April 27, 1954 K. LEEVERS ET AL 2,676,366

SEALED WINDOW ASSEMBLY

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Fig. 1

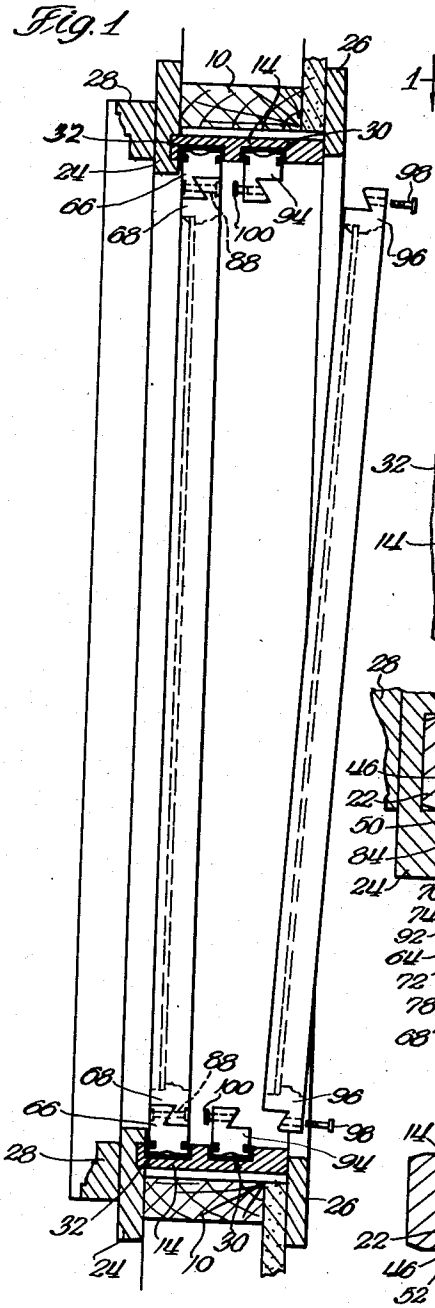


Fig. 2

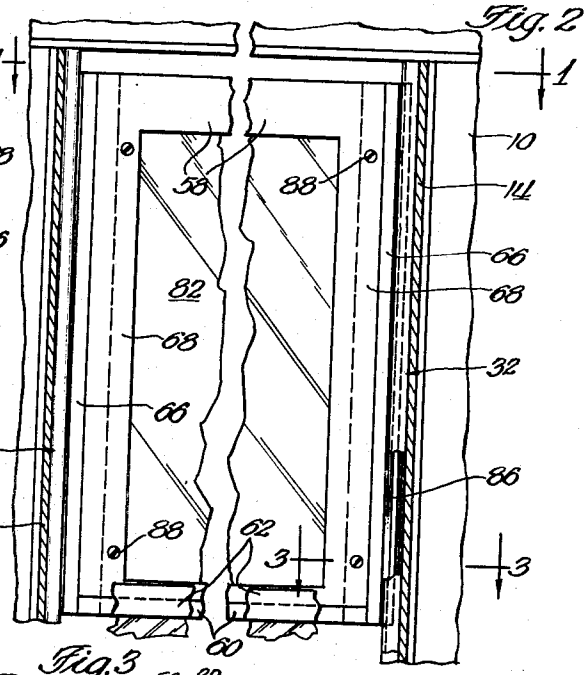


Fig. 3

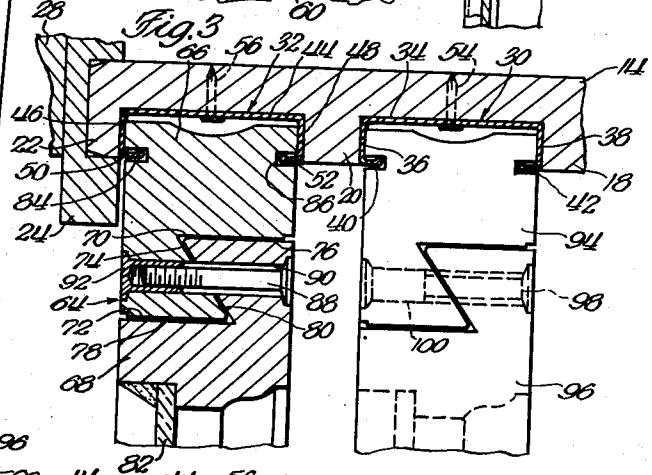
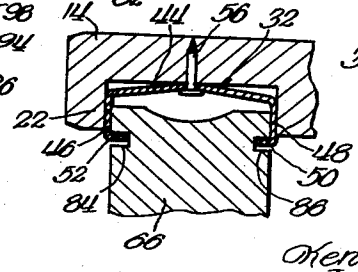


Fig. 4



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SEALED WINDOW ASSEMBLY

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3 Claims. (Cl. 20—52)

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The present invention relates to a sealed window assembly, including a sealed window sash and a novel weather strip element, the assembly being particularly suited for use in the construction of prefabricated buildings.

