

[54] WINDOW STRUCTURE

3,290,076 12/1966 Le Tarte 287/189.36 H

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[57] ABSTRACT

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A window including a housing block mounted in each end of the upper rail of the window for use in connecting the upper rail to the end rail, and housing a pivot pin mounted in the block for longitudinal adjustment between an extended operative position mounting the window for vertical movement and pivotal movement relative to a window opening, and a retracted position flush with the end rail, enabling manipulation of the window into and out of mounted position in the window opening, together with means accessible at the front of the window for adjusting the pivot pin.

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[51] **Int. Cl.**..... **E05d 7/08**

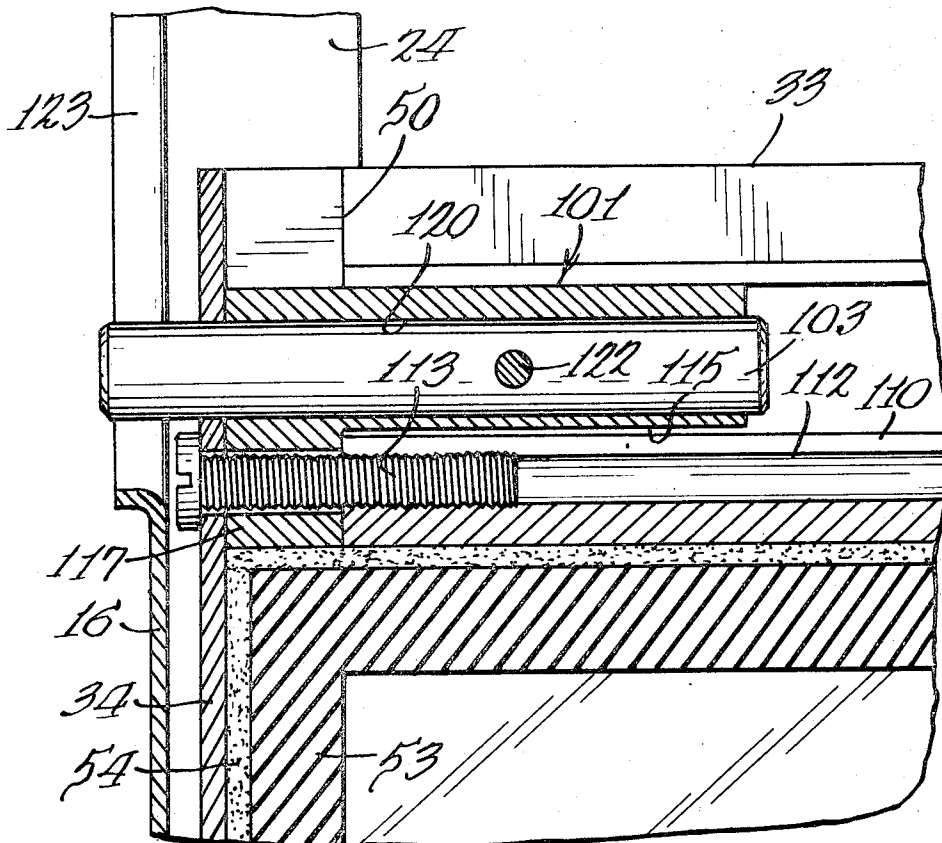
[58] **Field of Search** 49/371, 453, 449, 450;
287/189.36 H

