Fig. 2

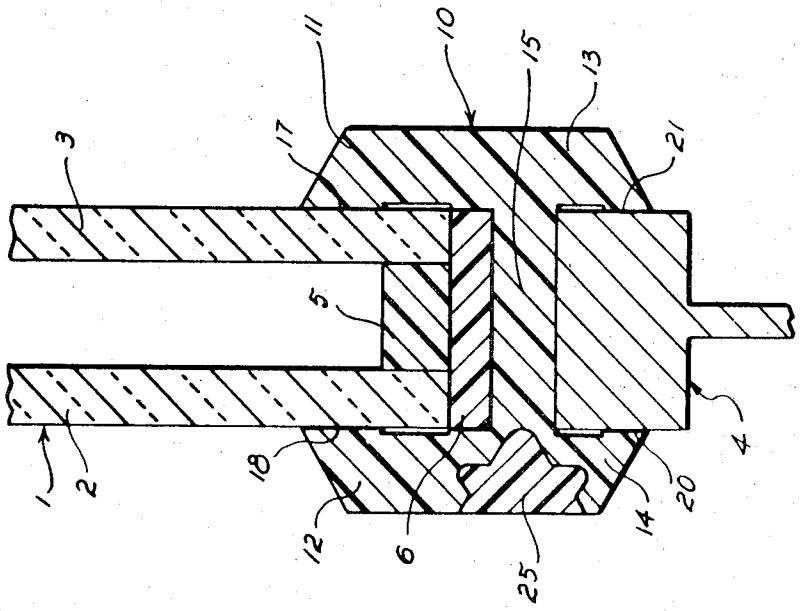

Fig. 1

PRIOR ART

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SEALING STRIP

CROSS REFERENCE TO RELATED APPLICATION

The application is a continuation-in-part of our earlier filed co-pending application Ser. No. 759,314, filed on Sept. 12, 1968 and now abandoned.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention is related to seals. More specifically, it concerns seals suitable for mounting window glass in a window frame.

2. Description of the Prior Art

There are several methods of installing glass in the window glazing art. Elastomeric connector strips have been developed and are commonly used for sealingly mounting and cushioning panels such as window glass in a frame or wall of a building. Many widely used seal designs utilize a generally H-shaped cross-section which provide oppositely disposed channels one of which sealingly engages the window glass and the other of which sealingly engages the surrounding window frame or wall.

Windows are often glazed with factory-produced panes consisting of two parallel sheets of glass separated by a thin dehydrated air space maintained by a tight seal around their edges. Because of the seal and the dehydrated air there is no condensation or accumulation of dirt within the air space. The heat loss through the window is substantially reduced during the winter, and the heat gain during the summer is correspondingly reduced.

Whether a window consists of a single sheet or a double sheet of glass it is important that the seal strip provide an effective seal against the elements. Furthermore, it is necessary that the seal sufficiently resist the windloads applied to the window area. If not, a high wind may cause the seal to roll-out and blow the window glass out of the frame.

In the past, the commonly used H-type gasket has limited the glass size used in windows. Larger glass sizes have created a roll-out problem. This is particularly true in double-glazed windows since the relative depth of the seal channels in relation to the gasket width is generally less than that of a single glass window. In fact, some city construction codes have limited the window size in building construction simply because the glazing seals of the past have been inadequate for larger sizes.

Furthermore, in the past, to withstand high windload velocities, it has been necessary to use glazing gaskets with small glass to gasket clearances and excessive lip seal clamping pressure. This has resulted in a high cost of labor for installing the units.

SUMMARY OF THE INVENTION

The present invention involves an elongated elastomeric sealing member whose cross section comprises generally parallel portions connected by a web portion and forming a channel therebetween for sealingly engaging another member, characterized by an elongated tongue portion projecting from the web portion into non-engaging disposition the channels but adapted for engagement with the other member resisting lateral movement or pull out of the sealing member relative to the other member on a force being directed against the sealing member. One embodiment for window glazing uses is similar to a standard H-type seal but with the additional tongue element which increases its windload carrying capabilities and allows normal gasket to glass clearances making installation cheaper. In such a use the tongue is normally nonengagingly disposed in a channel formed in a window frame but is adapted to engage the frame under abnormal wind loads to create a positive locking action between the frame and gasket. This enables the gasket to resist pull out in the direction of the glass and gives greater resistance to lateral movement and roll.

