

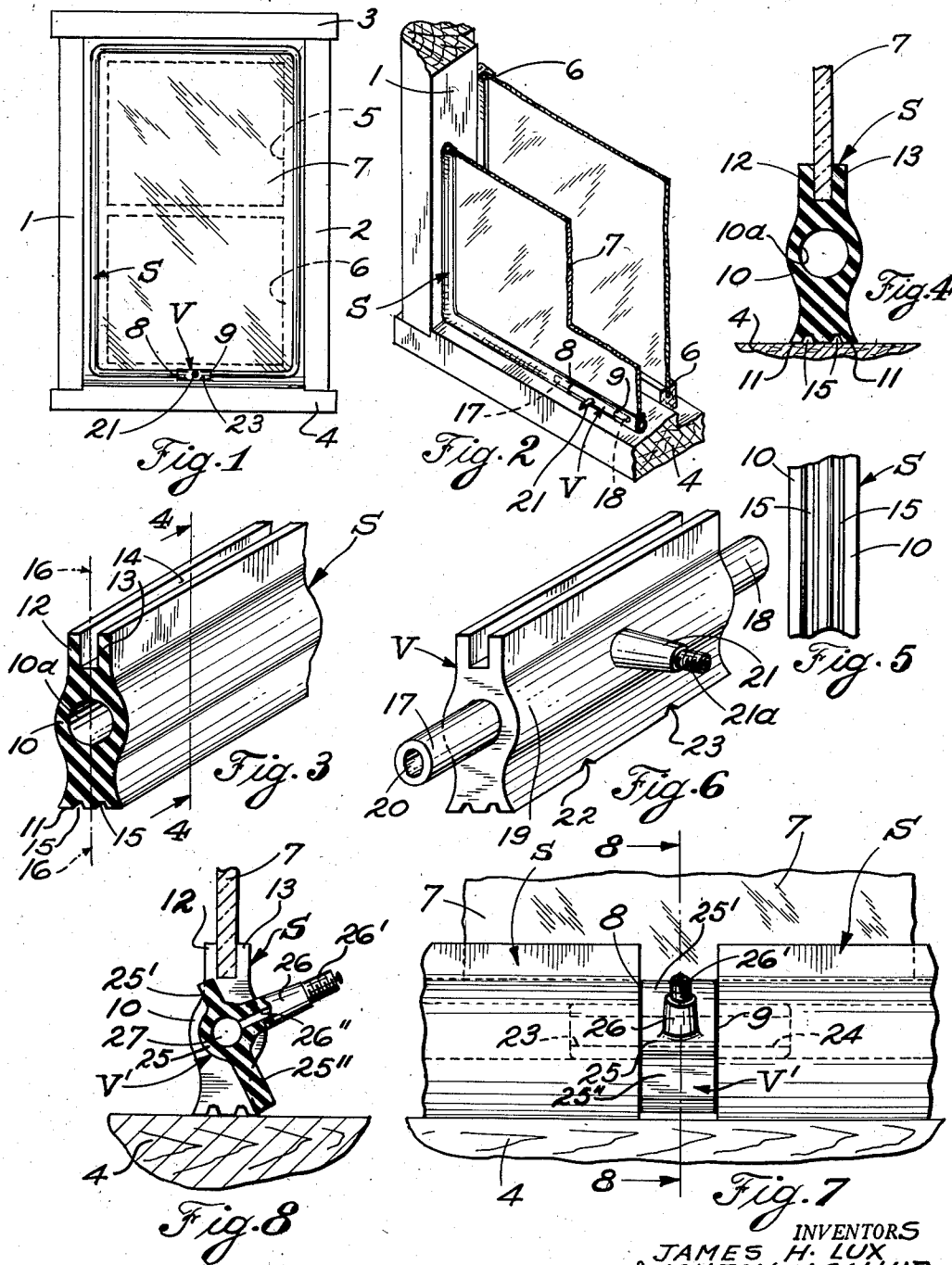
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J. H. LUX ET AL

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INFLATABLE CLOSURE SEALING AND RETAINING MEANS

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INVENTORS
JAMES H. LUX
& MILTON N. GALLUP.
BY
Cowan, Sessions
Kunz & Lawler
ATTORNEYS

1

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INFLATABLE CLOSURE SEALING AND RETAINING MEANS

James H. Lux and Milton N. Gallup, Lakewood, Ohio

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This invention relates to securing and sealing means for removably retaining a closure panel in a frame structure.

