

Inventor
John C. West
By *Fred Bing*
Attorney

July 29, 1958

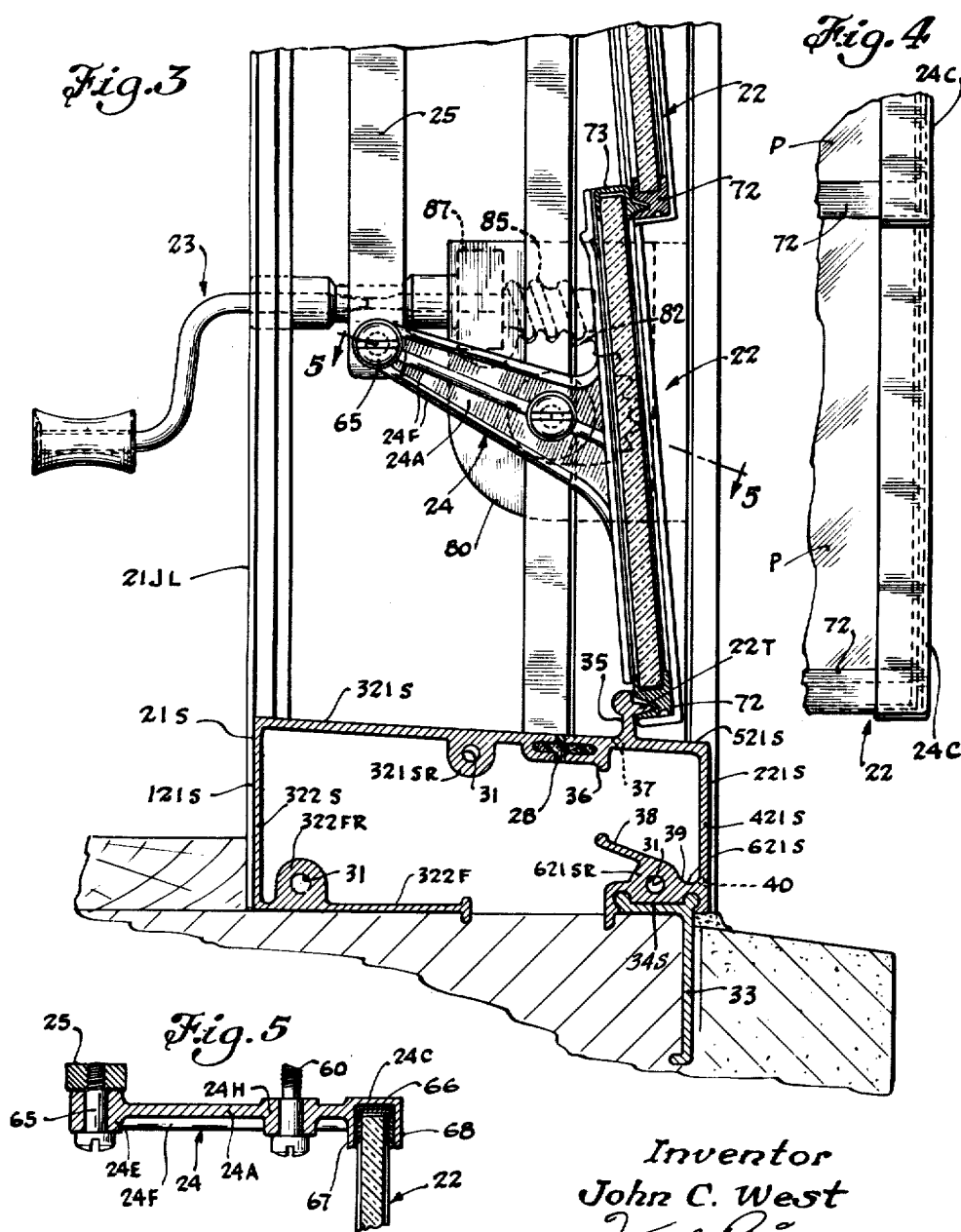
J. C. WEST

2,845,153

WINDOW STRUCTURES

Filed April 26, 1954

6 Sheets-Sheet 2



Inventor
John C. West

By Fred D. King
Attorney

July 29, 1958

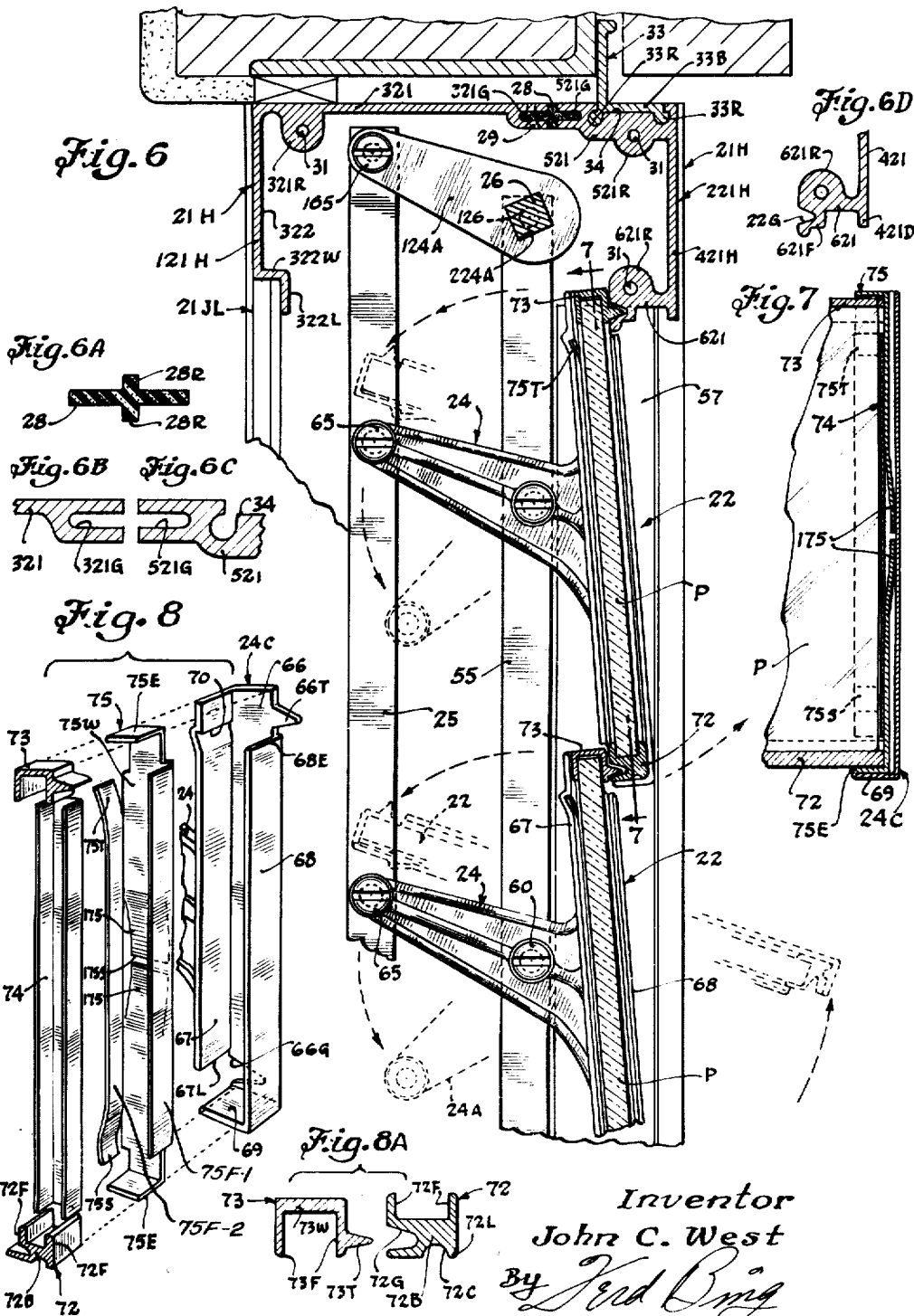
J. C. WEST

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6 Sheets-Sheet 3



Inventor
John C. West

By *Red B. King*
Attorney

July 29, 1958

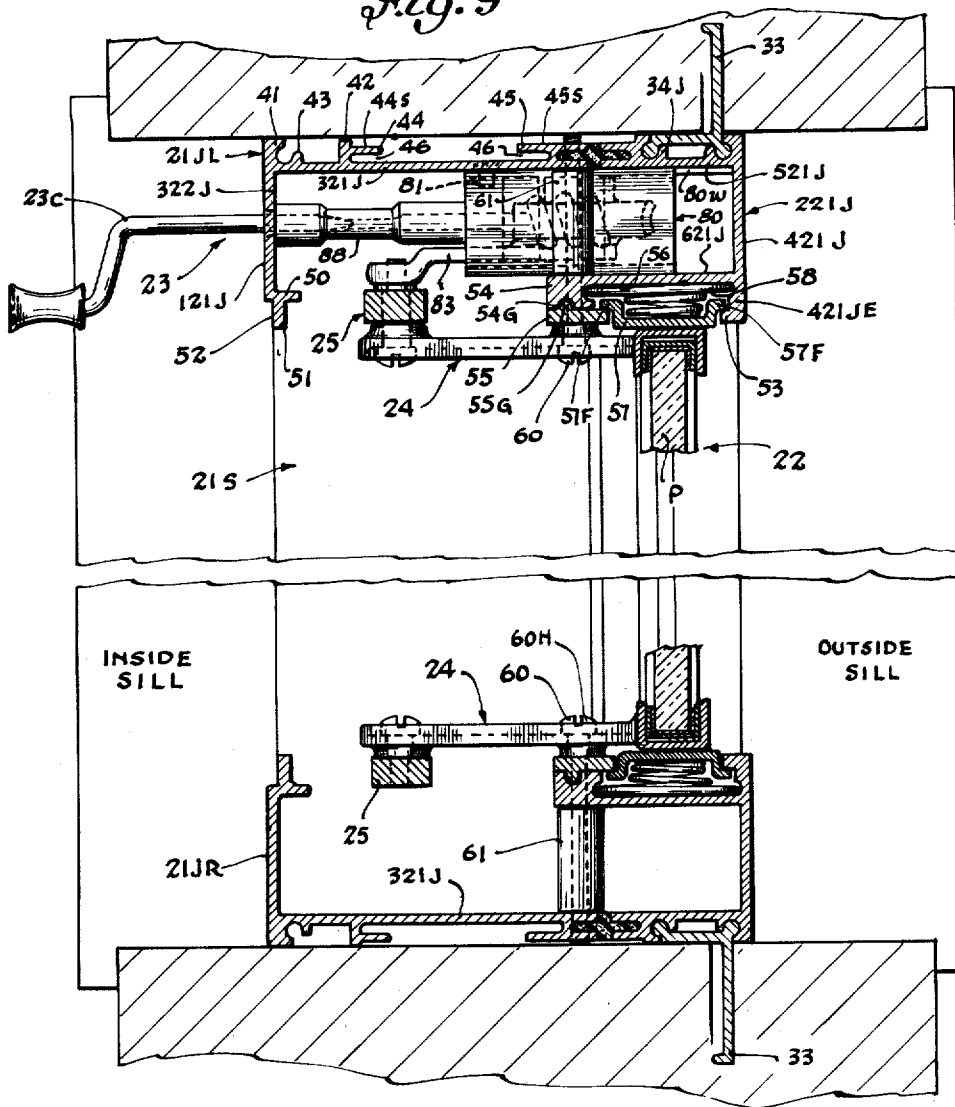
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Fig. 9



Inventor
John C. West
by *Fred Bing*
Attorney

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Fig. 10

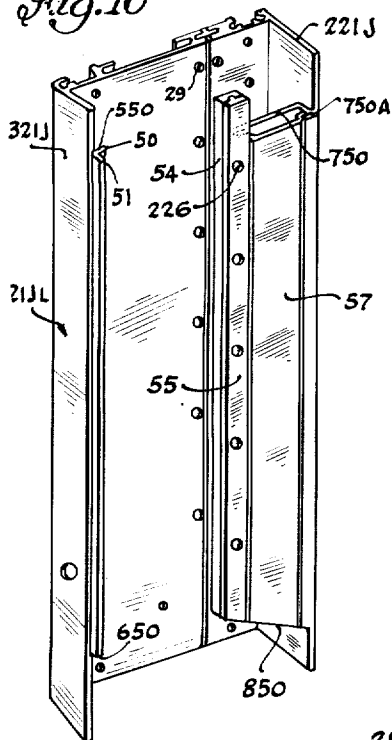


Fig. 11

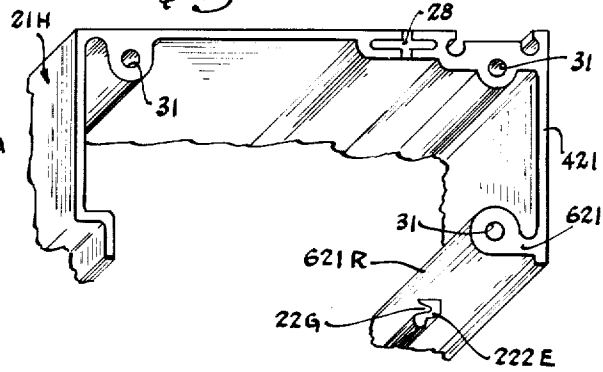


Fig. 12

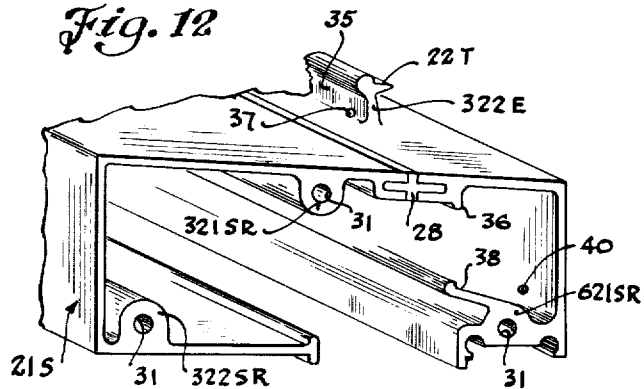


Fig. 13

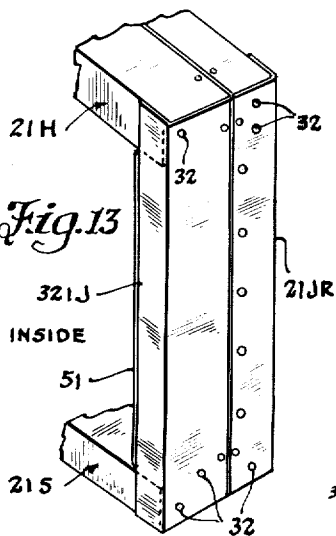
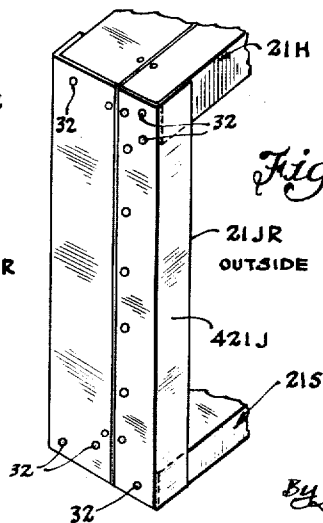


Fig. 14

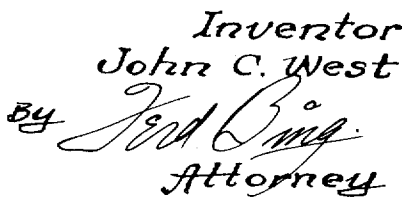


Inventor
John C. West
By *Ed Bing*
Attorney

J. C. WEST

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2,845,153

WINDOW STRUCTURES

John C. West, Chicago, Ill., assignor to Protex Weather-strip Manufacturing Co., Chicago, Ill., a corporation of Illinois

Application April 26, 1954, Serial No. 425,534

10 Claims. (Cl. 189—62)

This invention relates to windows, and particularly to windows of the jalousie type.

Jalousie windows, as heretofore proposed and used, have been relatively difficult to manufacture and install, and have not embodied characteristics of appearance, strength and weather-sealing capabilities which would enable them to be used in all types of window locations and in all types of climates. In view of this, it is the primary object of the present invention to improve jalousie window structures so that they will be adapted for use in all types of locations and in all kinds of climates, and a related object is to afford window structures of the aforesaid character that are adapted for convenient incorporation in buildings through the embodiment of such windows according to recognized modular standards.

