United States Patent [19]

Anderson

[11] **3,842,540**

[45] **Oct. 22, 1974**

[54] **WINDOW STRUCTURE**

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[73] Assignee: **V. E. Anderson Mfg., Co.,** Owensboro, Ky.

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Related U.S. Application Data

[62] Division of Ser. No. 718,052, April 2, 1968, Pat. No. 3,643,377.

[52] **U.S. Cl.** **49/181**

[51] **Int. Cl.** **E05d 15/22**

[58] **Field of Search** 49/181, 174, 322; 292/197

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Primary Examiner—Kenneth Downey

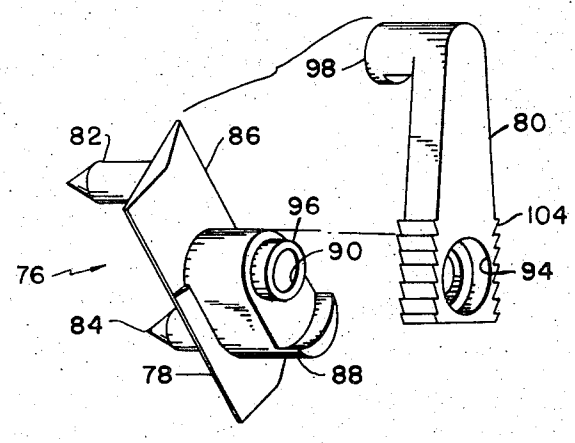
Attorney, Agent, or Firm—Whittemore, Hulbert & Belknap

[57] **ABSTRACT**

Tilting double hung window construction, including a single plastic guide member at each side of a window sash for providing compression between a window frame and the window sash mounted therein and weatherstripping therebetween, as well as guiding the window sash in sliding movement relative to the frame and two-part pivoted camming and locking structure for securing the window sash in a tilted vertical position, especially in conjunction with counterbalance structure which is readily engageable with and releasable from the counterbalance structure.

The window construction further includes unique single member glazing and mullion extrusions for facilitating glazing of the window structure and the sealing of window structures positioned side by side. Shipping clips for maintaining the frame of the window structure within predetermined limits during shipping and installing are also disclosed.

6 Claims, 17 Drawing Figures



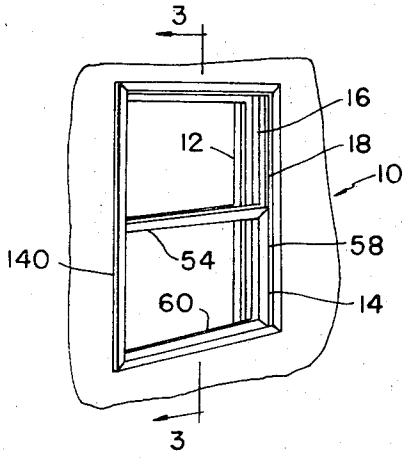
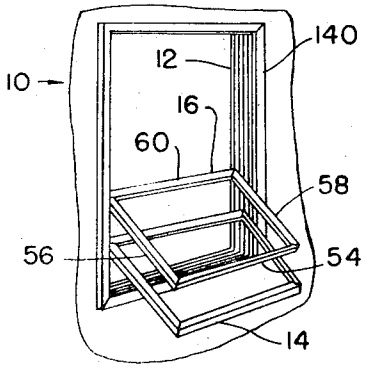


