Aug. 11, 1959 R. J. BUSH ET AL 2,898,647

WINDOW FRAME

Filed Nov. 14, 1955

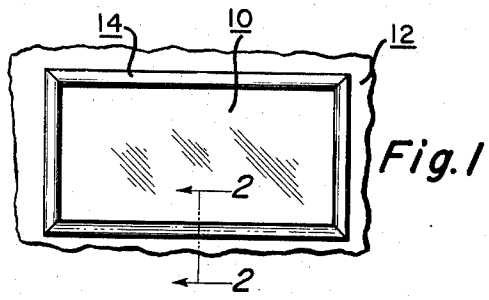


Fig. 1

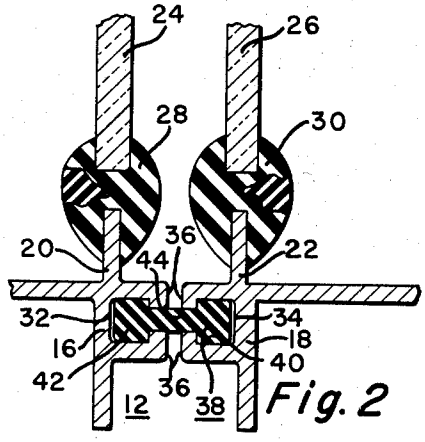


Fig. 2

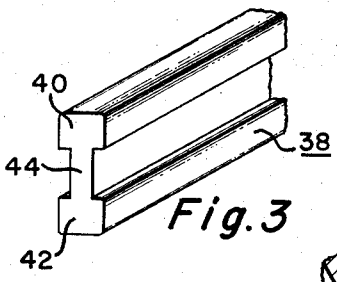


Fig. 3

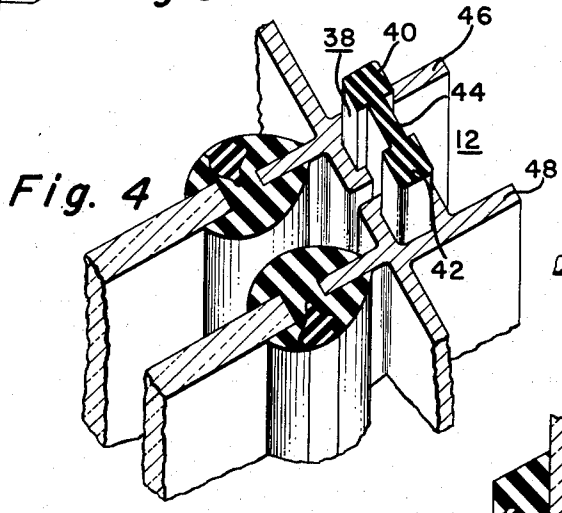


Fig. 4

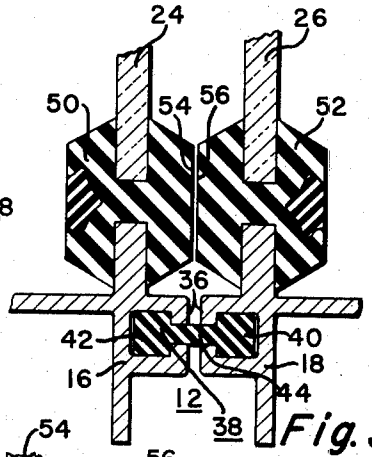


Fig. 5

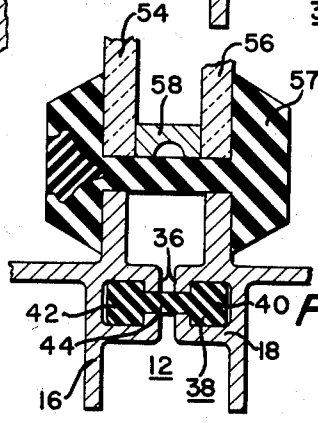


Fig. 6

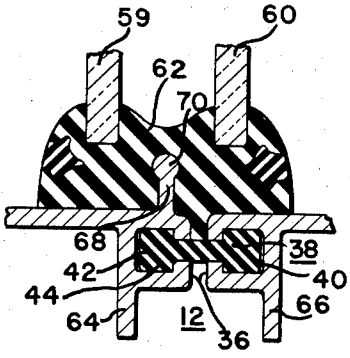


Fig. 7

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WINDOW FRAME

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Application November 14, 1955, Serial No. 546,585

1 Claim. (Cl. 20—56.4)

This invention relates to windows and more particularly to double pane windows and frames.