While jalousie windows as heretofore known have in some instances embodied metal frames, or frames including metal parts or strips, such prior frames for jalousie windows have been objectionable either because of the difficulty of applying metal mounting strips to conventional wood windows or window frames, or because of the direct transmission of heat from the inner portions of the metal frames which caused objectionable cooling of the inner portions of the frames and caused condensation of moisture thereon. Another object of the present invention is therefore to afford a full metal frame that is substantial and pleasing in appearance and rigid in character, and to enable such a frame to be constructed in a way that reduces condensation or sweating to an unobjectionable degree. A further object related to the foregoing is to afford a frame of the aforesaid character for a jalousie window wherein the head, sill and jambs each constitute a rigid member so that these rigid members may be shipped in a disassembled relation and may be readily assembled on the job to afford a frame that is adapted for incorporation into the wall opening in the usual and accepted manner.

In jalousie windows as heretofore known, it has been impossible to attain proper weather-sealing along the horizontal lapped joints between the adjacent glass panels and along the vertical end edges of these panels, and a further and important object of the present invention is to enable such weather-sealing to be accomplished in a simple and effective manner. Other and related objects of the present invention are to enable weather-sealing of the horizontal or long edges of the panels to be attained by means which do not tend to bend or bow the glass panels, and to accomplish this sealing by means which serve to materially increase the strength of the glass panels and which make it possible to use glass panels with unfinished or rough-cut edges. A further object is to accomplish a weather-sealing action along the horizontal edges of the lapped glass panels by means which serve also as an interlocking means to prevent individual removal of the glass panels from the tiltable supporting clips in which the glass panels are mounted.

In attainment of a proper weather-seal along the verti-

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cally extending end edges of the glass panels of a jalousie window, it is necessary to apply spring pressure in an endwise direction, and a further object of the present invention is to enable such yielding or spring pressure to be applied in a way that attains the proper sealing action, and which at the same time prevents tilting of the rocking supporting clips in which the panels are mounted.

In the construction of a building, it is considered best practice to mount the frames in the wall opening and to delay the glazing of the frame until the building operation has progressed substantially toward completion, and a further object of the present invention is to simplify the glazing of jalousie type windows, and to accomplish this in such a way that the mounting operation causes locking of the glass panels in position in the supporting clips. More specifically, it is an object of the present invention to afford a jalousie window structure in which the glass panels may be slipped into position in the mounting clips and locked in position therein by means of a snap-acting locking means that can be released only from the inside of the window.

Other and further objects of the present invention will be apparent from the following description and claims and are illustrated in the accompanying drawings which, by way of illustration, show preferred embodiments of the present invention and the principles thereof and what I now consider to be the best mode in which I have contemplated applying these principles. Other embodiments of the invention embodying the same or equivalent principles may be used and structural changes may be made as desired by those skilled in the art without departing from the present invention and the purview of the appended claims.

In the drawings:

Fig. 1 is an inside elevational view of a jalousie window embodying the features of the invention;

Fig. 2 is a fragmentary cutaway perspective view of a portion of the window;

Fig. 3 is a vertical sectional view at an enlarged scale and taken substantially along the line 3—3 of Fig. 1;

Fig. 4 is an enlarged fragmentary view of end portions of the glass panels as viewed from the right in Fig. 3;

Fig. 5 is a generally horizontal sectional view taken substantially along the line 5—5 of Fig. 3;

Fig. 6 is a vertical sectional view taken on an enlarged scale and substantially along the line 6—6 of Fig. 1;

Fig. 6A is an enlarged cross sectional view of the rigid heat insulating connecting member employed in making the elements of the window frame;

Figs. 6B and 6C are enlarged cross sectional views of the edge portions of adjacent frame members that are joined through the use of the heat insulating element of Fig. 6A;

Fig. 6D is an independent reproduction of a portion of the head member that is shown in Fig. 6;

Fig. 7 is a view showing an end portion of one of the glass panel units in vertical section taken substantially along the line 7—7 of Fig. 6;

Fig. 8 is an exploded perspective view illustrating the edging elements that are placed around the panel, and showing these elements in a schematic association with the mounting clip;

Fig. 8A is an enlarged vertical sectional view of two of the horizontal weather-sealing elements that are associated with the glass panes;

Fig. 9 is an enlarged horizontal sectional view taken substantially along the line 9—9 of Fig. 1;

Fig. 10 is a perspective view of the inside of one of the jamb members to show the special cutting and forming operations that are required;

Fig. 11 is a fragmentary perspective view of one end of the head member showing the special cutting and forming operations that are required;

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Fig. 12 is a perspective view fragmentally illustrating one end of the sill member and showing the special cutting and forming operations that are required;

Fig. 13 is a fragmentary inside perspective view illustrating the manner in which the head and sill are connected to the jamb;

Fig. 14 is a view similar to view 13 and constituting an outside perspective view of the structure; and

Figs. 15 and 16 are enlarged views showing the panels in different positions of adjustment.

GENERAL ORGANIZATION

For purposes of disclosure, the invention is herein illustrated as embodied in a prime window 20 having a metal frame 21 with a plurality of tiltable jalousie-type glass panels 22 mounted for adjustment by an actuator 23 through tilting movements in unison about individual horizontal axes so as to open or close the window. The frame 21 comprises right and left hand jabs 21JR and 21JL, a head 21H and a sill 21S, that are formed in the present embodiment primarily from metal extrusions, and which are rigidly related one to the other, and the glass panels 22 are tiltably mounted at their opposite ends on the respective left and right hand jabs 21JL and 21JR by means of mounting clips 24 which are pivoted on vertically spaced individual horizontal axes on the respective jambs. The clips 24 at the respective jambs 21JR and 21JL are connected together by vertically extending operating links 25, of which one is operatively connected to the actuator 23, and this operating link 25 has a motion transmitting connection with the other link 25 by means including a transmitting rock shaft 26 that is disposed within the head 21H, as will be described.

The frame 21—in general

Under the present invention, the head 21H, the jambs 21JR and 21JL, and the sill 21S are formed primarily from metal in such a way that sweating of the frame in cold weather is controlled and reduced to such a point as to be unobjectionable, and this is accomplished in a manner which enables the pre-cut head, sill and jambs to be quickly and easily put together on the job to afford a rigid frame assembly ready to be installed in the wall opening. Thus, each of these four major frame elements is made up primarily from an inner metal member and an outer metal member joined rigidly together by a rigid heat insulating member so that the inner metal member, which is located inwardly of the closure panels 22, cannot be objectionably cooled by loss or direct conduction of heat to the related outer metal member of the frame.

The head 21H

With respect to the head 21H, such a relation is afforded by an inner metal member 121H, an outer metal member 221H, and an intermediate heat insulating and connecting strip 28. As herein shown, both metal members are formed as extrusions from a metal such as aluminum, and in cross section, the inner extrusion 121H is generally in the form of an angle affording a horizontal flange 321 and a vertical flange 322 depending at right angles from the inner edge of the horizontal flange 321. The outer member 221H may be said to be generally in the form of a channel having a vertically disposed web 421, and having inwardly extending upper and lower horizontal flanges 521 and 621. In the assembled head 21H, the horizontal flanges 321 and 521 are disposed substantially in a common plane and the outer edge of the flange 321 and the inner edge of the flange 521 are formed with opposed longitudinal grooves 321G and 521G which receive the connecting strip 28. This strip 28H is formed from a rigid and strong heat insulating material and in a somewhat cruciform cross section so that the opposite edge portions fit snugly into the grooves 321G and 521G while projecting medial ribs 28R on the upper and lower surfaces of the strip 28 serve to space and effectually in-

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sulate the adjacent edges of the flanges 321 and 521. The strip 28 is secured adhesively in its assembled relation with respect to the two flanges, and in addition, I prefer to extend a plurality of spaced screws 29 into each of the flanges 321 and 521 from the surface thereof that will eventually be concealed, and into the strip 28, as shown in Fig. 6.

For the purpose of simplifying the attainment of a rigid assembly of the head 21H with the jambs 21JR and 21JL, the head 21H has a plurality of relatively heavy longitudinal ribs that are disposed on the inside surfaces of certain of the flanges above discussed. Thus a rib 321R is formed on the lower surface of the flange 321 adjacent to the vertical flange 322; a rib 521R is formed on the lower surface of the flange 521 adjacent to the vertical web 421; and a rib 621R is formed on the upper surface of the lower flange 621; and these ribs have locating bores 31 formed longitudinally into their opposite ends to receive fastening screws 32 which secure the jambs to the head, as will be described in further detail hereinafter.