It is a primary object of the present invention to provide a window assembly which may be prefabricated but which, at the same time, is efficiently weather sealed.

It is another object of this invention to provide a window assembly which in use remains efficiently weather sealed in spite of dimensional changes occurring in the window members because of humidity changes or other factors.

Still another object of the present invention is the provision of a window assembly which, while efficiently weather sealed, may be prefabricated in a minimum number of subassemblies comprising the sash, the top frame members and the side frame members which may be stocked in standard sizes requiring a minimum inventory and a minimum of storage space.

It is another object of this invention to provide a sealed window assembly which may be prefabricated with the sash balance installed and with the frame members in adjusted tension facilitating installation and promoting easy operation of the window.

It is another object of this invention to provide a prefabricated sealed window assembly which may be installed in a minimum time and which, though prefabricated, is comparable in cost to a conventional window.

It is another important object of this invention to provide a sealed window assembly which operates smoothly and easily under diverse climatic conditions and in diverse types of installations.

Another object of the present invention is the provision of a sealed window sash which is demountable after installation but which may be secured tightly to the frame members of the window.

It is another object of this invention to provide a demountable window sash which may be secured tightly to its containing members both in the plane of the sash and in a direction perpendicular thereto.

Still a further object of the present invention is the provision of a weather strip for use particularly in the construction of prefabricated sealed window assemblies which permits free operation of the window sash while automatically compensating for dimensional changes in the structural components of the window, i. e. while maintaining a tight seal even though the structural

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components may swell and shrink with changes in atmospheric humidity.

The manner in which the foregoing and other objects of this invention are accomplished will be apparent from the accompanying specification and claims considered together with the drawings, wherein like reference numerals indicate like parts, and wherein:

Figure 1 is a view partly in section taken along the lines 1—1 of Figure 2;

Figure 2 is a fragmentary view in elevation of the presently described sealed window assembly, the view being partly broken away better to show the construction of the assembly;

Figure 3 is a sectional fragmentary view taken along the lines 3—3 of Figure 2 and illustrating particularly the manner of mounting the sash component of the presently described sealed window assembly; and

Figure 4 is a detail sectional view illustrating the mode of operation of the weather strip element employed in the presently described sealed window assembly.

Generally stated the sealed window assembly of the present invention comprises frame members having longitudinal guideways therein. Slidably mounted within the guideways of the frame are one or more window sashes, each comprising a top piece, a bottom piece, and side pieces interconnecting the top and bottom pieces.

The side pieces of the window sash are divided longitudinally into two lapped sections, the overlapping surfaces of each of the sections having an inward inclination. Screw means are employed for holding the overlapped sections together, the screw drawing the meeting overlapped and edge surfaces of the pieces tightly together. As a result, the sash is secured to the rest of the window in two directions, i. e. in the plane of the window and in a direction perpendicular thereto.

The outermost of the sash sections is formed with a longitudinally extending groove on each of its side faces. The sash then may be mounted slidably within the guideways of the window frame by interconnecting it to the latter through a weather strip of suitable construction.

In the form disclosed herein, the weather strip element comprises a piece of resilient sheet material which is substantially U-shaped in transverse cross section. The opposed sides of the weather strip are provided at their free ends with inwardly projecting lateral extensions. These are adapted to be inserted in the grooves in the side piece component of the sash, while the central portion of the weather strip is adapted to

be secured within the guideway in the frame of the window. In this manner the sash is attached to the window frame in weather sealed relationship thereto, the weather stripping, because of its resilient character, following the sash unit in its phase of contraction and expansion. This is accomplished, furthermore, while still permitting the free movement of the sash within the frame.