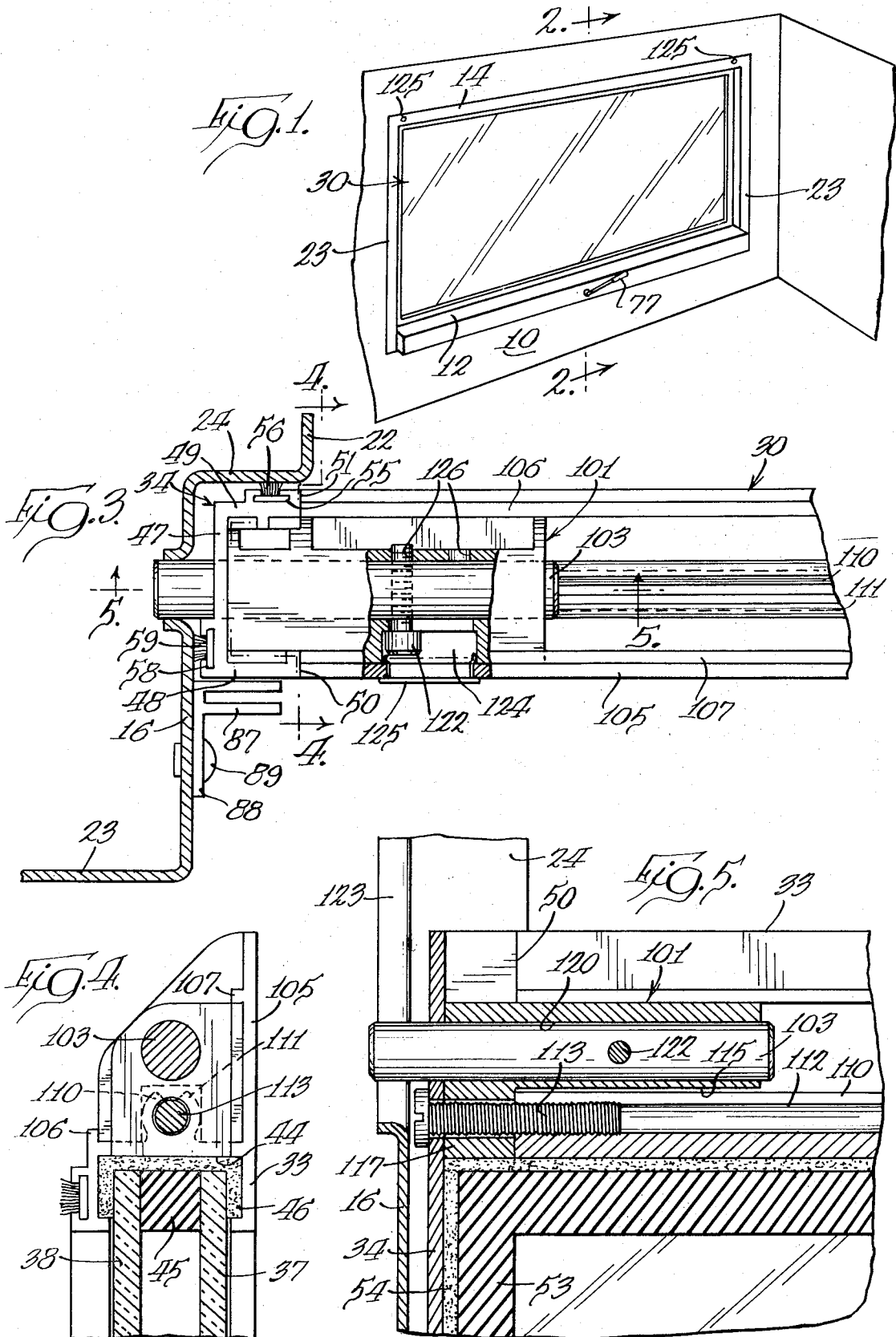
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