FIG. 1

FIG. 2



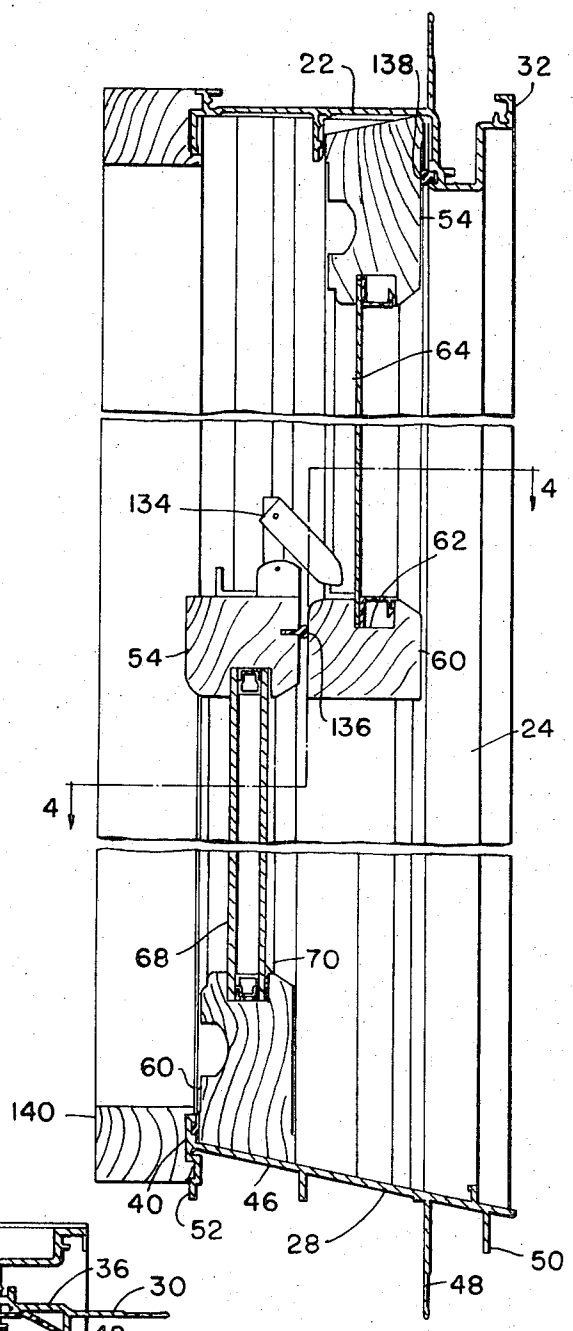


FIG. 3

FIG. 4

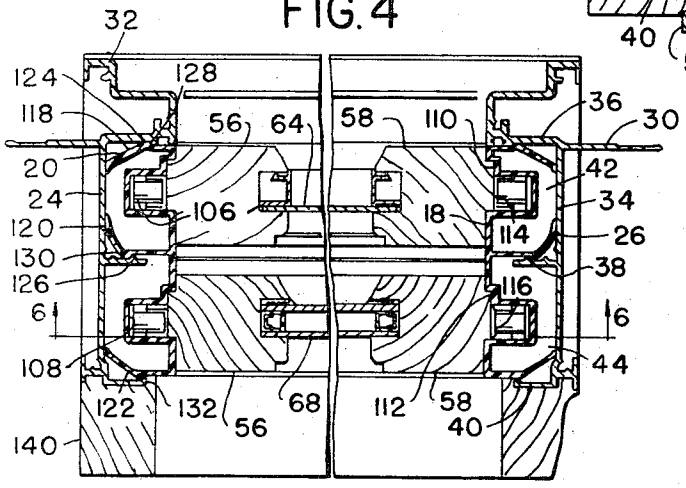
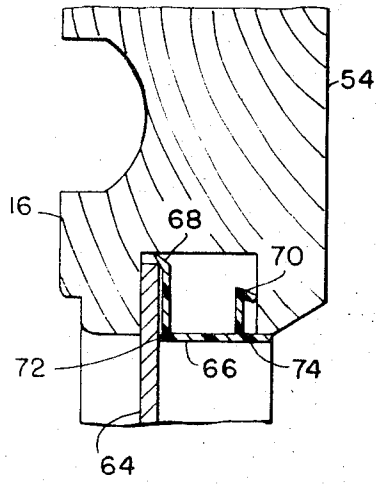


