Feb. 7, 1967 M. W. MERMELL 3,302,354

WINDOW ASSEMBLY

Filed Jan. 8, 1965 2 Sheets-Sheet 1

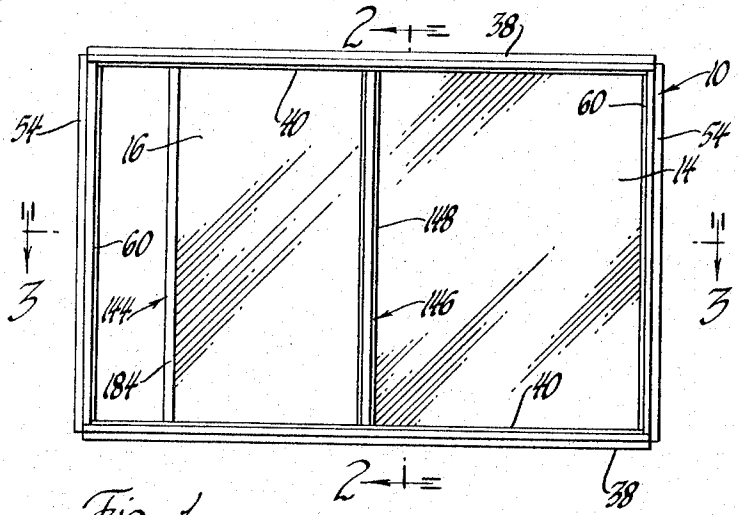


Fig. 1

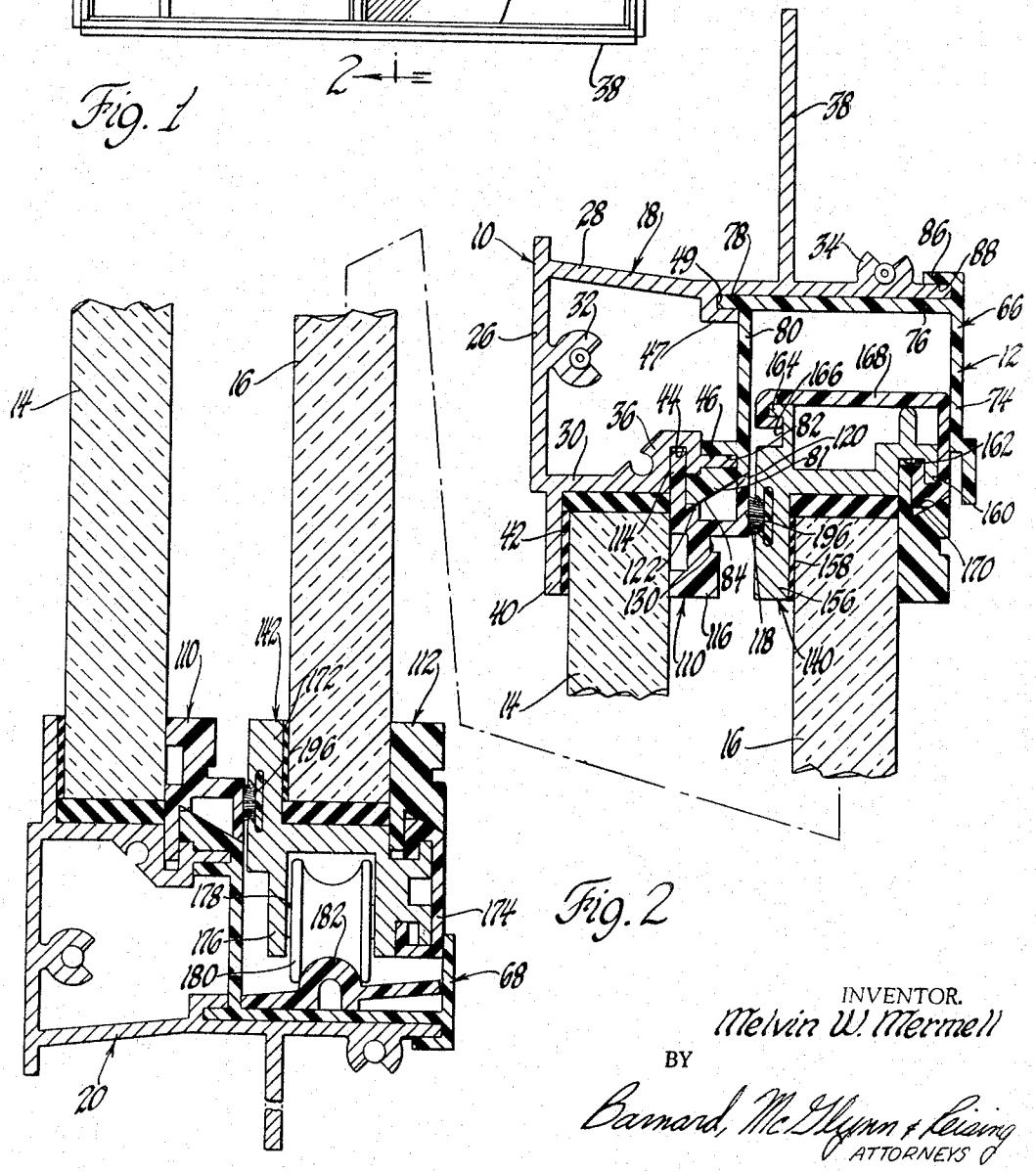


Fig. 2

INVENTOR.
Melvin W. Mermell
BY
Barnard, McGlynn & Leising
ATTORNEYS

Feb. 7, 1967 M. W. MERMELL 3,302,354

WINDOW ASSEMBLY

Filed Jan. 8, 1965 2 Sheets-Sheet 2

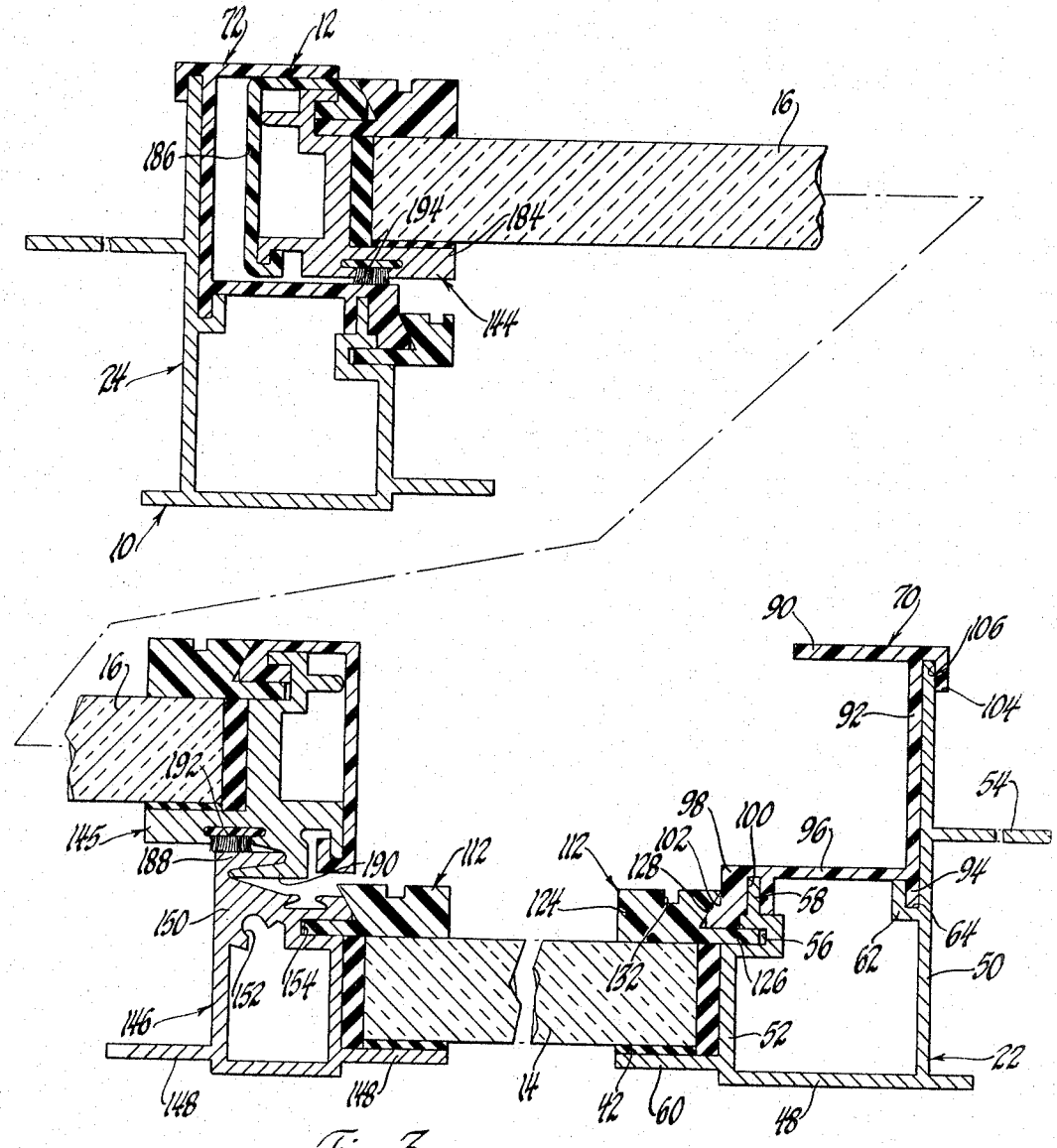


Fig. 3

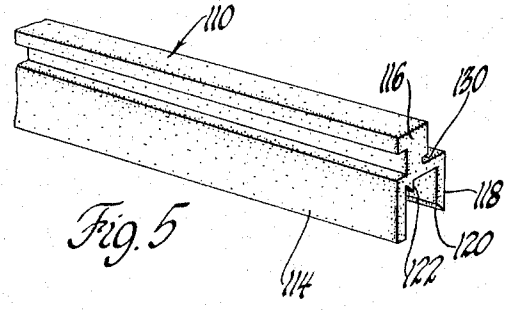


Fig. 5

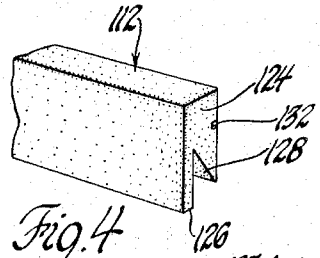


Fig. 4

INVENTOR.
Melvin W. Mermell
BY
Barnard, McGlynn & Reising
ATTORNEYS

United States Patent Office 3,302,354 Patented Feb. 7, 1967

3,302,354

WINDOW ASSEMBLY

Melvin W. Mermell, Birmingham, Mich., assignor to Zenith Glass Company, Detroit, Mich., a corporation of Michigan

Filed Jan. 8, 1965, Ser. No. 424,228
11 Claims. (Cl. 52—476)

This invention relates to window assemblies, and more particularly to the type of window assembly having an exterior frame secured in place in a building structure, an interior frame secured to the exterior frame, and a glass panel and/or a screen panel mounted in the exterior frame assembly.

In the building structures, it is often desirable to provide a window assembly which may be installed as a unit when the building is constructed and which is simple and economical to manufacture and assemble. It is also desirable to provide as many like parts as possible and to secure such parts together with a minimum of fastening devices and a minimum amount of labor. When the window assemblies are incorporated into a building structure, it is also desirable to provide some means for repair or replacement of various parts of the window assembly without complete removal from the building structure, and preferably such repairs, replacements and the like being capable of being made from the inside.