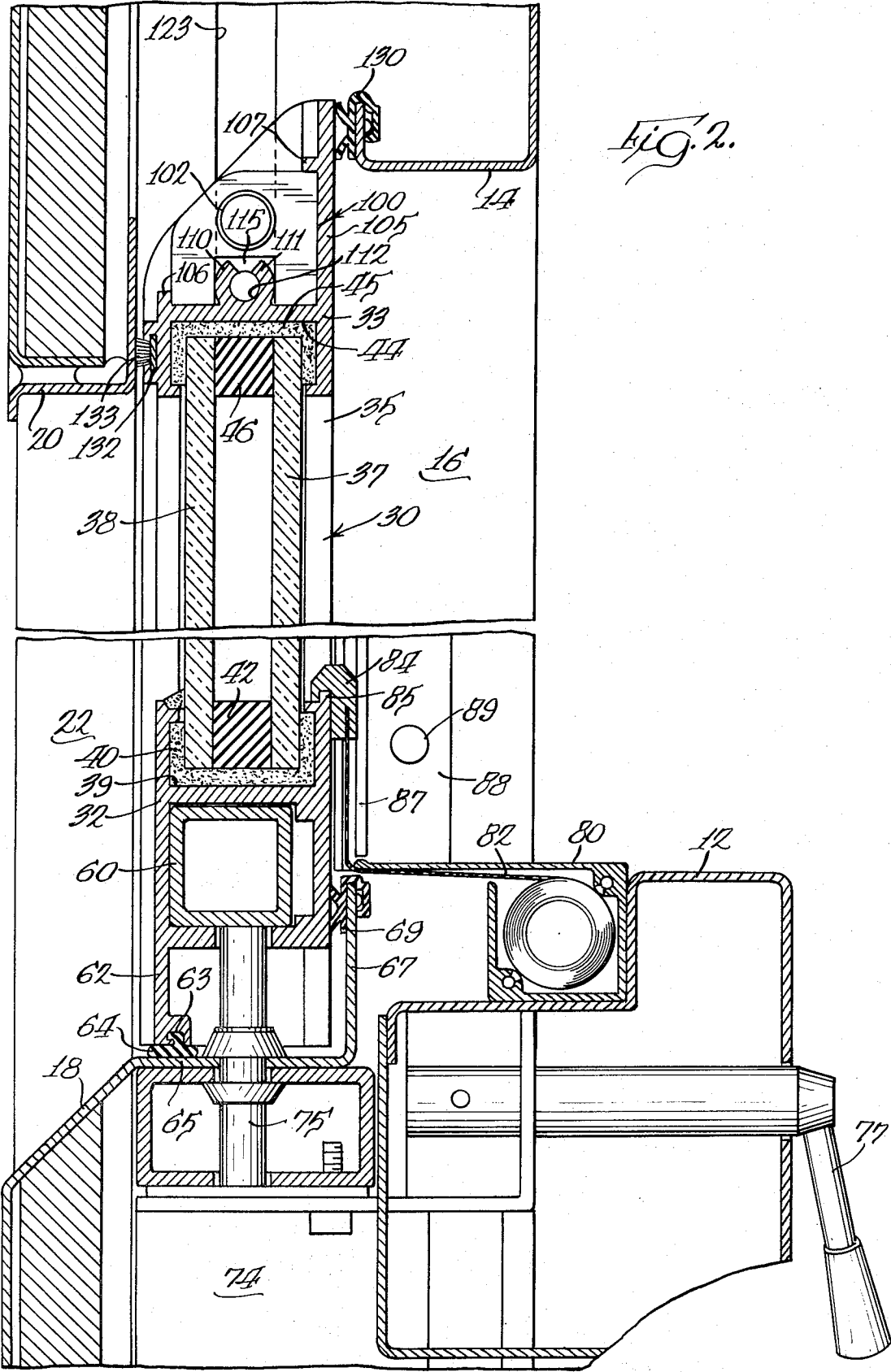
UNITED STATES PATENTS