On its upper surface, and substantially opposite the rib 521R, the flange 521 is formed with means adapted for mounting a masonry flange 33 which, as herein shown, is formed as a metal extrusion having a base flange 33B with longitudinal ribs 33R of identical but reversed form extending along its opposite edges. The ribs 33R project in the same general direction from one face of the base flange 33B, while the flange 33 projects in the opposite direction from one edge of the base flange, thus to dispose the flange 33 in a laterally non-symmetrical relation with respect to the base flange and the ribs 33R. The flange 521 has a longitudinal recess 34 formed therein that is complementary to the base flange 33B and its ribs 33R, and this recess and the base flange 33B and its ribs 33R are symmetrical about a central longitudinal axis so that the masonry flange 33 may be mounted to project in either of two different positions, opposite one or the other of the edges of the groove 34, and this enables the masonry flange to be readily arranged for proper cooperation with different wall thicknesses or constructions.

As shown in Figs. 6 and 6D, the web 421 has a short lower extension 421D that projects downwardly beyond the adjacent lower face of the flange 621, and this constitutes a drip flange to assure proper flow of water and minimize the amount of water striking the glass panels 22.

At its inside edge, and below the rib 621R, the flange 621 has a downwardly and inwardly extending flange 621F which cooperates with the inner lower surface of the rib 621R to define an inwardly opening sealing groove 22G which serves as a part of a sealing means along the upper edge of the upper glass panel 22, as will be described in further detail hereinafter.

At its lower edge, the flange 322 has a narrow outwardly projecting web 322W, and at the outer or right hand edge of the web 322W, a short downwardly projecting flange or lip 322L is formed, and these elements 322W and 322L serve in affording a finished and neat joint between the head 21H and the upper ends of the jambs, as will become apparent from the following description.

The sill 21S

The sill 21S is similarly formed from extrusions which comprise an inner member 121S of a generally channel-like form, and an outer member 221S that is also of a generally channel-like form. The inner member 121S has a vertical web 322S with a lower horizontal flange 322F projecting outwardly therefrom, or in a right hand direction as shown in Fig. 3. At its upper edge, the web 322S has an upper flange 321S, and this flange 321S has a slight outward and downward slope since it is to serve as the upper surface of the sill. The outer member 221S has a vertical web 421S with inwardly projecting upper

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and lower flanges 521S and 621S. The flange 321S and the flange 521S have their upper surfaces in a common sloping plane, and the adjacent edges have opposed longitudinal grooves 321SG and 521SG formed therein so that a rigid heat insulating strip 28, as above described, may be secured therein by adhesive and by screws 29, as described in relation to the head 21H.

The upper or inside surface of the flange 322F has a rib 322FR formed thereon adjacent the web 322S; the lower face of the flange 321S has a rib 321SR formed thereon relatively close to the outer edge of such flange; while the lower outer flange 621S has a rib 621SR formed on its upper face; and these ribs have locating bores 31 formed in opposite ends thereof for use in securing the sill to the jambs as will be described.

On the upper surface of the flange 521S and disposed about medially between the inside and outside edges of this flange, an upstanding longitudinal wall 35 is formed, such wall 35 having an outwardly projecting longitudinal rib 22T which serves as a part of a weather sealing means between the wall 35 and the lower edge of the lower glass panel 22, as will be described in detail hereinafter.

The lower surface of the flange 621S is formed with a longitudinal mounting slot 34S that in form and position is similar to the slot 34 of the head 21H, and this slot 34S serves as a mounting means for a lower masonry flange 33 which may be mounted in different relationships as hereinbefore described.

On the lower surface of the flange 521S and spaced slightly inwardly, or to the left as shown in Fig. 3, from the inner face of the wall 35, a downwardly extending longitudinal lip 36 is formed from which condensate or water may drip, and in those localities or climates where condensation may be expected on the inside portions of the outer metal members of the frame elements, one or more small weep holes 37 may be drilled through the flange 521S just inside of the wall 35, and these weep holes 37 open just outside of the lip 36. Any water that is thus drained from the lip 37 falls onto a downwardly and outwardly sloping drain flange 38 that extends from an upper portion of the rib 621SR, as shown in Fig. 3. Such water will, of course, drain outwardly or to the right in Fig. 3, and into a trough 39 that is formed on the top of the flange 621S between the rib 621SR and the outer web 421S. This water may then be discharged through downwardly and outwardly sloping weep holes 40 formed through the web 421S from the trough 39.

The jambs 21JR and 21JL

The jambs 21JR and 21JL, while being constituted as right and left hand members when they are cut to size ready for assembly, but it is important to note that the two jambs are made up from the same basic structural elements. These basic structural elements are shown in Figs. 9, 10, 13 and 14 wherein it will be evident that each jamb 21J comprises an inner metal extrusion 121J and an outer metal extrusion 221J which, in a broad sense, are joined together in the same manner as the inner and outer elements of the head and sill. The inner member 121J is generally angle-shaped in cross section so as to afford a flange 322J that forms the inner face of the jamb, and an outwardly extending side flange 321J. The outer member 221J is generally channel shaped in cross section, and affords an inner web 421J that constitutes the outer face of the jamb, a side flange 521J at one edge of the web 421J, and an opposed mounting flange 621J located at the opposite edge of the web 421J and parallel to and somewhat wider than the flange 521J.

The side flanges 321J and 521J are disposed in a common plane and have opposed grooves 321JG and 521JG formed in their adjacent edges so that a rigid heat breaker strip 28 may be secured therein by adhesive and by screws 29 so as to permanently and rigidly associate the inner and outer members of the jamb. These connected

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side flanges 321J and 521J constitute the side of the frame which is to be disposed adjacent the vertical side of the wall opening, and the flange 521J is relatively thick so that a longitudinal mounting groove or recess 34J may be formed therein for mounting a masonry flange 33 in the same advantageous manner as hereinbefore described with respect to the head 21H and the sill 21S. The side flange 321J has a thickness somewhat less than the thickness of the flange 521S, and to afford abutment surfaces in the plane of the outside face of the flange 521J, the flange 321J has a pair of spaced outwardly projecting ribs 41 and 42 of the height required to effect this purpose. The rib 41 constitutes a continuation or extension of the flange 322J, thus to afford a continuous flat exposed surface along the inside face of the jamb.

Between the ribs 41 and 42 an undercut mounting or connecting groove 43 is provided to facilitate connection of adjacent jambs, or to receive different types of masonry flanges when this is required. Between the rib 42 and the outer or right hand edge, Fig. 9, of the flange 321J, additional interlocking means are afforded. Thus, a flange 44 extends to the right, Fig. 9, from the rib 42, in spaced relation to the flange 321J, and a similarly spaced flange 45 extends to the left from the thick right hand edge portion of the flange 321J. These flanges thus define undercuts 46 which afford additional mounting facilities for conveniently receiving other types of masonry flanges.

It will be observed particularly in Fig. 9 of the drawings that the flanges 44 and 45 have outer surfaces 44S and 45S that are spaced from the plane defined by the ends of flanges 41 and 42, and this affords clearance space that is advantageous in mounting masonry flanges or other means at the side of the jamb.

The edge of the flange 121J that is remote from the flange 321J has a lateral web 50 formed thereon so as to project a short distance outwardly or in a right-hand direction in Fig. 9, while another flange 51 extends from the flange 50 so that a rabbeted groove 52 is formed along the left-hand or inside face of this edge of the flange 121J. The flanges 50 and 51 serve, of course, to impart additional strength to the adjacent edge of the flange 121J.

The clip mounting and the vertical weatherstripping

The flange 621J of the jamb, on the face thereof that is remote from the flange 521J, serves as a part of the mounting means for pivotally supporting the glass-supporting clips 24, as well as for weather-sealing means that act along the vertical end edges of the tiltable panels 22. In attaining these purposes, a flange extension 421JE is formed as an extension of the flange 521J so that the outer or right-hand surfaces as viewed in Fig. 9 form a common outer face for the jamb, and at its end, the flange extension 421JE has an inwardly extending ledge 53 for purposes that will appear hereinafter. At the other or left-hand edge of the flange 621J, a relatively thick bar 54 is formed, this bar 54 being somewhat in the nature of a flange, but extending from the plane of the flange 621J through a distance somewhat less than the flange 421JE. This mounting bar 54 has a vertical groove 54G formed therein, and a securing plate 55 is disposed against the flat face of the bar 54 with a rib 55G on the plate 55 engaging the groove 54G, and the width of the plate 55 is such that it slightly overhangs the right end edge of the bar 54 so as to afford a structural element that is like the ledge 53. Thus, the ledge 53, the plate 55 and the flange 421JE and the bar 54 serve to define an undercut mounting groove 56 that is relatively wide and somewhat shallow, and in which a vertically extending weatherstripping plate 57 may be mounted for yielding movement toward and away from the end edge of the panels 22. This weatherstripping plate 57 is in the form of a shallow channel, the web of which is arranged

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to project normally beyond the plane of the end of the flange 421JE, a plurality of springs such as expansive coil springs 58 being disposed within the groove 56 so as to urge the weatherstripping plate yieldingly toward the desired engaged relation with the panels 22. These coil springs 58 are conical in form so that their wide coils seat laterally under tension in lateral grooves under the side flanges of the groove 56, thus to hold springs 58 in the desired positions in the groove 56. The extent of the outward movement of the plate 57 is limited by providing laterally extending retaining flanges 57F on the weatherstripping plate 57 so that these flanges 57 are disposed within the groove 56 and will engage the ledge 53 and the overhanging portion of the plate 55.