There are numerous window assemblies available which include an exterior frame and an interior frame, the two structures being joined together by screws, bolts, rivets, or other fastening devices. Such window assemblies are expensive to manufacture and produce, and include a large number of parts which must be precisely formed and precisely assembled in order to properly form the window assembly. Many units are available that are formed of extruded pieces, and mating parts do not always fit in the proper manner due to tolerance stackups and the like. Disassembly procedures are extremely complicated, should a repair or replacement of various parts become necessary. Such window units are extremely expensive to manufacture and produce, are expensive to assemble and mount in building constructions, and are not conveniently disassembled or repaired should the need arise.

The window assembly in which this invention is embodied comprises, generally, an exterior frame of extruded members, so formed that the header and sill pieces of the exterior frame are alike, the jamb pieces of the exterior frame are alike, and similarly with the interior frame, the header and sill substantially the same and the jamb members substantially the same. Suitable window panels are disposed in the exterior frame, abutting against flanges formed in the exterior frame, and having sealing material therebetween. The interior frame subassembly fits conveniently within the exterior frame, the interior frame and window panels being held in place by locking strips extending around the periphery of the glass panel and interor frame and locking in place in the exterior frame. Suitable angular surfaces are provided on the interior frame and on the locking strips to take up tolerance differences that exist between the interior frame and the exterior frame, thus assuring a proper fit of the various parts upon assembly. The unit is so constructed that once mounted in a building structure, it is possible to remove the locking strips and then remove the entire interior frame and or the glass panels from the exterior frame, all from the interior side of the window assembly. Repair and replacement of various parts are possible, since the parts are standard and since tolerance differences are accommodated by the locking strips.

A window assembly constructed in such manner is extremely adaptable to any type of building construction, and is extremely inexpensive and economical to manufacture, produce, and mount. The window structure lends itself to various combinations of glass panels, screens, storms, and rolling window panels, and the entire unit is pleasing to the aesthetic sense, both interior and exterior.

These and other advantages will become more apparent from the following description and drawings in which:

FIGURE 1 is an elevational view of the exterior side of a window assembly embodying the invention.

FIGURE 2 is a vertical cross-sectional view of the window construction illustrated in FIGURE 1, taken substantially along the line 2—2 of FIGURE 1 and looking in the direction of the arrows.

FIGURE 3 is a horizontal cross-sectional view of the window construction illustrated in FIGURE 1, taken substantially along the line 3—3 of FIGURE 1 and looking in the direction of the arrows, the left hand panel in FIGURE 3 being located in a different position than the left hand panel of FIGURE 1.

FIGURE 4 is a perspective view of a portion of a locking strip used in holding the interior frame in place against the exterior frame of the window assembly illustrated in FIGURES 1 through 3.

FIGURE 5 is a perspective view of a portion of another type of locking strip used to hold the interior frame against the exterior frame in the window assembly illustrated in FIGURES 1 through 3.

Referring more particularly to the drawings, FIGURES 1 through 3 best illustrate a window construction of the type having an exterior frame, illustrated generally by the numeral **10**; an interior frame, illustrated generally by the numeral **12**; and a pair of glass panels, illustrated by the numerals **14** and **16**. Exterior frame **10** is conveniently formed of extruded aluminum sections with as many like parts as possible, although other materials and other shapes may be used within the scope of the invention. The interior frame **12** is likewise formed of extruded sections of rigid vinyl material, with as many like sections as possible, although other materials may be utilized within the scope of the invention.

For purposes of the following description, the terms "exterior" and "interior" are intended to mean the directions toward the outside and toward the inside of the window assembly, respectively, in a plane normal to the window unit. The terms "inner" and "outer" are intended to mean the directions toward the middle of the window construction and away from the middle of the window construction, respectively, in the plane of the window unit. Thus, the window panel **14** is exterior to the window panel **16**, and the top of the frame assemblies **10** and **12** are outward from the glass panels **14** and **16**.

Exterior frome **10** includes a header, number **18**, and a sill, number **20**, at the top and bottom thereof, respectively, and side jamb numbers **22** and **24** secured at their ends in any convenient manner to the header and sill members **18** and **20**. Header **18** and sill **20** are exactly the same in shape, size, and dimension, but reversed in position, as illustrated in FIGURE 2. Since they are alike, the header **18** will be described in more detail and like reference numerals refer to like parts in both the header **18** and the sill **20**.