FIG.5



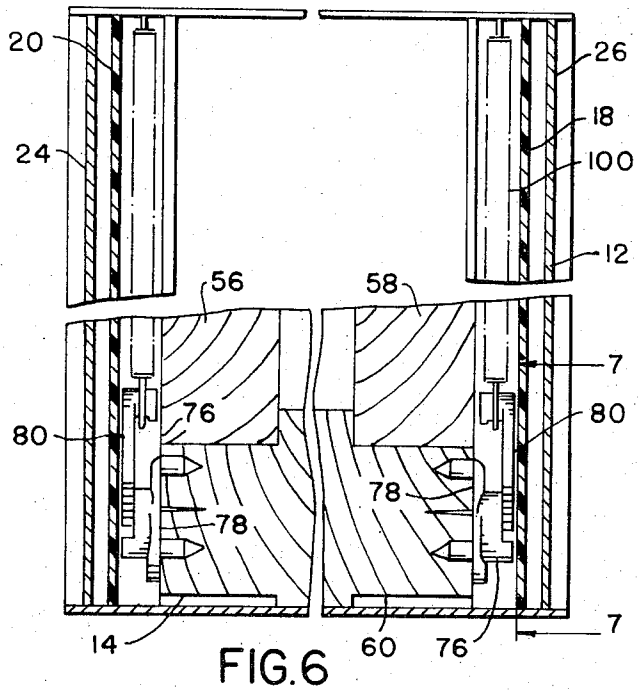


FIG.6

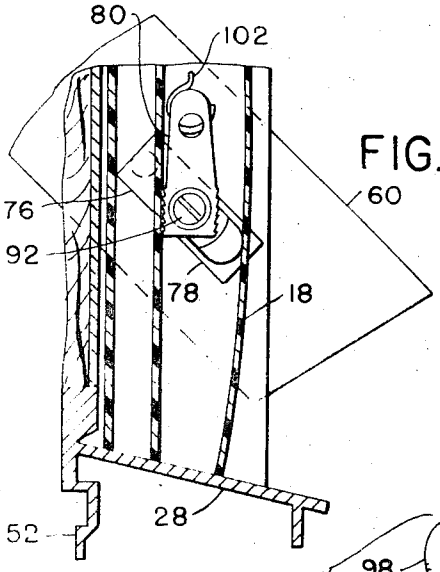


FIG.8

FIG.7

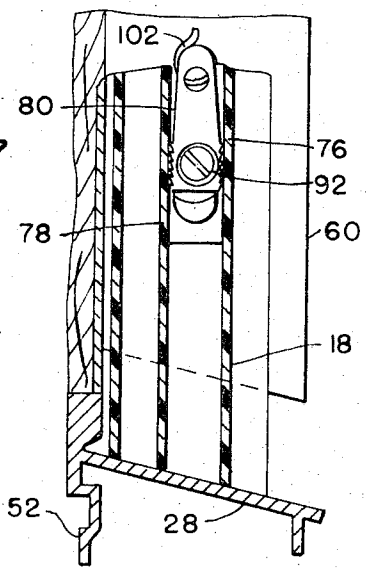
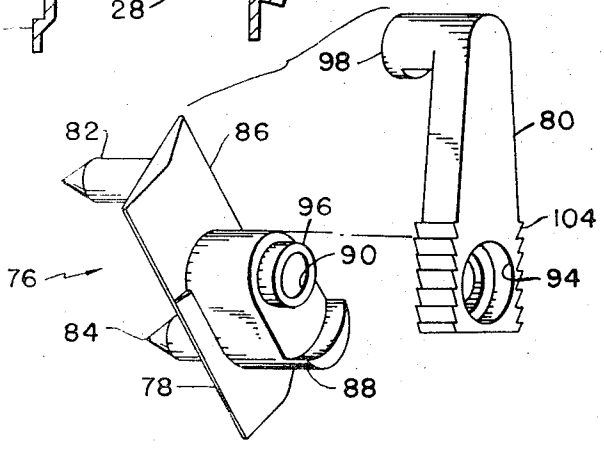


