

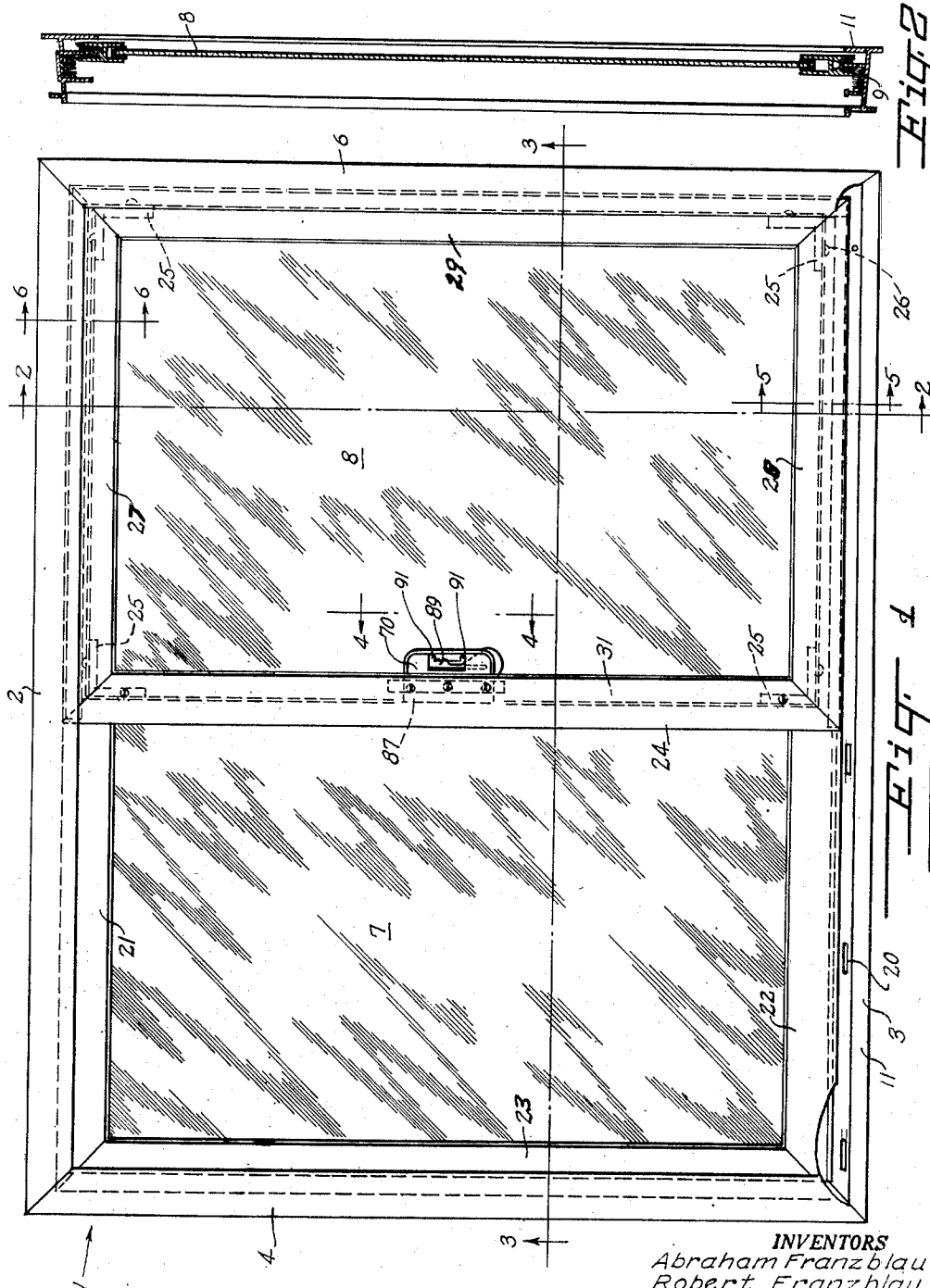
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A. FRANZBLAU ET AL
SLIDING WINDOW CONSTRUCTION