Header **18** includes an exterior wall **26** from which an interiorly extending wall **28** extends. Spaced from wall **28** and extending interiorly from wall **26** is another wall **30**. Walls **26**, **28**, and **30** form a box-like cross-section, as illustrated in FIGURE 2, and contain fastener receiving means **32**, **34**, and **36**, respectively. The fastener receiving means may be in the form of beads, provided with

suitable apertures for receiving screw fasteners or the like passing through the side walls of the jamb members 22 and 24 at the corner joints. Extending outwardly from wall 28 is a mounting fin 38 which is easily and suitably attached to the building structure by any convenient fastening means.

Extending inwardly from wall 30 is a flange 40 against which the window panel 14 abuts along the peripheral edge of the window panel. A suitable strip of sealing material 42 is provided between the flange 40 and the window panel 14 to prevent the entry of dirt and moisture through the window assembly. Seal strip 42 may also include an adhesive to assist in holding the window panel 14 in place.

Also formed in the wall 30 and spaced from the flange 40 is an outwardly directed slot, illustrated by the numeral 44, the purpose for which will become hereinafter more apparent. Wall 30 terminates in a flange 46 extending interiorly to receive the interior frame 12.

An inwardly and interiorly directed flange 47 extends from wall 28 to form a slot 49 extending lengthwise of the header 18. Slot 49 serves to receive a suitable flange on the interior frame 12 in a manner to become hereinafter more apparent.

The jamb members 22 and 24 of the exterior frame 10 are illustrated in FIGURE 3 and include similarly formed exterior walls 48 with interiorly directed walls 50 and 52 extending therefrom and forming the box-like section. Mounting fins 54 extend outwardly from wall 50 to be mounted on the building structure. Wall 52 is provided with an outwardly directed slot 56, the purpose for which will become hereinafter more apparent, and terminates in flange 58 for receiving the interior frame 12. Inwardly dericted flange 60 extends from wall 48 and serves to receive the peripheral edge of the window panel 14 with suitable sealing material 42 disposed therebetween. Extending inwardly and interiorly from the middle of wall 50 is an L-shaped flange 62 forming a slot 64 for receiving the interior frame 12.

Interior frame 12 includes a header portion 66, a sill portion 68, and jamb portions 70 and 72, the header 66 and sill 68 being substantially the same but in reversed positions. Jambs 70 and 72 are identical. Header 66 includes an interior wall 74 having a wall 76 extending exteriorly therefrom and underlying the wall 28 in the exterior frame header 18. Wall 76 terminates in a flange 78 received in the slot 49 formed in the exterior wall 28, and an inwardly directed wall 80 extends from wall 76. At the inner end of wall 80 is an enlargement 81 having a slot 82 formed therein to receive the flange 46 at the terminus of the wall 30 of the exterior frame header 18. Enlargement 81 has an angularly inwardly directed surface 84, the purpose for which will become hereinafter more apparent.

Interior wall 74 of the header 66 has at its outward edge an outwardly and exteriorly directed flange 86 which forms a slot 88 receiving the interior edge of the wall 28 in the exterior frame header 18. Thus, it is apparent that the interior frame header 66 is slid exteriorly into the exterior frame header 18, with the flanges, walls and grooves properly aligned and receiving the various mating parts. That is, wall 28 is received in groove 88, flange 78 is received in groove 49, flange 46 is received in groove 82, all of which flanges, walls, and grooves extend in the interior-exterior direction.

The distinction between the interior frame header 66 and the interior frame sill 68 is in the flange 89 formed in the interior wall 74 of the header 66. Flange 89 defines a cover for the ends of the jambs 70 and 72 at the corners of the frame. Such covering is not necessary in sill 68, but may be provided if desired.