In the construction of buildings and other structures having windows, it has become widespread practice to employ metal frames for supporting the windows. To eliminate the need for storm windows and the attending inconvenience of installing, removing and storing storm windows, it has also become a practice to employ permanently installed double pane windows. The panes of these windows are installed in a spaced relation whereby the relatively high insulating properties of the air occupying the space between the panes is advantageously utilized. When a double pane is supported within a metal frame, the advantages of the double pane are to some extent reduced by reason of the high heat transmission coefficient of the metal frame.

It is an object of the present invention to provide a double pane window supported within a metal frame wherein the frame comprises at least two spaced frame members which are joined and held in spaced relation by an insulating member. The glass panes are preferably attached to one or both frame members by means of elastomeric sealing strips. The frame members are preferably joined and supported in spaced relation by means of an insulating strip, preferably of elastomeric material, having enlarged top and bottom portions which are disposed respectively within opposed partially closed channel portions provided on the frame members.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred form of the present invention is clearly shown.

In the drawings:

Figure 1 is an elevation view of a window;

Figure 2 is a cross sectional view taken along lines 2—2 of Figure 1 showing a frame and window structure made in accordance with the present invention;

Figure 3 is a frame joining strip;

Figure 4 is a perspective view of the view shown in Figure 2;

Figures 5, 6 and 7 are other forms of a frame and window structure made in accordance with the present invention.

Referring now to the drawings, the present invention, as shown in Figure 1, involves a frame and window construction, wherein a double window pane **10** is supported within a metal frame **12** and is secured therein preferably by means of sealing strips **14** hereinafter more fully described.

Referring to Figure 2 the frame **12** consists of two portions **16** and **18** disposed side by side in spaced relation. The frame portions have inwardly directed continuous projections **20** and **22** to which glass panes **24** and **26** respectively may be attached by means of sealing strips **28** and **30** respectively. These sealing strips may be of the well known type disclosed in the Eichner Patent No. 2,189,138, the function of which is well known and which in itself forms no part of the present invention.

The frame portions **16** and **18** are each provided with facing partially closed opposed channel grooves **32** and **34**. The grooves are partially closed preferably by means of inwardly directed portions or flanges **36** disposed at the top of the channel walls. A joining strip **38** having enlarged portions **40** and **42** and a connecting or web portion **44** is disposed between the frame members so that the enlarged portions **40** and **42** of the joining strip are disposed within the partially closed channels **32** and **34** and the web portion **44** extends through the channel openings integrally joining the enlarged portions **40** and **42**. The enlarged portions **40** and **42** are preferably of a configuration whereby they will substantially fill the partially closed channel portions **32** and **34**. The enlarged portions **40** and **42** and the partially closed channels **32** and **34** are further of a configuration which will permit the inwardly directed projections **36** and of the channels to securely retain the enlarged portions of strip **38** within the channels and thereby firmly join frame members **16** and **18** and provide a support for holding the frame members in predetermined spaced relations. To this end the strip **38** is preferably made I-shaped and the partially closed channel **32** and **34** are shaped to snugly receive these enlarged ends of the strip to engage the flange portions **36** of the channels whereby lateral movement of the frames is effectively prevented.

The dimensions of strip **38** are made slightly smaller than the channel spaces in which the strip is inserted so that the strip may be readily inserted in place with or without lubrication and thereby facilitate assembly of the frame and panes. As may readily be understood a slight misalignment of the enlarged portions of the strip with respect to each other within the frame channel portions is effective in wedging the enlarged portions of the strip within the channel spaces so as to effectively hold the frame members in a predetermined spaced relation. The web or connecting portion **44** of strip **38** is made of a cross sectional thickness and length so that in use the web **44** does not tend to buckle or otherwise distort. To secure optimum web dimension for a given frame and window assembly it may readily be seen that the positioning of the channels with respect to the position of the window panes, and the depth of the channels, may be correspondingly adjusted.