It will be noted that the weatherstripping plate 57 is relatively wide, and this enables full vertical contact to be attained between the plate 57 and the general vertical edges of the panels 22, even though these panels slope to a slight extent when they are in their closed positions, as shown in Fig. 6 of the drawings. In contrast, the bar 54 is somewhat narrower and is of such a width as to afford substantial strength, even though pivot supporting means extend therethrough as will be described.

In affording the pivotal supporting means for the clips 24, the present invention utilizes such pivotal support means to impart substantially increased strength to the frame structure. Thus, as shown in Fig. 9 of the drawings, each clip 24 has a relatively long pivot stud 60, the head 60H of which is disposed adjacent the clip 24 and the pivot screw 60 extends through the clip, the plate 55 and the bar 54, and the screw extends through the space between the flanges 621J and 321J and is threaded into the flange 321J at substantially the point where the heat-breaker strip 28 is associated therewith. Between the flanges 321J and 621J, a spacer sleeve 61 is mounted so that by drawing the screw 60 relatively tight, the opposed flanges of the jamb may be rigidly connected, one to the other. Since similar pivotal connections are provided at relatively short intervals throughout the length of the jamb, the jamb is effectually strengthened by the action of these screws and spacing sleeves.

The clips 24 and the glass panel mounting

The clips 24 under the present invention are arranged for association with the glass panels 22 in a novel and advantageous manner whereby the mounting of the glass panels in the clips may be readily and easily accomplished even by relatively inexperienced workmen, and whereby removal of the glass panels from the closed window is impossible by operations that are performed from the exterior of the window. Moreover, the arrangement that is provided under the present invention affords an extremely effective weather-seal between the horizontal edges of the panels 22, and this is accomplished with a minimum of reduction of the transparent area of the window, and without causing objectionable bowing or stressing of the glass panels that form the window.

The clips 24

The clips 24 may, of course, be formed by different processes, and as herein shown, these clips are formed as die cast members. These clips must, of course, be formed in right and left-hand embodiments, and each such clip is somewhat T-shaped in form in that a mounting channel 24C is afforded into which the adjacent end of a panel 22 may extend, and a laterally projecting mounting end arm 24A extends from one side of the channel 24C. For descriptive purposes, it may be said that this arm 24A projects from the inner side of the channel 24C, and intermediate its ends and relatively close to the channel 24C, the arm 24 has a mounting hub 24H through which the pivotal supporting screw 60 may extend, as is shown particularly in Fig. 5 of the drawings. At its remote end, the arm 24A has an enlarged hub 24E that serves to receive a pivot stud 65 which extends through

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the hub 24E and is threaded into the related vertical actuating rod 25 to complete the actuating connection for the clip 24. The arm 24A is preferably strengthened through the provision of a plurality of ribs or flanges 24F, thus to insure proper transmission of the window-actuating forces.

The relationship of the arm 24A to the channel 24C is such that up and down movement of the link 25 may serve to move the glass panel 22 from the generally vertical closed position shown in Figs. 3 and 6 toward a generally horizontal open position that is shown in dotted outline in Fig. 6, and thus the arm 24A is arranged at such an angle with respect to the channel that when the panel 22 is in its closed position, the arm 24A will extend inwardly and upwardly at a slight angle. This angle, of course, may be varied to some extent, so long as the proper operative relationship between the arms 24A and the operating links 25 is maintained throughout the entire operative range of the panels 22.

As will be evident in Figs. 5, 8 and 9, the channel 24C of the clip 24 has a web 66, an inner flange 67 and an outer flange 68, and the channel is open at its upper end but is closed at its lower end by a lower end wall 69 which is permanently joined to the lower end of the outer flange 68 so that this lower end wall cannot be bent out of position through the use of ordinary tools. This is important because it constitutes one element in preventing downward removal of the glass panels 22 through the use of ordinary tools by a person working from the outside of the closed window. The outer flange 68 terminates downwardly a short distance from the upper end of the web 66, as will be evident in Figs. 3 and 8, and this is important as will hereinafter become apparent in assuring proper operation of the weatherstripping means as will be described. The other or inner flange 67 of the channel 24C extends upwardly so that its upper end is in the same plane with the upper end of the web 66, and within the channel 24C and downwardly along the flange 67, this flange has a downwardly facing latching shoulder 70 which functions in attaining what I have termed a "snap-in" mounting action in respect to the glazing of the present window. This snap-in mounting operation will be described in detail hereinafter. As shown particularly in Figs. 3 and 8, the inner flange 67 terminates in a lower end edge 67L that is spaced upwardly a short distance from the lower or end wall 69 of the channel, and this structural form is important in enabling effective cooperation of the weather-sealing means between the adjacent horizontal edges of the panels 22, as will be described.

At a point opposite the space between the lower end wall 69 and the lower edge 67L of the inner flange 67, the web 66 has a somewhat V-shaped notch formed therein so as to extend forwardly from the rear edge thereof, this notch being identified in the present instance by the reference character 66G. This notch 66G serves as a part of the weather-sealing means between the adjacent clips 24, and complementary means are formed on the web 66 on its outer edge above the level of the edge 68E of the outer flange 68. Such complementary or cooperating means are shown clearly in Fig. 8 of the drawings wherein it will be evident that a tooth-like projection 66T is formed so as to extend in what may be termed an outward or right-hand direction, as viewed in Figs. 6 and 8. With this arrangement, the tooth 66T of a lower clip 24 may project into the cooperating notch 66G of the next higher clip 24 to effect a weather-seal between the adjacent clips, and in this connection, it may be observed that such cooperation is quite similar to the cooperation that is attained between weather-sealing means mounted on the upper and lower edges of each of the adjacent glass panels 22, as will be described in some detail hereinafter.

The outer face of the web 66 is formed as a flat, smooth surface that is located in a plane that is perpendicular to the axes of the hubs 24E and 24H, thus to provide for a

large area of flat surface contact with the yielding sealing plate 57, and this assures proper weathersealing of the end or vertical edges of the tiltable window panels.

The glass panels 22

Under the present invention, each glass panel 22 is provided with means which not only serve to afford an effective weather-seal along the horizontal edges, and provide for quick and easy mounting of the glass panel in the clips 24, but the means that are associated with the glass panel 22 serve to enable glass strips or panes to be used without the costly finishing or grinding operations that have heretofore been required in respect to the horizontal edges of the glass panes. Thus, as shown particularly in Figs. 6 to 9 of the drawings, each glass panel 22 comprises a longitudinal pane or strip of glass P of a width that is coordinated with the spacing of the pivots 60, and along the upper and lower edges of these panes P of glass, weather-sealing means are permanently mounted, and such weather-sealing means are of such a form and are so related to the panes P that the panes P are effectually strengthened and reinforced against bending. Thus, a lower weatherstrip 72 and an upper weatherstrip 73 are afforded, and these strips 72 and 73 are formed as extrusions from a metal such as aluminum.

The lower weather-sealing strip 72 comprises a relatively thick lower body portion 72B with upstanding spaced flanges 72F along opposite edges thereof, and these flanges afford a groove that is adapted to receive the lower edge of the glass pane P with a relatively snug fit. It should here be pointed out that the lower strip 72, as well as the upper strip 73, are secured to the glass pane P through the use of an adhesive that is disposed between the opposed surfaces of the glass pane and the mounting groove of the strip. The lower weather-sealing strip 72 is arranged on what may be termed its inner side edge with a groove 72G which corresponds in size and form with the notch 66G that is formed in the web of the glass receiving channel 24C. As will be evident in Figs. 6, 8 and 8A, the lower face of the body 72B of the strip 72 has an upward groove or channel 72C formed therein just inwardly or to the left of the right-hand edge thereof, thus to form a downwardly projecting drip lip 72L along the outer lower edge of the strip 72.