The interior frame jamb members 70 and 72 are similarly provided with interior walls 90 from which extend walls 92 terminating in flanges 94 received in slots 64 in the exterior frame jamb 22 or 24. Inwardly directed wall 96 extends from wall 92, terminating in an enlargement 98 having a slot 100 to receive the flange 58 of the exterior frame jamb, the enlargement 98 being provided with an angularly inwardly directed surface 102 for purposes to become hereinafter more apparent. The outward edge of wall 90 has an L-shaped flange 104 forming a slot 106 to receive the interior edge of wall 50 of the exterior frame jamb 22. Thus, the interior frame jambs as with the interior frame header and sill, are received within the exterior frame jambs with the walls and slots in proper alignment in the interior-exterior direction.

In order to securely hold the interior frame 12 in place against the exterior frame 10, and to secure the glass panel 14 against the flanges 40 and 60, locking strips, illustrated generally by the numerals 110 and 112, are provided. Locking strips 110 include an outwardly directed leg 114 which is received in tight fitting relation in the slot 44 formed in the wall 30 of the exterior frame header 18 or sill 20. Strip 110 extends inwardly from the leg 114 to include an enlarged portion 116 engaging the window panel 14 and holding the panel in place against the etxerior flange 40. For this purpose, slot 44 is spaced from flange 40 a suitable distance to receive glass panel 14 and to compress seal strip 42. Extending outwardly from the enlargement 116 and spaced from the leg 114 is a second leg 118, engaging enlargement 81 of the interior frame header 66. The end of leg 118 has an angular surface 120 of the same angle as the enlargement 81, and a projection 122 adjacent to the leg 114 is also angularly formed along the same angle as the surface enlargment 81. Thus, when the locking strip 110 is properly located, the leg 114 is received in the slot 44 to hold the glass panel 14 against the flange 40, and the strip holds the enlargement 81 of the interior frame 12 against any movement in the exterior-interior direction. In so doing, the entire interior frame header 66 is securely locked in its engagement with the exterior frame header 18.

Locking strip 112 is similar in structure and function to locking strip 110, and includes an enlarged body portion 124 having a leg 126 extending outwardly therefrom. Leg 126 is received in tight fitting engagement in the slot 56 formed in exterior jamb wall 52, and the enlargement 124 bears against the window panel 14 to secure the window panel against the exterior flange 60, compressing the sealing strip 42. An angular surface 128 formed on the outer portion of the enlargement 124 receives and abuts the angular surface 102 of the enlargement 98 on the interior frame jamb 70. In so doing, the locking strip 112 holds the glass panel 14 in place, as well as preventing interior-exterior movement of the interior frame jamb 70 relative to the exterior frame jamb 22.

Locking strip 110 and locking strip 112 are each provided with longitudinal slots 130 and 132, respectively, to receive an installing or removing tool. Such tool assists in sliding the locking strips into the slots 44 and 56, respectively, or out of the slots 44 and 56, respectively, as desired.

Although the foregoing description has been related to a fixed glass panel in the window construction, the window assembly will accommodate a movable glass panel and frame structure therefor so that the window unit may be opened. A screen panel or storm window panel may be mounted in the frame structure as well.

Referring to FIGURES 1 through 3, a movable glass panel 16 is mounted in a frame structure including an extruded aluminum sill member 142, and side jamb members 144 and 145. The exterior frame 10 is provided with a center mullion strip 146 having outwardly directed side flanges 148, one of which serves to receive the glass panel 14, as illustrated in FIGURE 3, and the other being adapted to receive a screen panel, storm window panel or the like. Mullion 146 has a box-like cross section with an interior enlargement 150 having a fastener receiving bore 152 formed therein. A slot 154, is formed

in the mullion strip **146** to receive a locking strip **112** and secure the glass panel **14** against the flange **148**.