2,835,934

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2 Sheets-Sheet 1



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2 Sheets-Sheet 2

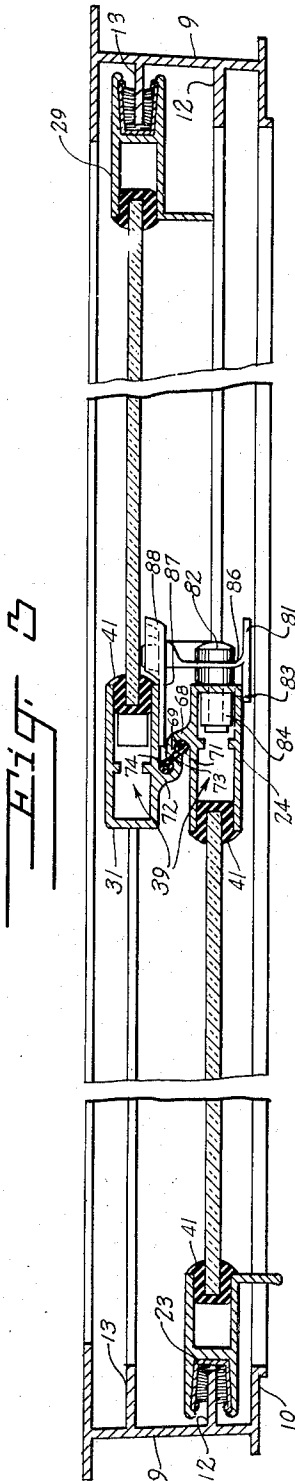
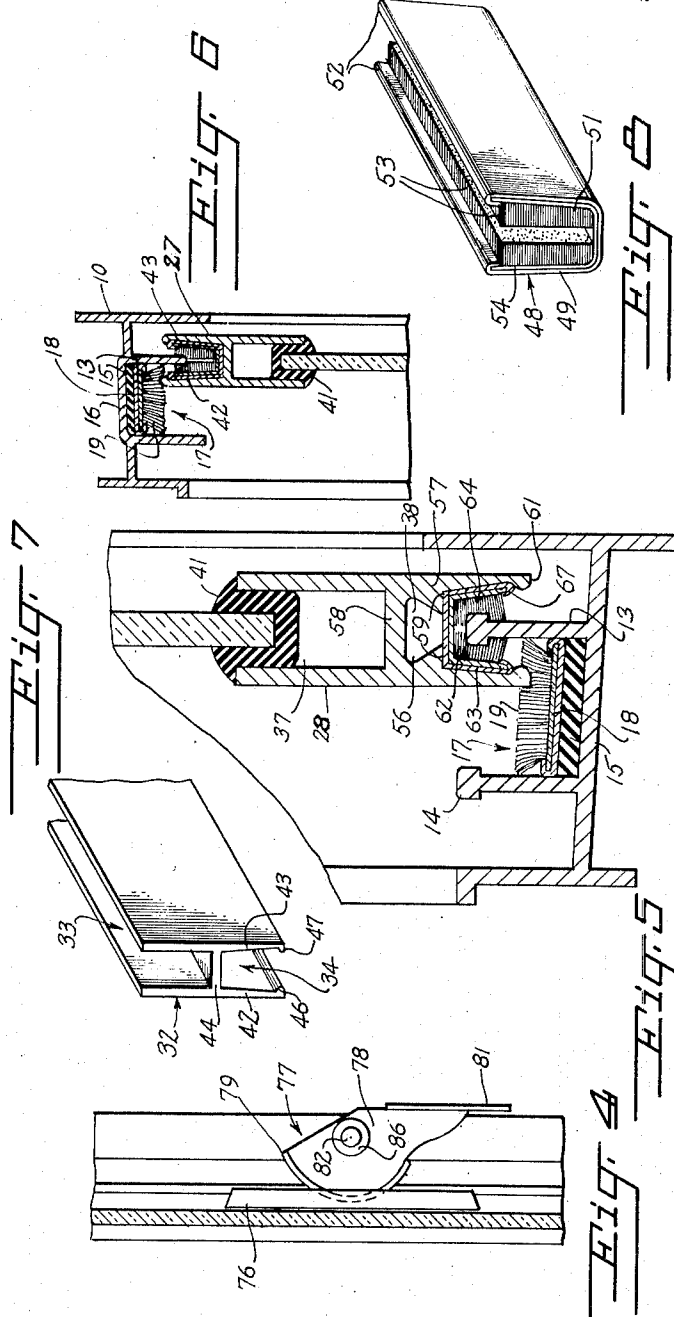