In the accompanying drawings and description we have illustrated our invention as applied to a storm window which is adapted to be positioned within a window frame to serve as an insulating panel in addition to the regular window sash. However, it will be understood that our improved securing and sealing means is also adapted for removably securing in position panels of metal, plywood or other materials wherever it may be desirable to provide a readily removable closure member for a hatch or other opening.

It is among the objects of our invention to provide an improved sealing and retaining means for storm windows or the like which may be readily attached to a panel member of glass or other material without special tools or skill. Other objects of our invention include the provision of a storm window or the like which may readily be installed and removed, which is light in weight and occupies a minimum of space, which may be made in any desired size, and is economical to produce and assemble. A further object of our invention is the provision in an inflatable sealing and retaining means for storm windows or the like of variable means which may readily be adjusted to provide the desired degree of venting of the space between the storm window and the regular window sash.

The above and other objects of our invention will appear from the following description of several embodiments thereof, reference being had to the accompanying drawings in which:

Figure 1 is an elevational view of a window frame in which a storm window incorporating our invention is installed;

Figure 2 is a fragmentary perspective view of one of the lower corners of the window installation shown in Figure 1;

Figure 3 is a perspective view of a section of our improved inflatable sealing and retaining strip member;

Figure 4 is a vertical cross-sectional view of our improved resilient inflatable sealing and securing strip member taken substantially on line 4—4 of Figure 3, a section of glass being positioned in the retaining groove;

Figure 5 is an outer edge view of a section of our improved sealing strip showing the frame engaging face thereof;

Figure 6 is a detached perspective view of one form of connecting valve member for joining the ends of the inflatable tube member;

Figure 7 is a fragmentary side elevational view illustrating a modified form of connecting valve member adapted to be positioned to provide varying degrees of venting of the space between a storm window and the main window sash; and

Figure 8 is a vertical cross-sectional view taken substantially on line 8—8 of Figure 7.

Referring to Figure 1, the window frame includes the

2

jamb portions 1 and 2, lintel 3, and sill 4 and may be provided with an upper sliding window sash 5 and lower sliding sash 6. As best seen in Figure 2 the window frame projects outwardly from the sash 5 and 6 in the usual manner and it is within the outwardly extending walls of the frame structure that our storm window is positioned and secured.

As illustrated the storm window consists of a single pane of glass 7 which is cut so that it is smaller in each of its dimensions than the corresponding inside dimensions of the outwardly projecting portion of the window frame. As will appear later the storm window glass need not be cut with great accuracy but, in an average size window, would have its outer dimensions from one-half to one and one-half inches less than the corresponding dimensions of the window frame, depending on the exact size and type of sealing strip which is employed.

The storm window glass pane or panel 7 is provided with a continuous hollow or tubular sealing strip member S which extends around the periphery thereof with its two ends 8 and 9 (Figure 1) in spaced opposed relation. As shown in Figure 1 the strip S is so installed on the panel 7 that the gap between the ends 8 and 9 comes at the center of the bottom of the panel but it will be understood that this location of the ends might be varied.

The strip S is of rubber, plastic, or other suitable resilient material and is preferably formed by extrusion in well known manner. Thus where the term "rubber" is used in this specification and the appended claims it is intended to refer to and include both natural and synthetic rubber, and other resilient materials. As perhaps best seen in Figure 3, the strip S comprises a center tubular portion 10, a generally flat outer frame engaging face 11 on one side of the tubular portion and, diametrically opposite to the face 11 on the other side of the tubular portion, a pair of inwardly projecting flanges 12 and 13 which define a panel receiving notch or groove 14. The frame engaging face 11 is preferably longitudinally grooved or serrated as indicated at 15 to facilitate proper engagement thereof with the window frame and to accommodate for roughness or irregularities in the surface thereof. As seen in Figure 3, a common center line 16 between the groove 14 and the frame engaging face 11 also passes substantially through the center of the opening 10a in the tubular portion 10. This arrangement results in an inflatable seal unit which needs no metal molding or the like to support the inflatable element as the panel itself directly backs up the tubular portion of the seal strip S.