1,904,110	4/1933	Willmann.....	49/371
1,922,009	8/1933	Axe.....	49/450 X

12 Claims, 5 Drawing Figures







WINDOW STRUCTURE

BACKGROUND OF THE INVENTION

The present invention relates to a window construction, and particularly a relatively large window which may be described as a picture window, utilizing a metal frame supporting spaced parallel panes of glass providing an insulating structure.

Windows of the character described, when made in relatively large sizes, necessarily involve substantial weight. As a result of the size and weight, the windows are normally not mounted with complete freedom for unlimited pivotal motion, nor for full sliding movement such as that provided in conventional double hung sash windows. Nevertheless, it is desirable for such windows to be mounted with a capacity for at least limited vertical sliding motion to facilitate ventilation when it is necessary or desirable and at least some pivotal motion in order to permit cleaning of both the inside and the outside of the window. In order to provide for mounting of the window with the required flexibility of movement, it is desirable to include in the window frame a pivot pin extending outwardly from each end of the frame at the top of the frame. Preferably, the pivot pin should be retractable in order to enable positioning of the window frame in the window opening and removal of the window frame from the window opening.

Prior U.S. Pat. No. 1,904,110 relates to a window construction with retractable pivot pins, but the window is relatively small and lightweight, the pivot pins are not positively locked in the extended and retracted positions, and the block for mounting each pivot pin does not function to join the top and end rails of the window frame.

SUMMARY OF THE PRESENT INVENTION

It is a general object of the present invention to provide an improved window construction suitable for use in relatively large picture window installations where the weight of the structure is substantial and wherein a mounting block is utilized for retractable pivot pins in a manner to aid in joining the top rail of the window frame to the end rail of the window frame.

In a preferred form of the invention illustrated herein, a window frame includes a top rail with an upwardly directed channel and end rails with inwardly directed channels, and at each end of the top rail a mounting block for a retractable pivot pin is positioned in the channel of the top rail with a depending flange hanging over the end of the top rail to receive a securing bolt or screw which passes through the end rail and the depending flange, and into the top rail.

Preferably, the top rail is formed with guide means confining the mounting block against movement laterally or vertically relative to the top rail.

A pivot pin mounted in each block parallel to the top rail is adjustable longitudinally between an extended position where the pivot pin protrudes beyond the end rail, and a retracted position with the pivot pin flush with the end rail. Means for adjusting the pivot pin is accessible through the front of the top rail, and locking means positively holds the pivot pin in adjusted positions against accidental undesired movement.

Preferably, a screw securing the end rail and the mounting block and the top rail together passes into the top rail between spaced flanges which are expanded

against the mounting block as the screw is tightened in a manner to securely lock the block in position.

The construction according to the invention provides a high strength joint at the corner of the window frame adequate to support the substantial weight involved, and at the same time provides a retractable pivot pin capable of heavy duty use and positive retention in adjusted positions. Other advantages will appear in the following description.

BRIEF SUMMARY OF THE DRAWINGS

FIG. 1 is a perspective view of a window construction embodying the principles of the present invention;

FIG. 2 is an enlarged fragmentary vertical sectional view through the window structure of FIG. 1 taken at about the line 2—2 of FIG. 1;

FIG. 3 is a fragmentary top plan view of the window frame, with portions broken away to better illustrate various features;

FIG. 4 is a vertical sectional view taken at about the line 4—4 of FIG. 3; and

FIG. 5 is a vertical sectional view taken at about the line 5—5 of FIG. 3.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to FIG. 1, a wall 10 has a rectangular window opening which is lined by framing members which include on the inside of the wall a sill member 12, a head member 14 and side stiles as at 16. On the outside of the wall, the window opening is lined by a sill member 18 and a head member 20 and flanges 22 on the side stiles 16. The side stiles 16 include a front flange 23 which provides a facing on the wall 10 along the sides of the window. Intermediate the main body of the side stile 16 and the outwardly directed flange 22, there is a laterally inwardly directed flange 24 which provides a shoulder or abutment for holding a window in the opening in the wall.

The window opening in the wall 10 is closed by a window structure generally designated 30 including a rectangular metal frame comprised of a horizontally disposed bottom rail 32, a parallel top rail 33, and upright side rails or end rails 34 and 35. The end rails 34 and 35 are similarly constructed except that they are mirror images of each other, so that only the rail 34 will be described in complete detail. The rails 32, 33, 34 and 35 are rigidly connected together, and each of them is formed with an inwardly directed channel for receiving spaced parallel inner and outer panes of glass as at 37 and 38 with an insulating space therebetween. More particularly, referring to FIG. 2, the bottom rail 32 is formed with an upwardly facing channel as at 39, and the lower edges of the panes of glass 37 and 38 are set in the channel 39 in appropriate cement as at 40 with a spacer 42 therebetween. The glass is thereby securely held in position in the rail 32 while at the same time appropriately cushioned in a manner to reduce vibration and shock transmitted to the glass during movement of the window.