FIG.9



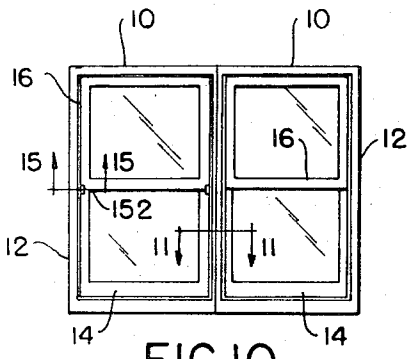


FIG.10

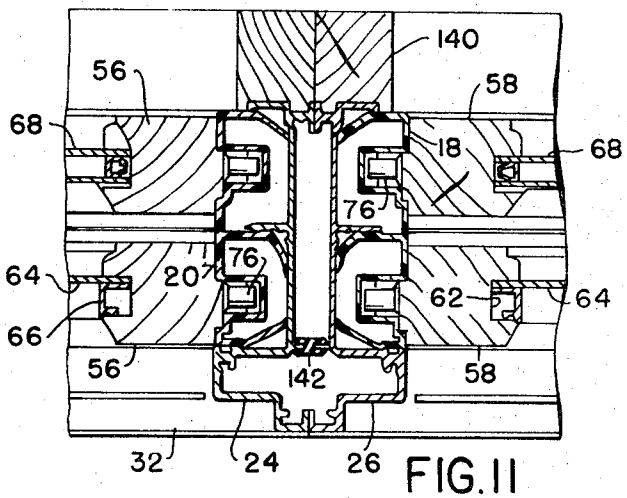


FIG.11

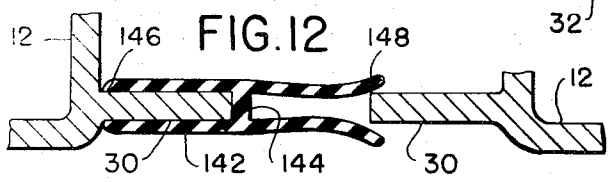


FIG.12

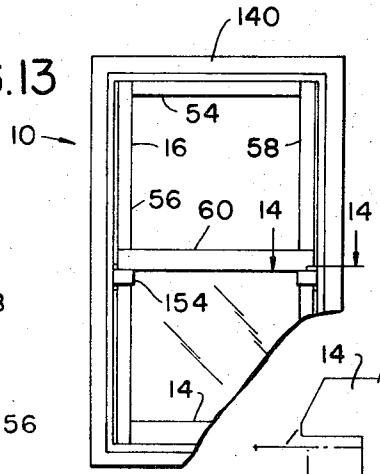


FIG.13

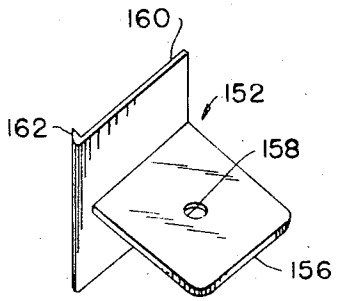


FIG.16

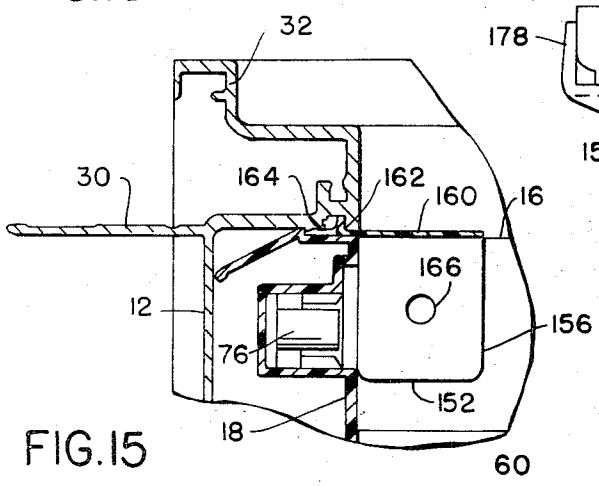


FIG.15

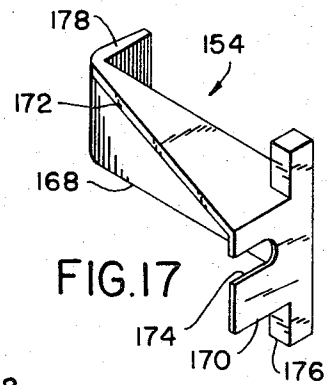


FIG.17

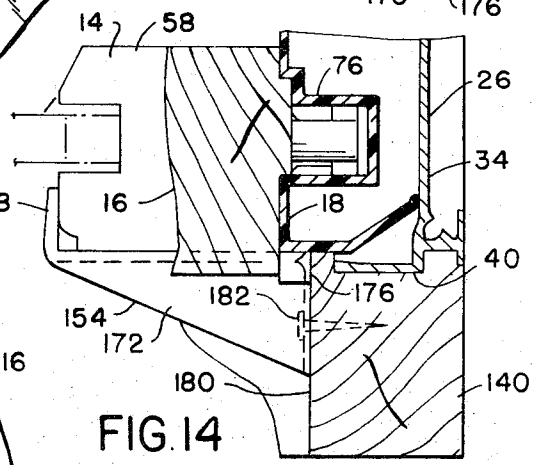


FIG.14

WINDOW STRUCTURE

CROSS REFERENCE TO RELATED APPLICATION

This application is a division of my application Ser. No. 718,052, filed Apr. 2, 1968, now Pat. No. 3,643,377, issued Feb. 22, 1972, which is a continuation-in-part of my Pat. No. 3,464,160, issued Sept. 2, 1969.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention relates to tilting double hung windows and refers more specifically to a tilting double hung window having a single plastic guide member between the window sash and window frame at each side thereof for providing compression, weatherstripping, and sash guiding functions, a two-part camming and locking structure for pivotally mounting the sash with respect to the guide member and window frame, unique glazing and mullion structure and packing clip structure for maintaining the window frame dimensions during shipment and installation.

2. Description of the Prior Art

In the past tilting double hung windows of the type which may be cleaned from the inside of a building in which the window is installed by pivoting the window sash about one edge thereof to expose the outside surface for cleaning have been deficient in that the usual means for supporting the sash in the window frames have been rather complicated, often expensive, and sometimes inefficient. Thus, a minimum of three separate members, that is a metal guide for the sash, spring means operable between the window guide and metal frame for maintaining compression of the metal guide against the sash, and a felt member or similar weatherstrip material between the sash and outer frame have usually been required at each side of the window sash.

Wherein locking structure has been provided in the past to maintain the sash of tilting double hung windows in a predetermined vertical position when tilted, the locking structure has been complicated, expensive to manufacture or inefficient. Further, the prior locking structures have not generally been readily engageable with and releasable from assembly with counterbalance structure for the sash.