To install the strip S on the panel 7 it is only necessary to cut a piece of the proper length to extend around the periphery of the panel, start it on the edge of the panel as at 9 and fit the groove 14 over the edge around the entire periphery of the panel 7 until the end 8 of the strip S is positioned in spaced relation to the end 9. If desired a suitable cement may be employed in the groove 14 to assist in retaining the strip in position on the panel but this is not ordinarily required as the flanges 12 and 13 are preferably so spaced and disposed that their inherent resilience will cause them frictionally to grip the panel. Furthermore, in order to permit the strip S to bend around the corners of the panel 7 the flanges 12 and 13 are preferably notched by the user in well-known manner at the time of installation to permit bending around the corner without buckling.

To connect the ends 8 and 9 of the tubular strip member S we provide a connecting valve unit V, one form of which is seen in detached perspective in Figure 6 and which may be made of the same material as the tube S. This unit comprises end portions 17 and 18 shaped and sized to fit snugly within the opening 10a in the adjacent

3

ends of the strip S. The intermediate or center portion 19 of the valve unit V is of the same cross section as the strip S and is of a length substantially equal to the distance between the ends 8 and 9 of the strip S on the window pane 7. The entire unit V is tubular, being provided with a central opening 20 of somewhat smaller diameter than the opening 10a in the tube S. A tubular valve stem 21, having a passage therethrough, projects outwardly from the side wall of the center section 19, has a threaded outer end portion 21a, and contains a suitable releasable pressure retaining self-closing valve such as the type commonly used in pneumatic tires. When the connecting valve unit V is inserted between the ends of the strip S the portions 17 and 18 project into the opening 10a in the strip and are preferably sealed therein by a suitable rubber cement or the like.

The glass panel 7 has been originally cut of a size such that, after the strip S and the valve unit V are installed thereon but with the tubular portion 10 deflated, the entire unit will fit readily into the outwardly projecting walls of the window frame. When so positioned the weight of the storm window will of course be supported largely on the portion of the strip S which extends along the bottom edge thereof. While the storm window assembly is held in this position a pump, for example an ordinary tire pump, or other source of compressed air is connected to the valve stem 21 and air under pressure directed into the continuous resilient tube which surrounds the storm window glass panel, causing the walls of the tubular portion 10 thereof to expand and forcing the outer edge face 11 firmly into engagement with the adjacent faces of the surrounding window frame. It has been determined that even though the window frame faces flare outwardly to a certain degree the sealing face 11 of the strip S will conform thereto and form a weather-tight seal and also firmly hold the glass panel in position by frictional engagement.

When it is desired to remove the storm window it is only necessary to release the valve in the stem 21, permitting the air under pressure in the tubular strip S to escape and the strip itself to contract so that the entire assembly may be readily withdrawn.

It is usually desirable in storm window installations to provide a vent for the space between the storm window and the regular window. This is to assist in preventing condensation and permit drainage of any condensation which may occur. Such vent may conveniently be provided by forming transverse grooves 22 and 22a in the outer face of the center portion 19 of the valve unit V. It will be understood however that if venting is not desired these grooves may be omitted.

In Figures 7 and 8 we have illustrated a modified form of connector and valve unit, generally indicated at V'. This unit has a tubular body comprising tubular end portions 23 and 24 and a tubular center section 25. An upper flap 25', of a length so that it just reaches the under edge of the glass panel 7 when vertically disposed, projects from said center section 25. The lower flap 25'' projects from the opposite side of the center section 25 and is preferably of the same length or slightly longer than the lower half of the strip S. A valve stem 26, threaded at 26' and having a passage 26'' therethrough, corresponds to previously described tubular valve stem 21 and contains a similar valve which provides an inflating connection to the central opening 27.