Fig. 7

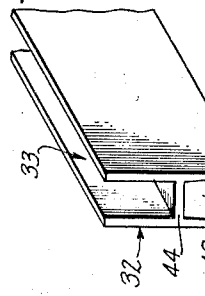
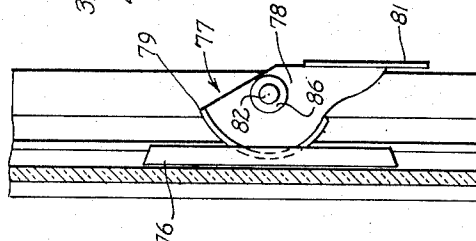


Fig. 4

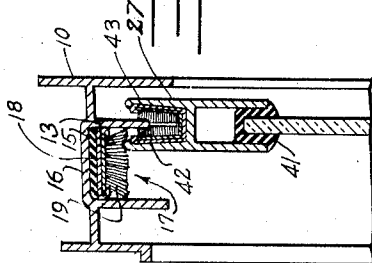


Fig. 6

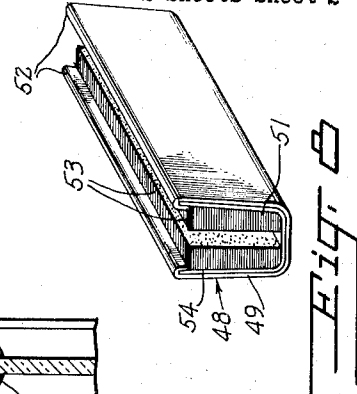


Fig. 8

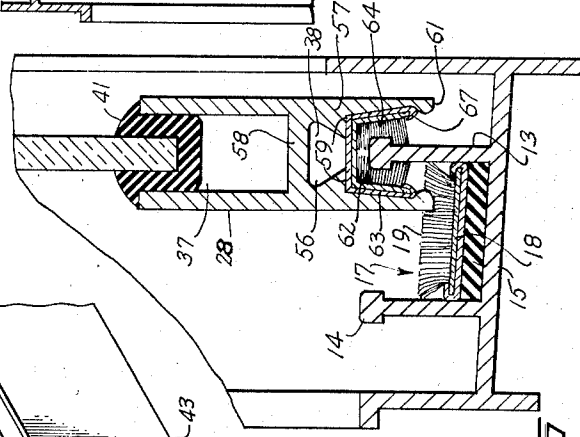


Fig. 5

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SLIDING WINDOW CONSTRUCTION

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7 Claims. (Cl. 20—52.2)

The present invention relates generally to sliding window constructions and more particularly to silent sliding window constructions adapted to provide weather tight seals for the window openings.

In the form of sliding window constructions to which the present invention is particularly directed there is provided a pair of horizontally sliding sashes each being of such a size as to closely approximate one half of the window opening. Each of the sashes is provided with a longitudinal channel extending about the periphery of the sash, the channel engaging a track in the frame of the window for slidable motion thereupon. One of the major problems encountered in window constructions of this type is the provision of a tight long-life weather seal for preventing the entrance of air and moisture through the window construction, particularly between the peripheral channels of the sliding sashes and the rails of the frame. It has been the practice to insert a packing or suitable weather stripping material in the channels of the sashes and to crimp the ends of channels into engagement with the packing so as to positively retain the packing in the channel. However, such conventional means of securing the packing or weather strip in the channels is inconvenient and difficult and does not readily lend itself to rapid fabrication.