Similarly, in the past, window sash have sometimes not been capable of being reglazed readily and where glazing has been possible, reglazing of a window sash has required considerable skill and special tools and material. Sealing between two adjacent windows has also been rather haphazard in the past, often amounting to merely packing calking material between the adjacent windows and providing flanges or the like to hide the calking material.

Again, in prior window structures wherein a sash is placed in a frame for shipment to and installing on a job site, the frames often become bowed or warped out of shape in storage, shipment or in installing, so that the finished window in place has in the past often been difficult to operate due to irregularities in the frame. Correction of the irregularities on the job site again requires considerable skill and is time consuming and therefore expensive.

In addition, prior window structures have generally been either metal or wood, that is, if a metal exterior has been required in the past for maintenance purposes, the interior of previous window structures has generally also been metal. Conversely, when a wooden window has been desired for aesthetic appearance and warmth, the entire window has usually been constructed of wood in the past. The interior aesthetic appearance and warmth of wood window structure has not previously been satisfactorily, combined with the maintenance advantages of metal exterior window structure.

SUMMARY OF THE INVENTION

The invention is a tilting double hung window structure wherein a single plastic guide member is inserted in the frame at each side of the jambs and serves the multiple purposes of providing required compression between the frame and sash to maintain the sash in adjusted positions, guiding the sash in vertical movement and weatherstripping between the sash and frame. The guide members in conjunction with unique two-part camming and locking structure further permit tilting of the sash into substantially any desired position with relative ease to facilitate cleaning of the window. The window structure of the invention uses a minimum number of separate parts which parts are uniform where possible and are metal on the exterior and wood on the interior to provide weather resistance and aesthetic appearance.

The sash of the double hung window structure of the invention are reglazable to which end there is provided a unique single piece glazing member. In addition, the window structure of the invention may be installed side by side by use of a single, particularly efficient mullion strip. Further, the installation of the window structure is facilitated by the provision of packing and shipping clips during the manufacture of the window which maintain the frame dimensions with respect to the sash during storage, shipment and installation to prevent installation of the window with the frame deformed so as to hinder operation of the sash in the installed frame.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of double hung window structure constructed in accordance with the invention having the sash in a closed position.

FIG. 2 is a perspective view of the double hung window structure of FIG. 1 showing the sash in a tilted position for cleaning or the like.

FIG. 3 is an enlarged broken longitudinal section view of the window structure illustrated in FIG. 1 taken substantially on the line 3—3 in FIG. 1.

FIG. 4 is an enlarged broken transverse section view of the window structure illustrated in FIG. 1 taken substantially on the line 4—4 on FIG. 3.

FIG. 5 is an enlarged portion of the section view of FIG. 3, particularly showing the glazing strip for a sash head.

FIG. 6 is a broken section view of the window structure illustrated in FIG. 4 taken substantially on the line 6—6 in FIG. 4.

FIG. 7 is an enlarged, partial section view of the window structure of FIG. 6 taken substantially on the line 7—7 in FIG. 6.

FIG. 8 is a section view similar to the section view of FIG. 7 showing the window sash in a tilted position.

FIG. 9 is an exploded perspective view of the camming and locking structure of the window structure illustrated in FIG. 1.

FIG. 10 is an elevation view of a pair of window structures as illustrated in FIG. 1 installed side by side.

FIG. 11 is an enlarged partial cross section view of the window structure illustrated in FIG. 10 taken substantially on the line 11—11 in FIG. 10.

FIG. 12 is an enlarged section view of a portion of the window structure illustrated in FIG. 11 in a partly assembled condition, particularly showing the mullion strip for sealing between the window frames.

FIG. 13 is an interior elevation view of window structure, as illustrated in FIG. 1, having packing and shipping clips assembled therewith.

FIG. 14 is an enlarged partial section view of the window structure illustrated in FIG. 13, taken substantially on the line 14—14 in FIG. 13.

FIG. 15 is an enlarged partial cross section of window structure constructed in accordance with the invention, as shown in FIG. 10, having an exterior packing and shipping clip secured thereto, taken substantially on the line 15—15 in FIG. 10.

FIG. 16 is a perspective view of the outside shipping and packing clip shown installed in FIG. 15.

FIG. 17 is a perspective view of the inside packing and shipping clip shown installed in FIG. 14.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The window structure 10 of the invention includes a window frame 12, a pair of window sash 14 and 16 and guide members 18 and 20. The frame 12 is metal, the sash 14 and 16 are wood, and the guide members 18 and 20 are plastic. The frame, sash and guide members when assembled, as illustrated in FIGS. 3 and 4, provide a tilting double hung window, the sash of which may be pivoted inwardly for cleaning or for subsequent tilting and removing as desired. In addition, as shown best in FIGS. 3 and 4, the window structure 10 combines the advantages of a metal exterior and a wood interior so that maintenance is kept at a minimum and the natural beauty of wood is preserved.