Header strip **140**, includes an inwardly directed flange **156** against which the glass panel **16**, is secured with a sealing strip **158** disposed therebetween. Header strip **140** extends interiorly over the glass panel **16** and terminates in an inwardly directed flange **160**, forming a slot **162**. Flange **156** extends outwardly to terminate in a flange **164** providing a slot **166**. A rigid vinyl trim strip **168** is secured over the top of the header strip **140** and is received over the flanges **160** and **164** in the manner illustrated in FIGURE 2. In order to hold the trim strip **168** in place, a locking strip **112** is secured in the slot **162** biasing the glass panel **16** against the flange **156**. At the same time angular surface **102** engages a similarly directed angular surface **170** on the trim strip **168**, thus securing the trim strip **168** in place on the header strip **140**.

Similarly with the sill strip **142**, an inwardly directed flange **172** receives the lower peripheral edge of the window panel **116** with a sealed strip **158** disposed therebetween. A rigid vinyl trim strip **174** is secured over the interior portion of the sill strip **142** by a locking strip **112**, in a manner similar to that above described with respect to the trim strip **168** and the header member. Extending outwardly from flange **172** in the sill member **142** is an outwardly directed flange **176** which receives an axle **178** supporting a roller **180**. Roller **180** turns freely within the sill structure **142** and engages a suitably shaped track **182** disposed in the bottom of the interior frame sill **68**.

The construction of jamb member **144** and **145** for the movable window pane **16** are substantially the same, and only one of which will be hereinafter described. Jamb strip **144** includes a flange **184** to receive the glass panel and has a trim strip **186** secured over the edges of the jamb strip **144**. Locking strips **112** secure the assembly together.

At the interior edge of mullion **146**, a locking flange **188** is formed which engages and is complementary to a locking flange **190** on the inner jamb member **145**, as illustrated in FIGURE 3, when the movable window assembly is in the closed position. The locking flanges **188** and **190** will engage to completely close the assembly. The moveable window structure may be slid or rolled to the right, as viewed in FIGURE 3, the roller **180** traversing along the track **182** to open a section of the window unit.

In order to seal the construction against the entry of weather and moisture a suitable strip **192** is received in jamb **145** and engages the locking flange **188** on the mullion. Similarly a sealing strip **194** in the jamb member **144** engages the interior frame structure and a sealing strip **196** in the header section **140** seals against the locking strip **110** with like construction in the sill strip **142**. Thus, the seal runs around the periphery of the movable window assembly to securely seal the assembly in the interior frame structure.

It will now be apparent that once the window unit is mounted in the building construction, by means of the mounting fins **38** and **54** extending around the periphery thereof, the interior frame structure as well as the window panels and the movable window itself may be installed or removed from the interior side of the window unit. This is accomplished by removing the locking strips **110** and **112** which bias the glass panels toward their abutting flanges and which angularly engage the interior frame structure. This may be done to assemble, or to remove and replace, various parts of the window unit should the need arise. On the other hand the entire window unit may be assembled prior to mounting in the building construction and mounted as a unit by means of the fins **38** and **54**. The entire window unit thus presents an extremely economic and efficient assembly, easily mounted and easily cared for, and adapted to various uses and modifications in its construction.

Numerous changes and alterations to the structure will now become apparent to those having skill in the art after having had reference to the foregoing description and drawings. However, it is not intended to limit the scope of the invention by the foregoing but by the scope of the apended claims in which: the embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A window assembly comprising:
an exterior frame;
a panel received in said exterior frame;
an interior frame received in said exterior frame;
and continuous means removably received in said exterior frame and engaging said panel and said interior frame and extending around the periphery of said panel and said interior frame, said means securing said panel and said interior frame in said exterior frame and preventing disengagement thereof, said means being removable in the plane of said panel to permit removal of said panel and said interior frame from said exterior frame from the interior side of said window assembly.

2. A window assembly comprising:
an exterior frame having an inwardly opening slot formed therearound;
a panel received in said exterior frame;
an interior frame received in said exterior frame and having an angularly inwardly directed peripheral surface thereon terminating adjacent said panel;
and continuous means received in said slot in said frame and engaging said panel and having an outwardly directed angular surface engaging said angular surface on said interior frame, said means securing said panel and said interior frame in said exterior frame, and said means being removable to permit removal of said panel and said interior frame from said exterior frame from the interior side of said window assembly.