When the unit V' is positioned with the ends 23 and 24 extending into the ends 8 and 9 of the strip S, it may be rotated about the longitudinal axis of its tubular body within certain limits by lifting or lowering the valve stem 26. Thus in Figure 7 the unit V' has been positioned so that the upper flap 25' of the center section is spaced inwardly slightly from the lower edge of the glass 7 thus providing a small vent opening to the space between the storm window and the regular window. However if the unit V' were rotated counterclockwise from the

4

position of Figure 8 a larger vent opening would be provided and, if it were rotated clockwise to a position where the flaps 25' and 25'' were vertical and aligned with the glass panel 7 substantially no vent opening would be provided. Thus with the connecting valve unit V' seen in Figures 7 and 8 venting means are provided which may be adjusted from fully closed to maximum venting position.

Although we have described the illustrated embodiments of our invention in considerable detail it will be understood that variations and modifications may be made in the specific cross sectional form of our resilient tubular sealing strip and in the specific form of the connecting valve unit without departing from the spirit of our invention. We do not therefore wish to be limited to the exact arrangement herein shown or described but claim as our invention all embodiments thereof coming within the scope of the appended claims.

We claim:

1. In combination with a frame structure, a panel member smaller in each dimension than the inside dimensions of said frame structure, a resilient sealing and retaining strip member extending around said panel with its ends in spaced opposed relation, said retaining strip member having a longitudinally extending tubular portion and longitudinally extending spaced flanges projecting from said tubular portion and forming a slotted panel receiving portion adjacent said tubular portion, and a tubular connecting member between and secured to said ends of said strip member whereby a continuous tubular passage is provided around the periphery of said panel, said connecting member having an inflating valve member extending into the interior thereof whereby said tubular portion of said sealing and retaining strip may be inflated and expanded into sealing and retaining engagement with said frame structure.

2. A storm window or the like comprising a pane of glass, an inflatable rubber sealing and retaining strip member extending around the periphery of said pane with its ends spaced apart along one edge thereof, said strip member comprising a central tubular portion having a pair of spaced flanges extending outwardly from one side thereof and forming a groove in which the edges of said pane are disposed and a frame engaging face portion on the diametrically opposite side of said tubular portion, and a connecting valve member extending between and secured to said ends of said strip member; said connecting valve member having a tubular body connecting the ends of said tubular center portion of said strip and completing a hollow tube around the periphery of said pane and a passage connecting said tubular body to the outside, and releasable pressure retaining valve means in said passage through which said strip member may be inflated and inwardly expanded.

3. A storm window or the like comprising a pane of glass, an inflatable rubber sealing and retaining strip member extending around the periphery of said pane with its ends spaced apart along one edge thereof, said strip member comprising a central tubular portion having a pair of spaced flanges extending outwardly from one side thereof and forming a groove in which the edges of said pane are disposed and a generally flat frame engaging face portion on the diametrically opposite side of said tubular portion, said face portion extending in a direction substantially normally to said pane and substantially equal distances on each side thereof, and a connecting valve member extending between and secured to said ends of said strip member; said connecting valve member having a tubular body projecting into said ends of said tubular center portion of said strip and completing the resilient tube around said pane and a passage connecting said tubular body to the outside, and releasable pressure retaining valve means in said passage through which said strip member may be inflated and inwardly expanded.

5

4. A storm window or the like comprising a pane of glass, an inflatable rubber sealing and retaining strip member extending around the periphery of said pane with its ends paced apart along one edge thereof, said strip member comprising a central tubular portion having a pair of spaced flanges extending outwardly from one side thereof and forming a groove in which the edges of said pane are disposed and a generally flat frame engaging face portion on the diametrically opposite side of said tubular portion, said face portion extending in a direction substantially normally to said pane and substantially equal distances on each side thereof, and a connecting valve member extending between and secured to said ends of said strip member; said connecting valve member having a tubular body projecting into said ends of said tubular center portion of said strip and completing the resilient tube around said pane and a passage connecting

6

said tubular body to the outside, releasable pressure retaining valve means in said passage through which said strip member may be inflated and inwardly expanded, and upper and lower flaps extending from opposite sides of said tubular body and adapted to provide a variable vent opening therearound when said connecting valve member is rotated about the longitudinal axis of said tubular body.

References Cited in the file of this patent

UNITED STATES PATENTS

2,548,556	Ogren	Apr. 10, 1951
2,700,196	Panhard	Jan. 25, 1955
2,701,899	Krupp	Feb. 15, 1955
2,760,791	Neubauer et al.	Aug. 28, 1956