Considering the presently described sealed window assembly in greater detail and with particular reference to the drawings:

As is particularly apparent from Figures 1 and 3, the sealed window may be installed in the conventional environment wherein it is contained within structural members including the studs 10. Within the opening defined in part by the studs are the vertical window frame members or stiles 14. These may be of identical construction, being provided with the longitudinal, spaced apart projections 18, 20 and 22. These projections define guideways adapted to receive the window sash, projection 18 corresponding to the conventional trim stop, and projection 20 corresponding to the conventional parting stop or divider. Projection 22 is adapted to fit within a recess in the blind stop 24. The framing assembly also may include casing 26 and the outer molding strip 28.

Secured within the guideways formed by frame member 14 are the weather strip elements 30, 32. These preferably comprise strips of resilient material such as sheet metal. They are generally U-shaped in transverse cross section and have opposed sides provided at their free ends with inwardly projecting lateral extensions, which preferably are disposed at substantially right angle to the sides.

Thus weather strip 30 is formed with a central section 34 and with opposed side sections 36, 38. Each of the side sections has an inwardly projecting extension, these being indicated at 40, 42 respectively. Similarly weather strip 32 has a central section 44, and opposite side sections 46, 48, the latter having, respectively, inwardly directed extensions 50, 52. Weather strips 30 and 32 are secured within their respective guideways by suitable means, such as the tacks 54, 56. These preferably penetrate the central sections 34, 44 of the weather strips along substantially their longitudinal center lines, for a reason which will appear hereinafter.

The window sash included in the presently described assembly each comprise in general a top piece, a bottom piece, and two side pieces. Thus the upper sash includes the top piece 58 and the bottom piece 60 while the lower sash includes the top piece 62 and a bottom piece which is not illustrated but which is of conventional construction. It will be apparent that the joint between top piece 58 and the upper cross piece of the window frame, as well as that of the bottom piece of the lower sash and the sill may be weather stripped in conventional manner. Also, the meeting surfaces of bottom piece 60 of the top sash and top piece 62 of the bottom sash, which together form the check rail, may also be provided with suitable weather stripping. The side pieces of each sash are divided longitudinally into two lapped and jointed sections, the overlapped surfaces of each of these sections being complementary, and the median meeting surfaces being inclined to form acute angles with the end meeting surfaces of the joint. Hence when they are viewed in transverse cross section, the joint by which they are separated is substantially Z-shaped in outline.

The construction of the side pieces is particularly apparent from Figure 3. The side piece indicated generally at 64 of the upper sash comprises an inner section 66 and an outer section 68. Each of these is rabbeted or grooved to form a pair of overlapped extensions. In this manner section 66 is provided with end surfaces 70, 72 and an overlapped median surface 74, while inner section 68 is provided with end surfaces 76 and 78 and the overlapped median surface 80, surfaces 76, 78 and 80 of section 68 meeting respectively surfaces 70, 72 and 74 of section 66.

Section 68 is adapted to contain a pane of glass 82 in the usual manner. Section 66 has on its outer face a pair of spaced grooves 84, 86, adapted to be slidably engaged by the inwardly directed extensions 50, 52 of weather strip 32. In this manner means are provided for attaching section 66 of the sash to the frame member 14, and also to demountably attach the section 68 of the sash, which contains the pane of glass, to section 66 thereof.

To assist in the latter purpose, i. e. in securing the glass-containing sections of the sash to the outer sections thereof, means are provided for exerting clamping pressure upon the meeting inclined faces 74, 80 of the overlapped portions of each section. This produces a wedging effect which tends to draw the two sections tightly together in the plane of the sash as well as in a plane perpendicular thereto. In other words, it draws tightly together the edge surfaces 70—76 and 72—78, as well as the overlapped surfaces 74, 80.

Preferred means for thus attaching the inner section 66 of the sash to the outer section 68 thereof comprise a bolt or screw 88 which may penetrate the perforation 90 in the overlapped portion of section 68, engaging the threaded member 92 which may be driven through the overlapped portion of section 66. The force exerted by the bolt then will clamp the two sections tightly together in the manner explained above. In a similar manner the overlapped side sections 94, 96 of the lower sash may be joined by means of the bolt or screw 98 engaging the threaded member 100.

As has been indicated above, the presently described sealed window assembly is ideally designed for manufacture and installation as a prefabricated unit. When such is the case, there may be provided three stock sub-assemblies, i. e. a side frame assembly, a top frame assembly, and a sash assembly. These three components of the finished window may be provided in assorted standard sizes of length and width.

The side frame assemblies may include the vertical frame member 14, the blind stop 24, the casing 26, the molding strip 28, and the outer sections 66 and 94 of the sash side pieces. These elements may be fastened together in a suitable manner, it being noted particularly that the design of the weather strips 32, 30 makes possible the inclusion of sash pieces 66 and 94 in the sub-assembly, the inwardly extending projections of the weather strips acting to hold the sash elements to the frame member 14.