3. A window assembly comprising:
an exterior frame having an inwardly directed flange extending therearound and an inwardly opening slot formed therein and spaced interiorly from said flange;
a panel received in said exterior frame and between said flange and said slot;
an interior frame received in said exterior frame;
and continuous means removably received in said slot in said exterior frame and engaging said panel and said interior frame, said means securing said panel against said flange and securing said interior frame in said exterior frame, said means being removable in the plane of said panel to permit removal of said panel and said interior frame from said exterior frame from the interior side of said window assembly.

4. A window assembly comprising:
an exterior frame having an inwardly directed flange extending therearound and an outwardly directed slot formed therein spaced from said flange;
a panel received in said exterior frame and between said flange and said slot;
an interior frame received in said exterior frame and having an angularly inwardly directed peripheral surface thereon terminating adjacent said panel;
and continuous means received in said slot in said exterior frame and engaging said panel and having an outwardly directed angular surface engaging said angular surface on said interior frame, said means securing said panel and said interior frame in said exterior frame, and said means being removable to permit removal of said panel and said interior frame from said exterior frame from the interior side of said window assembly.

5. A window assembly comprising:
an exterior frame having an inwardly directed flange extending therearound and an outwardly directed slot therein spaced from said flange;

a glass panel received in said exterior frame and between said flange and said slot;

an interior frame engaging the interior side of said exterior frame and having an angularly inwardly directed flange extending therearound and terminating adjacent said slot in said exterior frame;

and a locking strip extending around the periphery of said panel and having a leg extending into said slot, said locking strip having an inwardly projecting portion engaging said panel and clamping said panel against said flange on said exterior frame, said strip having an angularly outwardly directed portion overlying and engaging said flange on said interior frame;

said locking strip preventing disengagement of said panel and said interior frame from said exterior frame and being removable to permit removal of said panel and said interior frame from said exterior frame from the interior side of said window assembly.

6. The window assembly set forth in claim **5** wherein said leg of said locking strip extending into said slot is of lesser dimension than the depth of said slot to permit the takeup of tolerance differences in said exterior frame and said interior frame.

7. Claim **5** wherein said locking strip is provided with a slot in the interior surface thereof to receive installing and removing means.

8. In combination with a window assembly having a panel and an interior frame and an exterior frame, a locking strip for securing said panel and said interior frame in said exterior frame, said exterior frame having a slot therein and said interior frame having an angular surface adjacent said slot, said locking strip including:

a leg portion adapted to be tightly received in said slot in said exterior frame;

a first portion extending from said leg portion and adapted to engage the interior peripheral edge of said panel and clamp said panel against said exterior frame;

and a second portion extending angularly from said leg portion and adapted to overlie and engage said angular surface on said interior frame to clamp said interior frame against said exterior frame.

9. The locking strip set forth in claim **8** wherein said leg portion is of lesser dimension than the depth of said slot to take up tolerance differences in said interior frame and said exterior frame.

10. The locking strip set forth in claim **8** and further including a slot formed in the interior surface of said second portion and adapted to receive installing and removing means.

11. The locking strip set forth in claim **8** wherein said second portion is provided with a groove in the surface engaging said interior frame to provide spaced contact therealong.

References Cited by the Examiner

UNITED STATES PATENTS

981,411	1/1911	Graef	52—498
2,701,041	2/1955	Toth	52—476 X
2,837,785	6/1958	May	52—502
2,945,269	7/1960	Domen	52—498 X
3,121,482	2/1964	Cobb et al.	189—75 X
3,169,281	2/1965	Clements	52—476
3,177,989	4/1965	Di Chiaro	189—76 X

FOREIGN PATENTS

248,151	2/1961	Australia.

HARRISON R. MOSELEY, *Primary Examiner.*

W. E. HEATON, K. DOWNEY, *Assistant Examiners.*