It is an important object of the present invention to provide a self-contained weather stripping unit for slidable sashes having peripheral channels, which units may be snapped into place in the peripheral channels of slidable sashes.

It is an object of the present invention to provide in a window construction employing slidable sashes having peripheral channels, a weather stripping unit which may be readily inserted in the peripheral channels of the slidable sashes, without any other means of fastening than by friction.

Still another object of the present invention is to provide a resilient weather strip unit for insertion in a peripheral channel of a slidable window sash, which unit, as a result of its resilient properties, forcefully engages the sides of the channel to prevent relative motion therebetween.

Another problem encountered in window constructions employing horizontally sliding sashes is the provision of silent window operation. The large amount of noise encountered in the operation of prior art sliding window constructions resulted primarily from the fact that these window constructions employed large areas of sliding contact between metal surfaces.

It is, therefore, another object of the present invention to provide a window construction having a metallic frame and metallic sashes slidable in the frame, wherein sliding contact between metallic surfaces is eliminated.

Another object of the present invention is to provide a sliding window construction having a frame member provided with metallic interior, peripheral tracks, slidable window sashes having peripheral channels adapted to receive the peripheral tracks, and non-metallic packing

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or weather stripping received in the sash channels to provide a non-metallic lining for the sash channels which engages the metallic tracks of the frame.

Yet another object of the present invention is to provide a window construction having a metallic frame with tracks extending about the inner periphery of the frame, slidable sashes having peripherally extending channels adapted to receive the tracks, non-metallic weather stripping secured in the sash channels and adapted to envelop the portions of this track extending into the channels, the portion of the tracks extending along the sill of the frame having enlarged head portions to provide an extensive area of contact between the tracks and the weather stripping, thereby to minimize the contact pressure between each track and the weather stripping of each sash. Minimization of contact pressure between the tracks and the weather stripping provides for ease of sliding movement, thereby reducing the noise and the wear on the slidable surfaces, particularly the weather stripping.

The window construction of the present invention further provides a pair of horizontally slidable sashes which completely seal the window opening and which may be locked in the window sealing position. Either or both of the sashes may be wholly removed from the window frame by a simple lifting operation to provide an unobstructive window opening, and for easy washing and window repairs. Provision is further made to prevent the removal of either or both of the sashes when they are in a window sealing position.

It is, therefore, another object of the present invention to provide a window construction employing slidable sashes which may be locked in a window sealing position or which may be completely removed when in the open position to provide a wholly unobstructed window opening.

Still another object of the present invention is to provide a simple sliding window sash construction which may form a complete bar to entrance of moisture or air when in a closed position and which may be securely locked in said closed position.

A further object of the present invention is the provision of a novel weather sealing relationship between sliding sashes and a window frame which promotes easy window operation and also insures full protection against the entrance of moisture or air.

The above and still further features, objects, and advantages of the present invention will become apparent upon consideration of the following detailed description of a specific embodiment of the invention, especially when taken in conjunction with the accompanying drawings, wherein:

Figure 1 is an elevation illustrating a sliding window construction in accordance with the present invention;

Figure 2 is a section taken along the line 2—2 of Figure 1;

Figure 3 is a section taken along the line 3—3 of Figure 1;

Figure 4 is an enlarged fragmentary section taken along line 4—4 of Figure 1;

Figure 5 is an enlarged fragmentary section taken along line 5—5 of Figure 1;

Figure 6 is an enlarged fragmentary section taken along line 6—6 of Figure 1;

Figure 7 is an enlarged isometric view of the sash rail and stile construction employed in the present invention; and

Figure 8 is an enlarged isometric view of a novel weather strip unit employed in the present invention.

Referring now more particularly to the accompanying drawings, Figure 1 illustrates a rectangular window frame generally indicated at 1, consisting of a head 2, a sill 3, and two jambs 4 and 6. Slidably mounted in frame 1

are an inner sash 7 and an outer sash 8, the sash 7 being an inner sash in the sense that it is disposed toward the interior of the structure with which the window frame is associated.