More specifically, the frame 12 includes the head member 22, the jamb members 24 and 26 and the sill member 28. The head and jamb members have a single cross section, as illustrated, including a mounting flange 30 to aid in installation of the window structure 10 in a building opening, an exterior molding portion 32 and portions 34, 36, 38 and 40 forming pockets 42 and 44 for receiving the guide members 18 and 20.

The sill member 28 includes the outwardly and downwardly inclined portion 46 and the portion 48 for securing the sill in a building opening. A water-stop portion 50 is provided on the cross section of the sill 48 and a molding receiving portion and sash stop member 52 is provided on the inside of the sill member 28. The head, jamb and sill members 22, 24 and 26 and 28, as shown, may be mitered and connected by convenient corner structure (not shown).

The sash 14 and 16 are exactly the same and each includes head, jamb and sill members 54, 56, 58 and 60. The head, jamb and sill members are provided with recesses 62 in which glass panes or other building panels 64 are secured by means of the glazing member 66, as shown best in FIG. 5, in the case of single thickness glass panes. Insulated window panes 68 may also be secured in the recesses 62 in the sash, as shown in FIG. 3, by means of a glazing structure 70.

The glazing strip 66 is shown in more detail in FIG. 5 and has a generally U-shaped cross section with one leg longer than the other. The longer leg terminates in a pointed portion 68 extending outwardly from the longer leg of the cross section and away from the shorter leg of the cross section. The terminal portion 70 of the shorter leg of the cross section of the glazing strip 66 extends at an acute angle to the shorter leg toward the connecting portion of the U-shaped cross section and away from the longer leg thereof, again as shown in FIG. 5. The connecting portion of the U-shaped cross section of the glazing strip 66 terminates on the longer leg side of the cross section in a pointed portion 72 and extends outwardly of the U-shaped cross section from the shorter leg in a portion 74, again as shown in FIG. 5.

The particular cross section of the glazing strip 66 permits glazing of the sash 14 and 16 with glass panes or similar building panels having substantially varying thickness. Thus, the pointed portions 68 and 72 provide excellent weather-seals, the portion 70 is flexible to accommodate panels of different thickness and further provides a sealing function, while the portion 74 of the cross section of the glazing strip provides a finished appearance, even with building panels of considerably different thickness.

In use, as will be seen subsequently, the sill of the sash 14 and 16 is secured in place by means of screws passing through the camming and locking structure illustrated in FIGS. 6 through 9. Thus, in reglazing the sash 14 and 16, it is merely necessary to remove the glazing strips 66, remove the sill of the sash, place a new pane of glass in the recesses 62, replace the sill and press the glazing strip 66 into position around the sash in the recesses 62, as shown in FIG. 5.

At the bottom of both the sash member 14 and the sash member 16, as shown in FIG. 6, the camming and locking structure 76, which is best shown in FIG. 9, is provided to permit pivoting the sash relative to the guide members 18 and 20 and the frame 12.

The camming and locking structure 76 includes the separate camming member 78 and locking member 80. The camming member 78 is secured to the sill of the sash, as shown in FIG. 6, by the portions 82 and 84 which are positioned a substantial distance apart on the base portion 86 of the camming member 78 and are adapted to be driven into the sills in the position shown in FIG. 6. The cylindrical portion 88 of the camming member 78 of the camming and locking structure is provided to react against a portion of the guide members as shown in FIG. 8, on tilting of the sash to which it is secured. The opening 90 is provided in the other end of the cylindrical portion 88 of the camming member 78 to receive the mounting screw 92 by which the locking member 80 of the camming and locking structure 76 is secured to the camming member 78, the camming and locking structure 76 is secured to the sash and the sill of the sash is secured to the jambs thereof.

The locking member 80 of the camming and locking structure 76, as shown in FIG. 9, is an elongated member having an opening 94 in one end thereof with an

outer enlarged diameter for receiving the head of the screw **92** and a reduced inner diameter fitting over the bearing portion **96** of the cylindrical portion **88** of the camming member **78**, whereby the locking member **80** is pivoted to the camming member **78**. The cylindrical extension **98** of the locking member **80** permits ready connection of the camming and locking structure to the window counterbalance structure **100**, as shown in FIG. **6**, by means of the hook **102** which may be readily engaged and disengaged therefrom should it be desired to remove the sash **14** or **16** from the frame **12**. Serrated edges **104** are provided on the locking member **80** of the camming and locking structure **76**, whereby on tilting of the sash, as shown in FIG. **8**, so that the camming member **78** engages one portion of the guide strips, the serrations are forced into engagement with an adjacent portion to lock the sash in a predetermined vertical position during tilting thereof.