BRIEF DESCRIPTION OF THE DRAWINGS

Further objects and advantages of the invention will become apparent from the following description when taken in conjunction with the drawing in which:

FIG. 1 is a detailed cross-section of window construction using the standard H-type gasket of the past; and

FIG. 2 is a cross-section of window construction according to one embodiment of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring first to FIG. 1, a glass panel 1 comprising two parallel sheets of glass 2, 3 are shown mounted in a window frame 4 with a standard H-type seal 10 as used in the past. A spacer element 5 is mounted between the glass sheets 2, 3 and approximately six inch setting blocks 6 are provided at quarter points adjacent the glass panel bottom edges. Setting blocks 6, made of a material such as neoprene, eliminate point contact and point loading of the glass panel 1.

Seal 10, made of an elastomeric material such as neoprene, comprises a pair of generally parallel portions, formed by inner wings 11, 12 and outer wings 13, 14, and a web 15 forming the cross member of the H. Inner wings 11, 12 terminate at their inner edges in inwardly directed lips 17, 18 and form an inner channel in which the edge of glass panel 1 is disposed and sealingly engaged by lips 17, 18. Outer wings 13, 14 terminate at their inner edges inwardly directed lips 20, 21 and form an outer channel in which the edge of window frame 4 is disposed and sealingly engaged by lips 20, 21.

A wedge member 25, generally of a material harder than seal 10, is disposed in a longitudinal recess substantially along the axis of web 32. To install the window unit seal strip 10 is fitted around the inside edge of window frame 4 with wedge 25 removed. Then inner wing 12 is bent back so that panel 1 may be fitted into the inner channel of seal 10. The wedge strip 25 is then inserted into the recess provided therefor, forcing wings 12 and 14 toward panel 1 and frame 4 respectively so that lips 11, 12 sealingly engage panel 1 and lips 13, 14 sealingly engage frame 4.

This type seal has been effective under certain conditions. However, to withstand high windload velocities with large glass panels, excessive lip seal clamping pressures and small glass to gasket clearances are required resulting in increased labor cost. Even this may not prevent the seal lips from rolling out under high windloads for large glass panels.

Referring now to FIG. 2, a detailed cross section of a window installation according to a preferred embodiment of the invention is shown which eliminates or reduces the problems encountered with the commonly used seal 10 of FIG. 1. As in FIG. 1, a glass panel 51 comprising two parallel sheets of glass 52, 53 are shown mounted in a window frame 54. However, a new and novel elastomeric connector seal 60 replaces the ordinary seal 10 of FIG. 1. Spacer element 55 and setting block 56 are similar to corresponding elements in FIG. 1.

Seal 60 comprises a pair of generally parallel portions formed by inner wing 61, 62 and outer wings 63, 64, and a web 65 forming the cross member of the H. Inner wings 61, 62 terminate at their inner edges in inwardly directed lips 67, 68 and form an inner channel in which the edge of glass panel 51 is disposed and sealingly engaged by lip 67, 68. Outer wings 63, 64 terminate at their inner edges in inwardly directed lips 70, 71 and form an outer channel in which the edge of window frame 54 is disposed and sealingly engaged by lips 70, 71. In these respects seal 60 is similar to seal 10 of FIG. 1.

However, a new and important feature has been added to seal 60. A longitudinal tongue member 80, integrally formed with seal 60, is provided projecting outwardly from web 65 into the outer channel formed by wings 63, 64. The cross-section of tongue 80 is formed by a shank portion 81 and a head portion 82. Oppositely directed lateral lips 83, 84 are provided on head portion 82. The free end of said head portion 82 is wedge shaped for installation reasons.

There is an inwardly opening channel 90 around the inside edge of frame 54. Frame 54 is also provided with laterally directed flange or shoulder members 91, 92 so that channel 90 has a throat area 93 of a substantially reduced width. In the normal installed position, as shown in FIG. 2, tongue 80 is disposed in channel 90 with a small clearance 83_a, 84_a between tongue lips 83, 84 and frame shoulders 91, 92. To provide such clearances 83_a, 84_a tongue shank 81 is of a length slightly greater than the thickness of shoulder members 91, 92. Tongue shank 81 is also of a width less than throat area 93 leaving a small amount of clearance between shank 81 and flange members 91, 92. Although in the drawing the tips of lips 83, 84 appear to slightly engage the side walls of frame channel 90, this has no effect or function and is not considered an engagement. In fact, it could be made with a clearance between the tips and channel side walls.