The head 2, sill 3, and jambs 4 and 6 are each preferably fabricated from extruded aluminum sections, each consisting of (see Figures 3, 5, and 6) a transverse base 9, lips 10 and 11, perpendicular to and extending along the inner and outer periphery, respectively, of the base 9 and two transversely spaced tracks 12 and 13, perpendicular to and extending longitudinally along the inner periphery of the base 9 between the lips 10 and 11. The sill 3 slopes downwardly toward the outer lip 11 and is provided with apertures 20 to enable drainage of water which otherwise would be trapped between the tracks 12 and 13. The tracks 12 and 13 associated with the sill 3 are provided with enlarged square head portions 14 having rounded corners. Secured between the tracks 12 and 13 is a relatively thin rectangular rubber-like packing 15 and secured to the top of the packing 15 is a weather strip unit 17. The unit 17 comprises a flat metallic member 18 having a lining of hair pile material 19, the edges of the member 18 being crimped into engagement with the material 19.

The head 2 is indented between the tracks 12 and 13 to provide a recess 16. Secured in the recess 16 are packing member 15' and weather strip unit 17' which are substantially identical with the packing 15 and unit 17, respectively. The units 17' and 17 cooperate with the upper and lower edges, respectively, of the sashes 7 and 8 to provide weather seals, as will hereafter be described.

The inner sash 7 consists of an upper sash rail 21, a lower sash rail 22 and two stiles 23 and 24. Each of the sash rails 21 and 22 is secured to each of the stiles 23 and 24 by corner brackets 5 which may be bolted to each of these members by screws 26. The outer sash 8 consists of an upper sash rail 27, a lower sash rail 28, and stiles 29 and 31. Each of the upper sash rails 21 and 27 and each of the stiles 23 and 29 are fabricated as aluminum extrusions 32, having an H-shaped cross section (see Figure 7), which provides a first U-shaped channel 33 and a second U-shaped channel 34. Each of the lower sash rails 22 and 28 is fabricated from an aluminum extrusion having an approximately H-shaped cross section which provides a first U-shaped channel 37 and a second channel 38. Each of the stiles 24 and 31 is fabricated of aluminum extrusions having a U-shaped cross section defining a channel 39. The channels 33, 37, and 39 are adapted to receive a rubber-like packing 41 which encases the margin of the glass of each of the panels 7 and 8 and effects a tight and permanent seal between the aluminum extrusions and the glass.

The channels 34 of each of the sash rails 21 and 27 and each of the stiles 23 and 29 are defined by wide walls 42 and 43 and a base wall 44. The side walls 42 and 43 have a tapered cross section which is thickest at its inner extremity adjacent the base 44 and terminates in its outer extremity in inwardly extending flanges or beads 46 and 47. The channels 34 are each adapted to receive a separately fabricated weather stripping unit 48 (see Figure 8) which may be snapped into place in the channel 34 and retained therein by the beads 46 and 47. The weather strip member 48 comprises a U-shaped channel member 49 fabricated from a resilient metallic or other suitable material. A lining 51 is disposed and glued within the U-shaped channel of the member 49 and is additionally secured therein by crimped edges 52, thereof. Secured to the lining 51 are two rectangular packing members 53 that define a centrally disposed passage 54 adapted to receive the track members 12 and 13 of the frame 1. The outer dimensions of the unit 48 are approximately equal to the inner dimensions of the channels 34 interiorly of the beads 46 and 47 and, therefore, may be pressed into position in the channels 34.

The resilient properties of the unit 48 together with the beads 46 and 47 of the extrusion 32 maintain the walls of the unit 48 in intimate contact with the walls 42, 43, and 44 interiorly of the beads 46 and 47. The intimate contact thus provided prevents slippage of the unit 48 and also insures a tight weather seal between the unit 48 and the extrusion 32.