The guide members **18** and **20** are constructed of a resilient plastic, such as a semi-rigid vinyl, nylon or the like. The guide members have a cross section illustrated best in FIG. **4**, including a pair of longitudinally extending recesses **106** and **108** for receiving the camming and locking structure **76**. The members **18** and **20** are further provided with lesser recesses **110** and **112** for receiving the edge portions **114** and **116** of the jambs of the sash **14** and **16**, whereby the sash are guided in vertical movement within the frame **12**, as previously indicated.

The arcuate resilient portions **118, 120** and **122** of the guide members **18** and **20** extend into the pockets **42** and **44**, as shown, and tend to urge the members **18** and **20** out of the pockets **42** and **44** and into engagement with the jambs of the sash **14** and **16**. The direction in which the arcuate portions **118, 120** and **122** are bent and the resiliency thereof provide weathertight window structure between the frame **12** and sash **14** and **16**.

The frame portions **36** and **38** are provided with projections **124** and **126** thereon extending into the pocket **42** which mate with abutments **128** and **130** on the portions **118** and **120** of the guide members **18** and **20** to maintain the guide members **18** and **20** within the pocket **42**. Similar projections **132** can be provided on the portion **40** of the frame jambs **24** and **26** and on the portions **122** of the guide members **18** and **20**.

Locking structure **134** is provided operable between the sashes **14** and **16** in the closed position and weather-stripping **136** and **138** is provided as desired to maintain a weathertight window.

The window structure **10** is completed by the wood interior molding **140** secured over the portions **40** and **52** of the head, jamb and sill members **22, 24, 26** and **28** of the frame, as shown in FIGS. **3** and **4**.

In overall operation, with the locking structure **134** unlocked, the inner sash **14** may be grasped by the head and pulled inwardly to pivot about the camming and lock structure **76** at the bottom thereof on forcing of the portion of the guide members **18** and **20** supported primarily by the portions **122** inwardly of the pockets **44**. Thus, either surface of the window pane **68** may be exposed on the inside of the window structure **10** for cleaning or the like, as shown in FIG. **2**. On lowering the upper sash **16**, the head of the upper sash **16** may be gripped and the upper sash pivoted about the camming and locking structure **76** adjacent the bottom thereof to urge the portion of the guide members **18** and **20** supported primarily by portions **118** and **120** into the pockets **42**. Again then both surfaces of the window pane **64** in the upper sash **16** may be exposed for cleaning or the like on the inside of the window structure **10**.

With the windows in the tilted position, as shown in FIG. **2**, they may be further inclined so that one side is raised higher than the other, whereby the camming and locking structure **76** may be removed from the recesses **106** and **108** and the sash **14** and **16** completely removed from the window structure **10** for replacing, repairing or the like.

Conversely, when it is desired to close the window structure **10**, the sash are first placed in the frame **12** with the locking and camming structure **76** in the recesses **106** and **108** to provide a horizontal pivot axis for the sash, and the sash is then pivoted back into the vertical position with the guide portions **114** and **116** of the sash within the recesses **110** and **112** of the guide members **18** and **20**. The lower sash may then be moved all the way to the bottom, as illustrated in FIG. **3**, the upper sash may be moved all the way to the top and the locking structure **76** latched, whereby the bottom of the lower sash is secured due to the camming and locking structure **76**. The top of the lower sash and the bottom of the upper sash are secured due to the pivot pins adjacent the bottom of the upper sash and the latch structure **134** and the head of the upper sash is secured due to the placing of the head of the sash of the pocket **42** in the head member.

When it is desired to install two of the double hung tilting window structures **10** side by side, as illustrated in FIG. **10**, the installation may be rapidly accomplished in a water-tight manner by use of the mullion strip **142**, illustrated best in FIGS. **11** and **12**. The mullion member **142** has a cross section, as shown in FIG. **12**, which is generally H-shaped having the cross bar portion **144** and the opposite end portions **146** and **148**. The end portion **146** is terminated with portions extending inwardly toward each other and terminating in points, while the end portion **148** is outwardly concave, as shown in FIG. **12**.

In installation, the first window structure **10**, for example the window at the left side in FIGS. **10, 11** and **12**, is installed in the usual manner after the mounting flange **30**, as shown best in FIG. **4**, has been partly broken off. The end portion **146** of the H-shaped cross section of the mullion member **142** is then engaged with the remainder of the mounting flange of the left window **12**, as shown in FIG. **12**. Subsequently, the remainder of the broken off mounting flange of the right hand window structure **10**, as shown in FIG. **10**, is inserted in the end portion **148** of the H-shaped cross section of the mullion member **142** and the window structures **10** are urged together, while the second window **10** is fixed in place.