The upper weather-sealing strip 73 is of generally channel-like form to afford a relatively thick web 73W and downwardly extending flanges 73F which are so spaced that the upper edge of the glass pane P may be inserted in and adhesively secured within the downwardly facing channel that is thus afforded by the strip 73. On its outer flange 73F, the strip 73 has a longitudinally extending and outwardly projecting tongue 73T that is of the same form and dimensions as the projecting tooth 66T of the clip 24, and this identity of size and form is for a purpose that will become apparent hereinafter.

After the upper and lower strips 72 and 73 have been put in place so as to extend from end to end of the horizontal edges of the glass pane P, means are mounted along the end edges of the pane P which effectually cover these edges and which function in the automatic locking of the panel 22 in the clips, and which also afford yielding take-up means to compensate for dimensional inaccuracies in the length of the panels 22. Thus, as best shown in Figs. 7 and 8 of the drawings, a channel-like filler strip 74 is adhesively secured about the end edge of the glass pane P in the space between the upper and lower strips 72 and 73, and the thickness of the filler strip and particularly the flanges thereof, is the same as the thickness of the flanges 72F and 73F. After the filler strip is in place, an end bracket 75 is secured in place to completely enclose the filler strip 74, cover the ends of the strips 72 and 73, and afford a plurality of spring means which assure proper location of the glass pane within the clips 24, while at the same time interlocking the panel 22 with such clips 24 and compensating for inaccuracies of

longitudinal dimensions of such panels 22. As shown in Fig. 8 of the drawings, the end bracket 75 is made from spring metal such as spring steel or spring-type aluminum or bronze, and the bracket 75 is generally channel shaped in form to afford a web 75W, an outer flange 75F-1 and an inner flange 75F-2. The web 75W is extended beyond the ends of the flanges, and is bent over to form upper and lower ears 75E which may extend along the respective lower and upper faces of the strips 72 and 73. As pointed out hereinabove, the flanges of the member 75 are terminated short of the ends of the web 75W, and with respect to the upper end of the flange 75F-1, this affords clearance which enables proper weather-sealing of the horizontal edges of the panels to be attained, as will be described hereinafter.

As to the inner flange 75F-2, it should be observed that the upper end portion thereof is separated from the web 75W for a substantial distance downwardly from the upper end of the flange, and this separated upper end portion is bent in what may be termed an inward direction or left-hand direction as viewed in Figs. 6 and 8 to afford a locking tooth 75T, this locking tooth being adapted to engage with and lock into the notch 70 of the clip 24 to prevent unauthorized upward removal of the panels 22 from the clips. The locking tooth 75T, of course, exerts a yielding action on the upper portion of the panel 22 to urge this upper portion outwardly and into contact with the outer flange 68 of the clip, and to assure similar seating of the lower portion of the panel 22 against the flange 68, the lower end of the flange 75F-2 is cut or separated from the web 75W and is bent into a spring arm 75S as shown in Fig. 8. It will be noted in particular that the lower end of this arm 75S has a slight reverse bend thereon so as to simplify insertion of the glass panel downwardly into position in the clip. As hereinbefore pointed out, the bracket 75 affords yielding means which act to compensate for endwise inaccuracies of the glass panels 22, and this is accomplished by forming the web 75W to afford spring means projecting and acting in an endwise direction. Thus, as shown in Figs. 4, 7 and 8, the web is separated from the flanges throughout a substantial portion of its intermediate length, and midway between its ends, the web 75W is transversely split as at 175S, thus to afford two spring arms 175 that project outwardly or endwise and in a centered relationship between the upper and lower edges of the glass panel. This is particularly well shown in Figs. 4 and 8 of the drawings.

With the clips 75 adhesively secured in position on the ends of the glass panel 22, this glass panel may be slipped downwardly into the channels 24C of the clips, and when the panel has reached its position against the lower end walls 69 of the clips, the locking tongues 75T will snap into the locking sockets 70, thus to hold the panel in position in the clips. The latching tongues 75T may, of course, be released with the use of appropriate tools from the inside of the window, but as against a person working from the outside of the window the latching tongues 75T prevent unauthorized removal of the glass panes.

It is important to observe that the tongues 73T of the upper weatherstrips are of a less width than the grooves 72G of the lower weatherstrip, and this same size or relationship is employed in the cooperating groove on the head 21H and the cooperating tongue that is afforded on the sill 21S. When these tongues 73T engage the wider grooves 72G under the present invention, the actual surface to surface engagement is limited to the lower and generally flat surfaces of the tongue and the groove, the upper surfaces of the tongue 73T and the groove 72G being spaced substantially from each other. Moreover, these lower surfaces are so related to the pivotal axis of the clips that in the final portion of the closing movements of the panels 22, the cooperating surfaces of the tongues and grooves move for at least a slight distance with a face to face wiping action which assures an effective

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tive sealing action. In attaining this result, the major portion of the lower surface of the groove is in each instance formed in a plane that is substantially parallel to the arcuate path of movement of the lower edge of the panel, and hence in the terminal portion of the window closing movements, the desired wiping action is attained. This relationship of the bottom of the sealing grooves is particularly important in respect to the lower edge of the lower panel 22, for in this instance the sealing groove must engage the stationary tongue that is afforded on the sill.

In the other positions in the window, the tongues are located along the upper edges of the panels 22, and hence have substantial components of downward as well as outward movement, and because of the wider vertical dimensions of the grooves, adequate clearance is provided for entry of the tongues into the grooves. Thus as the lower face of the tongue approaches closely toward its final engagement with the opposed lower surface of the groove, the tongue has one component of movement toward the plane of final engagement, as well as a second component of movement parallel to this final plane of engagement, and during such final engaging movements, the lower face of the groove moves substantially parallel to the final plane of engagement so that the aforesaid wiping action is attained and optimum sealing of the parts results.

When the tongue and groove sealing means have thus been engaged, it should be observed that an interlocking action is attained which supplements the action of the locking tooth in preventing unauthorized removal of the glass panels 22 from the supporting clips.

As to the end or vertical edge sealing of the panels 22, it is to be observed that the spring brackets by means of their end spring members 175, exert spring pressure endwise of the panels and against the clips 24, and this not only compensates for such slight endwise variation as may exist between the several panels 22, but also contributes to the attainment of a uniformly effective seal between the several clips 24 and the weatherstrip members 57.

The relationship of the clips 24 to the weatherstrip members 57 in the open position of the panels is also important, for with the arrangement herein shown, the center lines of the panels 22 are disposed substantially opposite the center lines of the strips 57. Hence the springs of the spring brackets 75 act against the yielding strips 57 in a uniform manner in the open, closed and intermediate positions of the panels, and tilting of the clips 24 by the yielding spring action of the strips 57 is avoided.

The operator 24 and its drive connections

The operator 24 that is shown herein comprises a gear casing 80 having one relatively wide wall 80W that is disposed against the inside surface of the flanges 321J and 421J of the jamb, and the edge of this plate 80W engages the inner face of the web 421J so that the fastening of the plate 80W by a single screw 81, as shown in Fig. 9, serves to hold the casing 80 against rocking movement. The opposite face of the casing 80W engages the inside face of the flange 621J, and thus the gear casing 80 is held in proper position within the left jamb 211JL, as shown in Fig. 9. Within the gear casing 80, a rocking segment 82 is provided which has an arm 83 integral therewith and extending through a slot in the inside edge of the casing 80W so that the end of the arm 83 is disposed in alignment with the lower pivot stud 65, this stud extending through the operating link 25 so as to pivotally connect the arm 83 with the link 25. The segment 82 is pivotally mounted within the casing 80 on an axis that is common to the lower mounting clip 24, and in accomplishing this, the segment 82 is mounted on a sleeve 84 so that the mounting stud 60 for the lower clip 24 may extend through this sleeve 84 and the walls

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of the casing 80 to connect the opposed parts of the jamb in the same manner as all of the other pivot studs 60. The segment 82 is engaged by a worm 85, which in the present instance is formed on a tubular shaft that is rotatably mounted at its rear end to the rear wall of the casing and which extends outwardly through the inner wall of the casing as shown in Fig. 9. Just inside the walls of the casing 80, suitable bearing means 87 are provided for rotatably supporting the tubular shaft on which the worm 85 is mounted. Between the inner side of the gear box 80 and the inner flange of the jamb the shaft is reduced or swaged as at 88 to form a reduced non-circular internal socket into which the non-circular end of an operating crank 23C may be extended when it is desired to open or close the window.