When the sashes 7 and 8 are inserted in the frame 1, one of the rails 12 or 13 is seated in the channel 54 provided by the packing members 53 of the weather stripping unit 48. The packing members 53 resiliently engage the two sides of its associated track member to provide a double weather seal which results not only in an effective bar to the entrance of rain or air, but also insures silent sliding action between the sashes 7 and 8 and either of the rails 12 or 13.

When the sashes 7 and 8 are in the closed position (see Fig. 3), rail 13 is seated in the channel 54 of the stile 21 and the rail 13 is seated in the channel 54 of the stile 29, thereby providing a double weather seal which is effective to bar the passage of air and moisture between the tracks 12 and 13, and the sashes 7 and 8, respectively.

In addition to the double weather seal provided by the packing members 53, a further weather seal is provided by cooperation between the wall 42 of the extrusion 32 of the upper sash rail 21 and the weather strip unit 17, the wall 42 extending into the contact with and slightly compressing the felt-like material 19 of the unit 17.

As previously explained, each of the lower sash rails is fabricated from an aluminum extrusion having an approximately H-shaped cross section which provides a first U-shaped channel 37 and a second channel 38. The channel 38 is provided with side walls 56 and 57 and a base wall 58, for both the channels 37 and 38. The walls 56 and 57, starting at the base wall 58, converge rapidly toward the center of the channel 38 and are cut back sharply toward the outer surfaces of walls 56 and 57 to provide shoulders 59 located at about one-third the depth of the channel 38 from the wall 58 and which extend longitudinally of the channel 38. The shoulders 59 are adapted to carry the weight of the sash 7 or 8, the strength of the common wall 58 being considered insufficient for this purpose. The remaining portion of the walls 56 and 57 are gradually tapered, being thickest adjacent the shoulders 59, and terminate in inwardly directed flanges or heads 61. Each of the channels 38 is adapted to receive a separately fabricated weather strip unit 62, which is similar in construction and identical in purpose to the units 32. The units 62 comprise a resilient U-shaped channel member 63 provided with a hair pile material 64, the material 64 being secured in the channel member 63 by crimped edges 67 of the member 63 and gluing. The outer dimensions of the unit 62 are approximately equal to the inner dimensions of the channel 38 between the shoulders 59 and the beads 61 and, therefore, when the unit 62 is pressed into the channel 38, the bottom of the member 63 seats against the shoulders 59 and the edges of its walls are positioned just under the beads 61.

When the sashes 7 and 8 are inserted in the frame 1, one of the rails 12 and 13 is positioned within the unit 62, the enlarged square head portions 14 contacting the portion of material 64 adjacent the bottom of the member 63. The enlarged square head portion 14 provides a large smooth contact surface which minimizes the contact pressure between the sash 7 or 8 and the track 12 or 13 and equally distributes the pressure over a large area of the hair-pile material 64. The minimization and equal distribution of contact pressure reduces wear of the material 64 and insures each of movement of the sashes 7 and 8 along the tracks 12 and 13. Further, the metal-to-hair-pile contact enables substantially noiseless movement of the sashes 7 and 8 over the rails 12 and 13, respectively.

In addition to providing noiseless operation of the

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sashes 7 and 8 and minimizing wear of the weather strip material 64, the large area of contact between the head portions 14 of the rails 12 and 13 and the material 64 provides an effective weather tight seal which bars entry of air and moisture between the rails 12 and 13 and the sashes 7 and 8. Additional weather sealing is provided by contact between the lower edge of the wall 56 of the lower sash rail 22 and the hair pile of the unit 17 disposed between the tracks 12 and 13 of the sill 3. The wall 56 exerts only a slight pressure on the hair pile, sufficient to effect weather sealing, but insufficient to impede movement of the sashes 7 and 8 along the rails 12 and 13.