Due to the configuration of the cross section of the H-shaped mullion strip **142**, including the pointed end portions **146** and the concave outward end portions **148** which at their closest point are closer together than the width of the cross bar **144**, the mullion strip snugly engages both broken off mounting flanges of the windows **10** in assembly, as illustrated in FIG. **11**, to provide a water-tight vertical barrier for the window structures in side by side installation.

It will be understood that additional windows may be similarly installed and that if it is desired to install a pair

or more windows at angles, such as 15° and 45° with respect to each other, such installation can be accomplished with mullion strips similar to mullion strip 142 and, for example, I-shaped mullion members having the desired angle positioned between the windows.

In shipment of the double hung tilting window structure **10**, it is particularly desirable to maintain the frame in a predetermined relation to the sash so that when the window structure **10** is installed, the proper compression will be applied to the sash by the guide strips **18** and **20** to permit easy movement of the sash. In accordance with the invention, the dimension between the frame **12** and the sash **14** and **16** is maintained by the exterior packing and shipping clip **152** and the interior packing and shipping clip **154**, as shown best in FIGS. **16** and **17**, respectively.

The exterior packing clip **152** includes the flat portion **156** adapted to extend horizontally of the window structure illustrated in FIG. **10** in position thereon and having the nailing opening **158** extending therethrough. The flat portion **160** of the clip **152** extends perpendicular to the portion **145** and is terminated in a sharp flange **162** on one side, as shown in FIG. **16.**

In installation, as shown in FIG. **15**, the sharp flange **162** of the packing clip **152** is inserted in the recess **164** extending longitudinally of the frame jambs **162** and the flat part **156** of the clip **152** is placed in surface to surface engagement with the bottom surface of the sill of the upper sash **16** in the upper position thereof and is secured in place by convenient means, such as nail **166.** The frame **12** is thus not allowed to bow outwardly of the sash.

The packing and shipping clip **154** includes the three relatively perpendicularly flat portions **168, 170** and **172,** connected as shown in FIG. **17.** The plane **172** is substantially triangular and the plane **170** includes a fastener notch **174** extending thereinto from one edge thereof. Rectilinear portion **176** extends in the plane of portions **168** and **170** of the clip **154** and through the plane of portion **172** thereof at the intersection of the planes, as shown. The portion **168** of the clip **154** terminates in a flange **178** extending at right angles thereto.

In use, as shown best in FIG. **14**, the interior packing and shipping clip **154** is positioned with the portions **168** and **170** in surface to surface engagement with the inside of the jamb of the sash **14** and the surface **180** of the wood molding **140** with the rectilinear portion **176** positioned bewteen the jamb and molding and the flange **178** engaging the jamb, as shown in FIG. **14.** The clip is then secured in place by fastening means, such as the nail **182.** The sash **14** and the frame **12** are thus rigidly secured in predetermined relation for shipment and storage to insure proper installation.

While one embodiment of the present invention has been considered in detail, it will be understood that other embodiments and modifications are contemplated by the inventor. It is the intention to include all embodiments and modifications as are defined by the appended claims within the scope of the invention.

What I claim as my invention is:

1. Pivot structure including a cam member and a lock member pivotally mounted on said cam member, said cam member including means for securing the cam member to a window sash or the like extending from one side thereof and a cylindrical camming portion extending from the other saide thereof having pivot means thereon, and the lock member including means for mounting the lock member on the pivot means and means for securing the lock member to a counterbalance or the like.

2. Structure as set forth in claim **1** wherein the means for securing the cam member to a window sash or the like extending from one side thereof comprises a pair of parallel spaced apart cylindrical portions each having one end secured to the rest of the cam member and pointed other ends, which cylindrical portions extend substantially perpendicular to the rest of the cam member.

3. Structure as set forth in claim **1** wherein the cylindrical camming portion has an elongated cross section and the pivot means on the cylindrical camming portion of the camming member comprises a hollow cylindrical portion extending outwardly therefrom.

4. Structure as set forth in claim **1** wherein the means for mounting the lock member on the pivot means comprises a cylindrical opening extending through the lock member for receiving the pivot means on the cam member.

5. Structure as set forth in claim **1** wherein the means for securing the lock member to a counterbalance or the like comprises a cylindrical portion extending from one end of the lock member substantially perpendicular thereto and a recess in the side of the cylindrical portion opening away from the one end of the lock member.

6. An integral cam member for a pivot structure or the like comprising a substantially flat elongated body portion, means for securing the cam member to a window sash or the like extending from one side of the body portion and a cylindrical camming portion having an elongated cross section in the direction of the extension of the body portion extending from the other side of the body portion and further including pivot means extending outwardly of the body portion from the camming portion.

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