Similarly top frame assemblies 102 of suitable construction may be provided, the ends of these being adapted to join the upper ends of a pair of side frame assemblies. Then after the window size has been determined upon, it is only necessary to select the framing sub-assemblies

in the proper height and width to fit the selected sash assembly. The framing members may easily be installed in the window opening by nailing them at appropriately spaced intervals. Thereafter the sash assembly may be attached by means of screws or bolts in the manner explained above.

It will be apparent that the weather strips **30**, **32** perform several important functions. In the first place, they serve their normal sealing function efficiently and in spite of atmospheric humidity changes causing dimensional changes in the wood components of the window in a direction across the grain. When such shrinking and swelling occurs, the weather strips nevertheless follow the sash in the manner indicated particularly in Figure 4 so that an efficient seal is maintained at all times. This is permitted by reason of the resiliency of the weather strips, which yield with contraction of the sash members and then spring back to their original position with expansion of the latter.

Furthermore, the weather strips permit sliding of the window in a vertical direction, the opening and closing operations being effected with equal facility in wet and dry environments.

Still further, the weather strips make possible the prefabrication of the unit in only three component sub-assemblies, since they serve to hold the outer sections **66**, **94** of the sash to the framing assemblies prior to the attachment of the sash assembly thereto. This, in turn, makes possible attachment of the sash balances at the factory. The weather strips thus serve an important integrating function which greatly simplifies the installation of the window.

Also cooperating in the latter object is the Z-shaped joint connecting the two sections of the side-pieces. Once the framing members are in place, it is a simple matter to attach the sash by means of screws or bolts **88**, **98**. Tightening of these draws the elements closely together in two directions through the action of the meeting inclined surfaces thereon, and thereby forms a tightly sealed, unitary structure.

It is to be understood that the form of our invention, herewith shown and described, is to be taken as a preferred example of the same, and that various changes in the shape, size and arrangement of the parts may be resorted to without departing from the spirit of our invention, or the scope of the subjoined claims.

Having thus described our invention, we claim:

1. A sealed window asembly comprising a pair of opposed frame members having longitudinal guideways therein, a window sash slidable in the guideways and comprising top, bottom and side pieces, the side pieces being divided transversely of the plane of the sash into two lapped and jointed sections, the joint meeting surfaces of the sections being complementary and substantially Z-shaped in cross section, the median meeting surfaces being inclined to form acute angles with the end meeting surfaces of the joint, and means for exerting clamping pressure on the side faces of said sections, the inclined surfaces thereof thereupon acting to draw the meeting surfaces of the pieces into abutting relationship with each other.

2. A sealed window assembly comprising a pair of opposed frame members having longitudinal guideways therein, a window sash slidable in the guideways and comprising top, bottom and side pieces, the side pieces being divided transversely of the plane of the sash into two lapped and jointed sections, the outer sections being formed with a longitudinally extending groove in each of their side faces, the joint meeting surfaces of the sections being complementary and substantially Z-shaped in cross section, the median meeting surfaces being inclined to form acute angles with the end meeting surfaces of the joint, means for exerting clamping pressure on the side faces of said sections, the inclined surfaces thereof thereupon acting to draw the meeting surfaces of the pieces into abutting relationship with each other; and substantially U-shaped weatherstrips secured within the guideways of the frame members along substantially the longitudinal center lines of the strips, the sides of the strips being provided at their free ends with inwardly projecting lateral extensions, the extensions engaging the grooves in the sash sections, thereby forming substantially weather tight, sealed joints.

3. The sealed window assembly of claim 2 wherein the median segments of the U-shaped weatherstrips are flexible in the direction of the sash upon dimensional change thereof.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
462,932	Rice	Nov. 10, 1891
562,789	Arnold et al.	June 30, 1896
642,922	Reid	Feb. 6, 1900
956,702	Gould	May 3, 1910
980,937	Forsyth	Jan. 10, 1911
1,144,046	Marczi	June 22, 1915
1,669,835	Mishoe	May 15, 1928
1,789,970	Dreher	Jan. 27, 1931
1,806,018	Julien	May 19, 1931
1,957,592	Heid	May 8, 1934
2,397,090	Dautrick et al.	Mar. 26, 1946
2,563,058	Neustadt	Aug. 7, 1951