In order to prevent the entrance of air and moisture between the sashes 7 and 8, the stile 24 is provided with an outwardly extending arcuate member 68 which terminates in an inclined flat surface 69, and secured between the arcuate member 68 and the stile 24 there is provided a cylindrical packing member 71. The stile 31 is similarly provided with an inwardly extending arcuate member 72 which terminates in an inclined flat surface 73 and secured between the arcuate member 72 and the stile 31 is a cylindrical packing member 74. When the sashes 7 and 8 are in the closed position as shown in Figure 3, the surface 69 of the member 68 engages the surface 73 of the member 72, thereby providing a continuous seal between the stiles 24 and 31. In addition, the outer extremity of the arcuate member 68 engages the packing member 74 and the inner extremity of the arcuate member 72 engages the packing member 71. Each of the arcuate members 68 and 72 slightly compresses the packing members 74 and 71, respectively, thereby further insuring a weather proof seal between the sashes 7 and 8.

In order to lock the sashes 7 and 8 in the position illustrated in Figure 1, the stile 24 of the outer sash 8 is provided with a centrally disposed keeper 76 secured to the inner surface thereof and the inner sash 7 is provided with a latch 77 disposed on the stile 24 horizontally adjacent to the keeper 76. The latch 77 consists of a flat body portion 78 extending transversely to the plane of the sashes 7 and 8. The outer edge of the body portion 78 of the latch 77 terminates in an arcuate flange 79 lying in a plane perpendicular to the plane of the body portion 78. The inner edge of the body portion 78 is bent at right angles, inwardly of the stile 24, to provide a flat plate 81 which may be grasped by the fingers when it is desired to actuate the latch 77. The latch 77 is rotatably mounted on a rivet or bolt 82 which extends through an aperture 83 in the end of the stile 24 and into engagement with a block or plate 84 disposed within the U-shaped channel 39 of the stile 24. Spacers 86 are disposed on the bolt 82 on either side of the latch 77 to insure easy rotation thereof. The keeper 76 consists of a leg 87 secured to the inner side of the stile 31, and a body portion 88 disposed horizontally adjacent to the latch 77. The body portion 88 contains an aperture 89 which communicates with two further apertures 91 extending horizontally from either end of the aperture 89. When the latch 77 is rotated into latching position the body portion 78 of the latch 77 enters the aperture 89 and the flange 79 of the latch 77 enters first one and then the other of the apertures 91 thereby providing a secure engagement between the latch 77 and the keeper 76.

It is usually desirable to be able to remove the sashes 7 and 8 from the frame 1 when cleaning the sashes or to provide a larger opening in warm weather. The present invention makes it possible rapidly and easily to remove the sashes from the frame whenever desirable. However, it is also desirable to prevent the removal of the sashes from the frame when the sashes are in the closed position so that an intruder may not gain undesired entry through the window. Removal of the sashes from the frame when the sashes are closed or only partly open is

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prevented by making the portion of each track positioned above the sash in its closed position of such a length that the sash cannot be raised sufficiently short to allow the sash to be raised enough to clear its bottom track. Such an arrangement is illustrated in Figure 6 wherein the sash 8 is in its open position. The track 12 located above sash 8 is short enough for the sash 8 to be raised sufficiently to clear the bottom track 12. The position of the track 13 illustrated in Figure 6 is the portion located above the closed portion of sash 7 and is sufficiently long to prevent the sash 7 being removed from the frame. More particularly, when the sash is raised the track 13 engages the bottom of the channel 54 of unit 48 before the bottom of the sash 7 clears the lower rail 13 and prevents further upward movement of the sash 7. The lengths of the tracks 12 and 13 respectively, are reversed on the other half of the frame so that if the sashes 7 and 8 are provided in the other half of the frame the sash 8 may be removed and the sash 7 cannot be removed.

The construction of the windows of the present invention has been described particularly with respect to horizontally sliding windows. The construction may be equally well applied to vertical sliding window constructions in which case the header and sill constructions would be interchanged with the jamb constructions and the sash rails would be interchanged with the sash stiles, and counter balancers installed.

While I have described and illustrated one specific embodiment of the present invention, it will become apparent that variations of the specific details of construction may be resorted to without departing from the true spirit and scope of the invention as defined in the appended claims.