The actuation of one of the links 25 is transmitted to the other link 25 through the medium of the transverse shaft 26 that is mounted within the head 21H, and to accomplish this, the heavy rib 54 and the plate 55 of each jamb 21J are extended upwardly into the head 21H as will hereinafter be described in some detail to afford a mounting for opposite ends of the transmitting shaft 26. This transmitting shaft as herein shown is of square cross section that is reduced at its opposite ends to a cylindrical form to afford bearing journals 126. These bearing journals are adapted to enter suitable bearing openings 226 formed at the factory at appropriate points in the upwardly projecting members 54—55, as shown in Fig. 10. The motion is transmitted to and from opposite ends of the shaft 26 by arms 124A that have substantially the same functional form and relationship as the arms 24A of the clips 24. Thus, each arm 124A is connected by a stud 165 to the upper end of the adjacent link 25. At its other end, each arm 124A has a squared opening 224A, Fig. 6, that is complementary to the squared form of the shaft 26 and which may embrace the shaft 26 adjacent to its end journals 126. Hence when one of the links 25 is actuated, it acts through its released arm 124A to transmit a related rocking movement to the shaft 26, and this rocking motion is in turn transmitted through the other arm 124A to the other one of the links 25, thus to actuate the two ends of the glass panels 22 in unison.

The fabrication, shipment and assembly

As hereinbefore pointed out, the window of the present invention adapts itself exceedingly well to the processes of fabrication, shipment and assembly, and the head, sill and jamb may be fully cut and prepared for fitting at the factory so that these elements, along with the glass panels, masonry flanges and the transmitting bar 26 may be shipped in a disassembled relation to the user, who may then readily and easily assemble the frame and the masonry flanges as well as the transmitting bar 26 to afford a frame unit that may be built into the wall of a building in the usual manner. Thereafter, the glass panels 22 may be quickly and easily put in their locked positions by a snap-in mounting operation so as to complete the window installation.

As hereinbefore pointed out, the ends of the head and sill are arranged to extend into the upper and lower ends respectively of the two jambs, thus to abut the ends of the heavy securing ribs of the head and sill against the flanges 321J and 421J of the jambs so that the fastening screws or studs 32 may be extended through the jamb members and into the pre-bored openings in the rib elements of the head and sill. To enable this relationship to be established, certain cutting and forming operations are necessary in respect to the head, sill and jambs, and these cutting operations may be readily and easily performed to afford the pre-cut end structures that are best illustrated in Figs. 10 to 14 of the drawings.

Thus, with respect to the assembly of the sill and the head with the jambs, it should first be noted that the distance between the inside surfaces of the flanges 322J and

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521J of the jambs is precisely equal to the dimension between the outside surfaces of the flanges 322H and 521H of the head and the dimension between the outside faces of the flanges 322S and 521S of the sill. The endwise insertion of the head or the sill into the space between the aforesaid flanges of the jamb requires that the flanges 50 and 51 be cut away near the upper end of the jamb down to the level 550, Fig. 10, of the lower surface of the web 322W of the head and at the lower end to a level 650, Fig. 10 at the height of the sill 21S. Similarly, and in order to allow for insertion of the flange 621H of the head, the flange 621J and the related weatherstripping plate 57 must be cut away down to the level 750, Fig. 10, of the lower surface of the flange 621H of the head. In this connection, it should be noted that the flange that defines the lower portion of the groove 22G in the head 21H must also be cut away from the end portions of the head to a location 222E, Fig. 11, such that these cutaway ends will engage the weatherstrip plate 57 when this weatherstrip plate is in its most outward position to which it may be urged by its springs.

In connection with the modification of the jambs, it should be noted that the cutting away of the flange 621J extends to the right in Fig. 9 to cut away the ledge 53 down to the aforesaid level and to the right to the plane of the left-hand or inside face of the flange 621J, as indicated at 750A in Fig. 10. Also, such cutting of the flange 621J extends to the left in Fig. 6 only to the adjacent vertical edge of the clamping plate 55 so that this clamping plate and the heavy mounting rib 54 extend upwardly for a substantial distance into the head 21H, thereby to provide a pivotal support or mounting opening 226 for the end or journal 126 of the motion transmitting shaft 26 as hereinbefore described. At its lower end the flange 621J, including the bar 54, the plates 55 and 57 and the ledge 53 are cut away up to a sloping lower edge surface 850 which in the assembled frame will bear against the sloping upper surface of the sill 21S.

With respect to the sill 21S, the only modification or special forming that is required is to cut off the end portions of the upstanding sealing wall 35 from the ends of the sill to vertical planes 322E such that the cut ends of this wall 35 will engage the weatherstripping plates 57 in the relationship hereinabove described with respect to the lower lap portion that forms the groove 22G.

The flanges 321J and 421J of the jambs are, of course, perforated or bored, as shown in Figs. 10 to 12, to receive the fastening screws or studs 32 so that these studs may be screwed into the ribs of the head and the sill.

Before such actual fastening of the jambs to the head and sill, the arms 124A must be operatively associated with the transverse shaft 26 which is to extend through the squared openings in the arms 124A and which then has its end journals 126 extended into the mounting openings 226 that have been provided in the upstanding support structures afforded by the plate 55 and the heavy rib 54. After this has been done, the fastening of the jambs to the head and sill may be completed.

It will be understood, of course, that the several mounting clips 24 with the related actuating links 25 are put in the desired assembled relationship at the factory, and hence after the head, sill and jambs have been assembled as hereinabove described, and after the masonry flanges 33 have been put in place in the desired relationship, the assembled frame is ready to be secured in or built into the wall opening. The jambs and the head and sill may, of course, be covered with a suitable masking material to protect the finish thereof during the completion of the construction work. After the construction work has progressed to the desired point, the separately packaged group of glass panels 22 may be readily and easily put in place in the mounting clips, and to do this, the several mounting clips 24 may be actuated to their fully opened position so that the glass panels 22 may be inserted one by one into the aligned pairs of clips 24. As this inserting

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movement takes place, each glass panel will be automatically locked in position by the action of the locking teeth 75T, and hence the window is ready for immediate functioning upon completion of the snap-in mounting of the glass panels therein.

Summary

From the foregoing description, it will be apparent that the present invention materially improves the structure, appearance and weather-sealing characteristics of jalousie type window structures and that these desirable improvements are effected under the present invention in such a way that the window structure is adapted for use in all types of locations and in all kinds of climates. Moreover, it will be evident that under the present invention the jalousie windows are adapted for use in accordance with well established standards of modular building construction, and hence the usefulness of windows of this type has been materially extended by the present invention.

It will also be apparent from the foregoing description that the present invention materially reduces and controls the sweating of the metal frames of the window, and that this is accomplished in such a way that the window frame may be constructed and installed as a unit in accordance with usual building practice.

Under the present invention it will also be evident that the use of rough-cut glass panels is made possible, and moreover it will be evident that a weather-sealing action is attained in an unusually effective manner about all edges of the panel and in such a way that undue stresses upon the glass panels have been avoided.

In addition to the foregoing, it will be evident that the present invention materially simplifies the use of jalousie windows since it enables the glass panels to be put in place in an extremely simple manner, and such glass panels in the window of the present invention cannot be removed by unauthorized persons operating from the exterior of the closed window.

Thus, while I have illustrated and described the preferred embodiment of my invention, it is to be understood that this is capable of variation and modification, and I therefore do not wish to be limited to the precise details set forth, but desire to avail myself of such changes and alterations as fall within the purview of the following claims.

I claim:

1. In a jamb and clip assembly for jalousie type windows, a jamb comprising a metal member with a first side adapted to abut against the vertical edge of the wall opening and second side constituting a mounting face parallel to said first side, said member having a relatively broad vertically extending undercut groove in said second side and having a separately formed retaining bar along one edge of the groove serving to define a portion of such groove, a flat rigid sealing strip mounted longitudinally in said groove and having a flat rigid structural sealing surface adapted to be urged outwardly beyond and in parallel relation to said second side of said member, spring means in said groove to yieldingly urge said strip outwardly, interlocking means on the strip within the groove to limit outward movement of said strip, a plurality of panel-mounting clips and shouldered pivot screws upon which said clips are respectively mounted and said screws being extended through said bar into said member in perpendicular relation to said second face to hold the bar in place and provide pivots about which the panel-mounting clips may be moved in sealing relation to said rigid sealing strip.