Referring to Figure 4 the projecting members **46** and **48** may be joined to a wall panel by means of a sealing strip of the type shown in Figure 6 (**57**) and is fully disclosed in copending application S.N. 494,858, now Patent No. 2,878,535, issued March 24, 1959, assigned to the assignee of the present invention whereby the frame members **46** and **48** are constantly urged together in an install position, or by any suitable construction method. The base of the frame assembly, regardless of the method employed in securing it to a wall, will rest on a relatively rigid member so that after installation it is not necessary for the frame joining strip **38** to support the frame members **16** and **18** against vertical misalignment after the installation of the frame assembly in a wall.

As shown in Figure 5 the sealing strips **50** and **52** may be advantageously made of a hexagonal configuration and of sufficient thickness so that the flat surfaces **54** and **56** facing each are adjacent each other and provide an additional support for maintaining the frame members **16** and **18** and the glass panes in a desired spaced relation. This construction is particularly desirable where sealing strips of the type shown in Figure 6 are used to secure the frame construction to a wall wherein the sealing strip exerts considerably inwardly directed force on the frame members **46** and **48**.

Figure 6 shows a sealing strip which may be used to secure to the frame member conventional double pane windows which consist of a pair of panes **54** and **56** held in spaced relation by a metallic strip **58** bonded to the panes. This sealing strip is fully disclosed in the copending application S.N. 494,858 mentioned above.

Figure 7 shows another modification embodying the present invention wherein the glass panes **59** and **60** are supported within a single sealing strip **62**. One of the frame members **64** is provided with an inwardly directed flange or projection **68** along the inner sides thereof. The projection **68** preferably is provided with a bead-like portion **70** along the top thereof, which is inserted in a corresponding groove in the base of the seal **62** to lock the seal to frame member. In assembling the frame and window, frame portions **64** and **66** are first aligned and the joining strip **38** is inserted in place thereby joining the frame members. Thereafter the sealing strip **62** is attached to the frame by inserting projection **68** in the corresponding groove in the base of the sealing strip. Finally the window panes are inserted in place as is well known in the art whereby the compressive forces within the sealing strip crowd the rubber thereof into sealing engagement with the panes and frame members and effect a lock between projection **68** and the seal strip **62**.

The joining strip **38** may be molded or extruded preferably from any of the well known elastomeric materials such as natural rubber, butadiene-styrene copolymers, butadiene-acrylonitrile copolymers, polychloroprene suitable mixtures of these materials and other synthetic materials of a similar character. The essential requirements of suitable joining strip material are that it have good heat insulating properties, that a joining member made up from the material may be readily inserted between the frame members and into the attaching means employed, and that it have adequate strength and stability to maintain the frame members in a predetermined spaced relation during and after the installation of the frame members.

When lubrication is used to facilitate entry of the strip **38** into the frame members any of the well known lubricants such as soap or soap water may be used advantageously.

While the form of embodiment of the invention as herein disclosed constitutes a preferred form, it is to be understood that other forms might be adopted, as may come within the scope of the claim which follows.

What is claimed is as follows:

A window construction, comprising first and second frame members, two spaced substantially parallel window panes supported by said frame members, each of said frame members having portions providing partially closed channel grooves, said channels being positioned with the open grooves facing each other so that a plane extending therebetween is substantially perpendicular to the plane of the window panes, a single elastomeric insulator between said frame members securing them in a substantially fixed spaced relationship to provide an insulating airspace therebetween, said elastomeric insulator having a cross section of substantially I shape with enlarged end portions and a central web portion, said end portions being respectively adapted to be securely retained within the channel grooves of each of said frame members and said web portion being integral with said end portions and maintaining said frame members in fixed spaced relationship, a projection on one of said frame members, and an elastomeric insulator means between the said frame members and the said parallel window panes removably securing the panes in spaced relationship to the said projection, so that the panes are removable without dismantling the frame members and the I-shaped insulator, said elastomeric insulator means having portions on at least two sides of said projection for securely clamping the insulator means to the projection and having a portion extending between and engaging the said frame members to aid the I-shaped insulator in maintaining the frame members in spaced relationship.

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