What we claim is:

1. A window sash construction comprising a sash rail having an H-shaped cross section defining two U-shaped channels extending longitudinally of said sash, one of said U-shaped channels having a bottom wall and tapered side walls thickest at their inner extremities adjacent said bottom wall and each terminating at its outer extremity in an inwardly-projecting, longitudinally-extending bead, a resilient member embodying a U-shaped cross section having side walls and a bottom wall and defining a channel extending longitudinally thereof, said U-shaped cross section having outer dimensions substantially equal to the inner dimensions of said one U-shaped channel of said sash, a packing member secured in said channel of said resilient member, said resilient member being positioned in said one channel of said sash rail interiorly of said beads, the resiliency of said resilient member maintaining intimate contact between the walls of said resilient member and said one channel of said sash rail.

2. A window sash construction comprising a sash rail including a U-shaped cross section defining a channel extending longitudinally of said sash rail, said U-shaped cross section having tapered, inner side walls and a bottom wall, said tapered inner side walls being thickest at their inner extremities adjacent said bottom wall and each terminating at its outer extremity in an inwardly projecting bead, a resilient member having a U-shaped cross section defining a channel extending longitudinally thereof, said U-shaped cross section of said resilient member having side walls and a bottom wall, and having outer dimensions substantially equal to the inner dimensions of said U-shaped cross section of said sash rail interiorly of said beads, a packing member secured in said channel of said resilient member and said resilient member being positioned in said channel of said sash rail interiorly of said beads, the resiliency of said member maintaining the walls thereof in contact with the walls of said channel of said sash rail.

3. A window construction comprising a frame having a sill member, a header member, and two jamb members, each of said members having two transversely spaced, longitudinally extending track members, two sashes each

having a channel defining member for slidably receiving said track members, said channel defining member comprising a sash rail having a generally H-shaped cross section defining two U-shaped channel members extending longitudinally of said sash, one of said U-shaped channel members having a bottom wall and tapered side walls, thickest at their inner extremities adjacent said bottom wall and each terminating at its outer extremity in an inwardly-projecting, longitudinally-extending bead, a resilient member embodying a member of U-shaped cross section having side walls and a bottom wall and defining a channel extending longitudinally thereof, said U-shaped channel member of said sash having outer dimensions substantially equal to the inner dimensions of said one U-shaped channel member of said sash, a packing member secured in said channel of said resilient member and said resilient member being positioned in said one channel of said sash rail interiorly of said beads, the resiliency of said resilient member maintaining intimate contact between the walls of the resilient member and said one channel of said sash rail, said packing member defining said channel for receiving said track members.

4. A window construction comprising a frame having a sill, a header and two jambs, each having two transversely-spaced, longitudinally-extending tracks, a longitudinally extending recess formed in said header between said tracks, a weather strip unit secured in said recess, said unit comprising an inverted U-shaped member and felt-like weather stripping secured in said U-shaped member, two sashes each including a channel-shaped sash member having side walls and a bottom wall and each receiving one of said tracks between said side walls when said sash is inserted in said frame, the edges of the side walls positioned between said tracks contacting said felt-like weather stripping.

5. The combination in accordance with claim 4, wherein said side walls are of tapered cross section, thickest at their inner extremities adjacent said bottom wall and each terminating at its outer extremity in an

inwardly projecting bead, a resilient member having a U-shaped cross section defining a channel extending longitudinally thereof, said resilient member having outer dimensions substantially equal to the dimensions of said channel of said sash member interiorly of said beads, and being positioned therein, a packing member secured in said channel of said resilient member and defining a channel for receiving said tracks of said header.

6. A window construction comprising a frame having at least a sill and a header, said sill having two longitudinally-extending, transversely-spaced tracks, a weather strip unit extending longitudinally of said sill between said tracks, two sashes each including a channel shaped lower sash member having side walls and a bottom wall and each receiving one of said tracks between said side walls when said sash is positioned in said frame, the edges of the side walls positioned between said tracks contacting said weather strip unit.

7. The combination in accordance with claim 6, wherein said tracks include a rectangular body portion and an enlarged square head portion.

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