2. A jamb for use in a window frame for jalousie type windows, said jamb comprising a metal member with a first wall adapted to abut against the side of the building wall opening and having an outside edge wall and an inside edge wall extending in the same direction from opposite edges of said first wall to define the outside and inside faces of the jamb, a second wall parallel

to and spaced from said first wall and extending from the edge of said outside edge wall toward but terminating in an inner edge short of said inside edge wall, said second wall having a mounting side that is remote from said first wall and on which one end of a series of tilt-able panels are adapted to be mounted, said mounting side of said second wall having a relatively broad vertically extending undercut groove, a flat rigid structural strip mounted longitudinally in said groove and having a flat sealing surface adapted to be urged outwardly beyond said mounting side of said second wall, spring means in said groove to yieldingly urge said strip outwardly, interlocking means to limit outward movement of said strip, spacing means disposed at intervals between said first wall and said inner edge of said second wall, pivotal supporting clips mounted on said mounting side of said second wall, and pivot studs for said clips extending through said clips, said inner edge of said second wall and into said first wall to support said clips and clamp said first and second walls against said spacing means.

3. A jamb for use in a window frame for jalousie type windows, said jamb comprising a metal member with a first wall adapted to abut against the side of the building wall opening and having an outside edge wall and an inside edge wall extending in the same direction from opposite edges of said first wall to define the outside and inside faces of the jamb, a second wall parallel to and spaced from said first wall and extending from the edge of said outside edge wall toward but terminating in an inner edge short of said inside edge wall, said second wall having a mounting side that is remote from said first wall and on which one end of a series of tilt-able panels are adapted to be mounted, said mounting side of said second wall having vertically extending undercut groove, a rigid structural sealing strip yieldingly mounted longitudinally thereof, spacing sleeves disposed at intervals between said first wall and said inner edge of said second wall, pivotal supporting clips mounted on said mounting side of said second wall in position to engage said strip with a weather sealing action, and pivot studs for said clips extending through said clips, said inner edge of said second wall, through said spacing sleeves, and into said first wall to support said clips and clamp said first and second walls against said spacing sleeves.

4. In combination, a pivot clip for supporting a lower type window panel, said clip comprising a channel section having a transverse web and inside and outside flanges, a mounting and supporting arm rigid with said channel and projecting laterally from said channel in a direction substantially parallel to the plane of said web, said arm having a first bearing opening located adjacent the projecting end thereof and a second bearing opening located adjacent to said channel with said openings having axes perpendicular to the plane of said web, said outside flange extending to the lower end of said web and there being a transverse wall fixed to said web and said outside flange and constituting a lower end closure for said channel, said inside flange extending upwardly to the upper end of said web and said outside flange terminating short of said upper end of said web to define an open upper end for said channel, said web having a tooth projecting therefrom in an outward direction above the level of the upper end of said outside flange, said inner flange terminating at its lower end in an upwardly spaced relation with respect to said lower end closure, and said inside flange having an inwardly facing notch formed therein in the portion below said lower end of said inside flange, and a window panel having one end disposed in said channel and having a spring locking tongue thereon engaging said notch to prevent edgewise withdrawal of the panel from said channel.

5. In a jalousie type window panel, an elongated rec-

tangular glass pane having inner and outer faces and having long horizontal upper and lower edges and short vertical end edges, upper and lower sealing and strengthening members comprising bars disposed along the respective upper and lower edges of said pane and each having relatively narrow and thin inner and outer mounting flanges embracing and adhesively secured to bordering portions of said pane along said upper and lower edges, the outer flange of said upper bar having a longitudinally extending tongue formed therealong and projecting in an outward direction, and said lower bar having a longitudinally extending groove formed therein in its inner face with said groove being of a cross sectional width greater than the cross sectional width of said tongue.

6. In a jalousie type window panel, an elongated rectangular glass pane having inner and outer faces and having long horizontal upper and lower edges and short vertical end edges, upper and lower sealing and strengthening members comprising bars disposed along the respective upper and lower edges of said pane and each having relatively narrow and thin inner and outer mounting flanges embracing and adhesively secured to bordering portions of said pane along said upper and lower edges, said upper member having a longitudinally extending tongue formed therealong and projecting in an outward direction, and said lower bar having a longitudinally extending groove formed therein in its inner face with said groove being of a cross sectional width greater than the cross sectional width of said tongue, said lower bar on its lower surface being formed with a longitudinal groove adjacent to its outer lower corner to define a drip lip along said corner.

7. In a jalousie type window having a frame with tiltably supported mounting clips disposed on a common axis and in opposed relation on opposite sides of the frame, the improvement which comprises a window panel having an elongated rectangular glass pane having inner and outer faces and having long horizontal upper and lower edges and short vertical end edges, upper and lower sealing and strengthening bars disposed along the respective upper and lower edges of said pane and each having relatively narrow and thin inner and outer mounting flanges embracing and adhesively secured to bordering portions of said pane along said upper and lower edges, said upper bar having a longitudinally extending tongue formed therealong and projecting in an outward direction, said lower bar having a longitudinally extending groove formed therein in its inner face with said groove being of a cross sectional width greater than the cross sectional width of said tongue, and spring brackets embracing opposite ends of said pane, said brackets having end walls disposed against the end edges of said panel and inner and outer flanges engaging inner and outer faces of said pane, said inner flange having an upwardly extending yielding locking tooth formed thereon for locking the panel in the mounting clips, and ears extended from said end walls of said bracket over the adjacent portions of the upper and lower edges of the pane, and said clips having upwardly opening channels into which said panel is inserted and the inner sides of said channels having locking notches therein for engagement by said locking teeth to hold the panel in said channels.

8. In a jalousie type window panel, an elongated rectangular glass pane having inner and outer faces and having long horizontal upper and lower edges and short vertical end edges, upper and lower sealing and strengthening bars disposed along the respective upper and lower edges of said pane and each having relatively narrow and thin inner and outer mounting flanges embracing and adhesively secured to bordering portions of said pane along said upper and lower edges, said upper bar having a longitudinally extending tongue formed therealong and projecting in an outward direction, said lower bar having a longitudinally extending groove formed therein

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in its inner face with said groove being of a cross sectional width greater than the cross sectional width of said tongue, and spring brackets embracing opposite ends of said pane, said brackets having end walls disposed against the end edges of said panel and inner and outer flanges engaging inner and outer faces of said panel, said inner flange having an upwardly extending yielding locking tooth formed thereon for locking the panel in a mounting clip, and said inner flange having a yielding spring arm thereon adjacent to its lower edge for balancing the yielding action of said yielding locking tooth.

9. In a jalousie type window panel, an elongated rectangular glass pane having inner and outer faces and having long horizontal upper and lower edges and short vertical end edges, upper and lower sealing and strengthening bars disposed along the respective upper and lower edges of said pane and each having relatively narrow and thin inner and outer mounting flanges embracing and adhesively secured to bordering portions of said pane along said upper and lower edges, said upper bar having a longitudinally extending tongue formed therealong and projecting in an outward direction, said lower bar having a longitudinally extending groove formed therein in its inner face with said groove being of a cross sectional width greater than the cross sectional width of said tongue, and spring brackets embracing opposite ends of said pane, said brackets having end walls disposed against the end edges of said panel and inner and outer flanges engaging inner and outer faces of said pane, said inner flange having an upwardly extending yielding locking tooth formed thereon for locking the panel in a mounting clip, and said end wall having projecting bow spring means formed from the metal of the end wall adapted to exert spring pressure endwise of the panel.

10. In a jalousie type window panel, an elongated rectangular glass pane having inner and outer faces and

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having long horizontal upper and lower edges and short vertical end edges, upper and lower sealing and strengthening bars disposed along the respective upper and lower edges of said pane and each having relatively narrow and thin inner and outer mounting flanges embracing and adhesively secured to bordering portions of said pane along said upper and lower edges, and spring brackets embracing opposite ends of said pane, said brackets having end walls disposed against the end edges of said panel and inner and outer flanges engaging inner and outer faces of said pane, said inner flange having an upwardly extending yielding locking tooth formed thereon for locking the panel in a mounting clip, and said end wall having projecting spring means formed thereon adapted to exert spring pressure endwise of the panel.

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