Seal 60 is installed around the interior of frame 54 in a manner similar to the installation of seal 10 of FIG. 1, with one exception. Tongue 80 must be inserted into channel 90. This may be accomplished by simply directing a force against web 65 opposite tongue 80. Tongue lips 83, 84 are forced against shank 81 as head 82 passes through throat area 93. The clearance provided between shank 81 and shoulders 91, 92 permit passage of the head 82 and folded back lips 83, 84. After passing through throat 93, lips 83, 84 spring outwardly to their position of engagement as shown in FIG. 2. This action is permitted by the clearances 83_a, 84_a between lips 83, 84 and shoulders 91, 92. The installation of window panel 51 and wedge 75 are performed in a manner similar to that described with reference to standard seal 10 in FIG. 1. The clearances 83_a, 84_a and between shank 81 and shoulders 91, 92 are important. In the normal load condition, neither the shank 81 nor lips 83, 84 engage shoulders 91, 92. If they did so they would very likely adversely affect the seal at lips 67, 68 and particularly at lips 70, 71, requiring higher manufacturing tolerances. It would also be expensive and very difficult if not impossible to install the seal by insertion of tongue 80 through throat 93. However, when an abnormal wind load is experienced the lips 83, 84 and probably one side of shank 81 would engage shoulders 91, 92 preventing the seal 60 from rolling out and allowing glass panel 51 to be blown out.

Thus, an effective seal is obtained between glass panel 51, seal 60, and frame 54. In addition, tongue 80 interlocks into frame 54 providing a positive locking action between frame 54 and gasket seal 60 under high wind loads. The head 82 and lips 83, 84 enable the gasket 60 to resist pull out from force components in the direction of panel 51 and shank 81 gives gasket 60 greater resistance to lateral movement and roll. This improved design has greater windload carrying capabilities and normal lip seal clamping pressures and glass to gasket clearances. Thus, larger glass panel area are permitted with easier and less costly installation.

Although the preferred embodiment described herein has been explained in use with a double-glazed window, it can also be used for single sheet windows. Neither is it limited to building windows. It can be used for joining panels of any type which require a sealing connection. Furthermore, the seal channel opposite the tongue could be eliminated and the sealing strip could be bonded on that side to a panel member or another tongue member could be provided in the opposite channel to provide interlocking connection between both panels or other type members to be joined.

Various embodiments of the invention are shown in the drawing and described in the specification, but many variations thereof will be apparent to those skilled in the art. It is not practical to show or describe all the variations included within the invention, and therefore the embodiments described should be considered illustrative only, and not limiting, the scope of the invention being as broad as is defined by the appended claims. The form of the claims and the specification, including the Abstract, is adopted solely for easier reading and understanding, and should not be considered in interpreting the scope of the invention claimed.

We claim:

1. A wall panel construction wherein a panel member is sealingly supported in a frame member by an elongated elastomeric sealing member having a generally H-shaped cross-section comprising generally parallel portions connected by a web portion and forming oppositely disposed inner and outer channels on either side of said web portion,

said inner channel sealingly engaging said panel member and said outer channel sealingly engaging said frame member,

said frame member having a channel therein opening toward said panel member through a reduced width throat entrance formed by laterally directed shoulder means,

said sealing member comprising an elongated tongue portion projecting from said web portion into said outer channel and insertable through said throat for nonengaging disposition within said frame member channel,

the cross-section of said tongue portion comprising a head portion connected to said web portion by a shank portion,

the width of said head portion being greater than the width of said throat entrance and the width of said shank portion being less than the width of said throat entrance.

2. Wall panel construction as set forth in claim 1 characterized in that said head portion is provided with oppositely directed lateral lips, there normally being a clearance between said lips and said shoulder means, said lips being adapted to engage said shoulder means to resist said pull out on a lateral force being directed against said panel member.

3. Wall panel construction as set forth in claim 2 characterized in that the clearance provided between said shank portion and said shoulder means is sufficient to permit passage of said head portion through said throat entrance into said frame channel on said lateral lips being forced against said shank portion.

4. Wall panel construction as set forth in claim 3 characterized in that the side of said head opposite said shank is wedge shaped in its non-deformed condition to wedgingly force said lips against said shank portion on said head being forced through said throat entrance, said lips being adapted to resume their natural position after passing through said throat entrance to engage said shoulder means.

5. A wall panel construction wherein a panel member is sealingly supported in a frame member by an elongated elastomeric sealing member having a generally H-shaped cross-section comprising generally parallel portions connected by a web portion and forming oppositely disposed inner and outer channels on either side of said web portion,

said inner channel sealingly engaging said panel member and said outer channel sealingly engaging said frame member,

said frame member having a channel therein opening toward said panel member through a reduced width throat entrance formed by laterally directed shoulder means,

said sealing member comprising an elongated tongue portion projecting from said web portion into said outer channel and insertable through said throat for engagement with said frame member channel resisting both lateral movement and pull out of said sealing member relative to said frame member,

the cross-section of said tongue portion comprising a head portion connected to said web portion by a shank portion,

the width of said head portion being greater than the width of said throat entrance and the width of said shank portion being less than the width of said throat entrance.

6. Wall panel construction as set forth in claim 5 characterized in that said head portion is provided with oppositely directed lateral lips and in that a clearance is provided between said shank portion and said shoulder means permitting passage of said head portion through said throat entrance into said frame channel on said lateral lips being forced against said shank portion.

7. Wall panel construction as set forth in claim 6 characterized in that the side of said head opposite said shank is wedge shaped in its natural position to wedgingly force said lips against said shank portion on said head being forced through said throat entrance, said lips being adapted to resume their natural position after passing through said throat entrance.

8. A wall panel construction wherein a panel member is sealingly supported in a frame member by an elongated elastomeric sealing member having a multichanneled body portion, comprising generally parallel portions connected by a web portion forming at least one of said channels,

one of said channels sealingly receiving said panel member, and

another of said channels sealingly receiving said frame member,

said frame member having a channel therein opening toward said web portion through a reduced width throat entrance formed by laterally directed shoulders,

said sealing member comprising an elongated tongue portion projecting from said web portion into said other channel and non-engagingly disposed within said frame member channel,

the cross-section of said tongue portion comprising a head portion connected to said web portion by a shank portion,

the width of said head portion being greater than the width of said throat entrance and the width of said shank portion being less than the width of said throat entrance.

9. A wall panel construction according to claim 8 wherein

said head portion is spaced away from said web portion a distance substantially greater than the thickness of said shoulders of said frame member whereby a clearance is normally provided between said head portion and said shoulders.

10. A wall panel construction according to claim 9 wherein said head portion comprises

resilient projections extending outwardly from said shank portion,

said projections being collapsible against said shank portion,

said head portion being wedge-shaped in its uncollapsed position,

said shank portion having a thickness substantially less than the width of said throat entrance,

the combined thickness of said head portion in the collapsed position and of said shank portion being less than the width of said throat entrance, and

said head portion returning to its uncollapsed position after insertion to resist removal of said tongue portion from said frame member channel.

11. A wall panel construction comprising:

a panel member,

a frame member around said panel member, and

an elongated elastomeric sealing strip for sealing engatement between said panel member and said frame member,

said frame member having a channel therein with a reduced width throat entrance formed by laterally directed shoulders,

said sealing member comprising two generally parallel sides connected by a web, said sides and web forming an upper channel to support said panel member and a lower channel to engage said frame member,

said sides each having laterally directed sealing lips on their ends projecting inwardly of said upper and lower channels to sealingly engage with said panel member and said frame member,

a longitudinal recess in one of said sides substantially along the axis of said web,

a wedge of a material harder than that of said sealing strip disposed in said longitudinal recess,

an elongated tongue projecting from said web into said lower channel, said tongue having a shank and a head,

said head comprising resilient projections extending outwardly from the end of said shank, said projections being collapsible against said shank, said head being wedge-shaped in its uncollapsed position,

said head being insertable through said throat entrance of said frame member into said frame channel,

said head having a width substantially greater than the width of said throat entrance,

the combined thickness of said head in the collapsed position and of said shank being less than the width of said throat entrance,

said projections being spaced away from said web a distance substantially greater than the thickness of said shoulders of said frame, whereby a clearance is normally provided between said projections and said shoulders.

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