Similarly, as seen in FIGS. 2 and 4, the upper rail 33 is formed with a downwardly facing channel as at 44 containing cement as at 45 in which the upper edges of the panes 37 and 38 are set, with a spacer 46 therebetween. As seen best in FIGS. 3 and 5, each of the end rails 34 and 35 comprises an inwardly facing channel shaped member including a central wall 47 connecting

front and rear walls 48 and 49 terminating with inner edges as at 50 and 51 abutting the end of the top rail 33. The inwardly facing channel in the end rail receives lateral edges of the panes 37 and 38 with spacer material therebetween as at 53 and cement as at 54 protecting the edges of the panes from the bottom of the channel.

The outer wall 49 of the side rail 34 is formed with an outwardly facing T-slot 55 carrying a vertically disposed sealing strip adapted to engage the flange 24 of the side stile 16 for purposes of providing a seal against the outside weather. Similarly, the central side wall 47 of the side rail 34 is formed with an outwardly facing T-slot as at 58 carrying a vertically disposed sealing strip 59 engaging the side stile 16 to provide an additional weather seal.

As seen best in FIG. 2, the bottom rail 32 of the window 30 is formed with a hollow central portion with a hollow rectangular reinforcing beam 60 therein. At the outer edge of the bottom rail 32, a downwardly extending flange 62 terminates at the bottom edge in a downwardly facing T-slot 63 including a weather stripping 64 for providing a seal against a central section 65 in the sill. At the inner edge of the central sill portion 65, an upwardly extending flange 67 carries at the upper edge a weather strip 69 adapted to engage the front face of the lower rail 32.

The bottom sill members 12, 18 and 65 are associated with a generally hollow wall construction, and in order to provide for elevating the window 30, which has a substantial weight, a hydraulic jack mechanism is utilized, though other means may be provided if desired. The jack mechanism includes a cylinder as at 74 with a projecting piston rod 75 adapted to engage the reinforcing beam 60 in the bottom window rail 32. Associated with the cylinder 74 is an appropriate pump (not shown) adapted to be operated by a handle 77 which is manually accessible at the inside of the wall 10. The hydraulic jack mechanism forms no part of the present invention and need not be described in complete detail. It should suffice to explain that the jack may be operated to elevate the window by oscillating the handle 77 back and forth to operate the pump for supplying fluid under pressure to the cylinder 74. When it is desired to lower the window, the handle is held in an upper position which exhausts the cylinder 74 as the weight of the window returns the rod 75.

Preferably, the inside sill 12 is constructed with a housing as at 80 for a rolled screen 82 with a free end portion extending outwardly of the housing 80 and a terminus attached to a pull bar 84 secured to an upwardly extending flange 85 on the lower window rail 32. The arrangement is such that when the window is elevated, the pull bar 84 is raised with the window and pulls the screen 82 to unwind it and thereby screen the window opening to the extent that the window is elevated. Lateral edges of the screen are each guided in a slot in a screen guide 87 having a flange 88 secured to the side stile 16 as by means 89. Vertical motion of the window is guided between the window framing flange 24 acting against the outer surface of the window and the screen guide 87 acting against the inner surface of the window.

According to the present invention, opposite ends of the top rail 33 are secured to upper ends of the side rails 34 and 35 by means of housing blocks 100 and 101 of similar construction except that they are oppositely

facing at opposite ends of the top rail. The blocks function as housings for pivot pins as at 102 and 103 adapted to hold the window 30 in the surrounding frame structure. Because of the similarity in the blocks 100 and 101, only the latter will be described in complete detail.

In order to adapt the top rail 33 of the window for receiving the blocks 100 and 101, it is formed with an upwardly directed front flange as at 105 having a substantial height, and a shorter rear upwardly directed flange as at 106 which define a channel-shaped recess for the blocks bounded at the top by a rearwardly extending flange 107. The outer dimensions of each of the blocks 100 and 101 are such that the blocks fit closely between the flanges 105, 106 and 107 so that each of the blocks is confined against movement vertically and laterally forwardly or rearwardly relative to the top window rail 33.

For purposes of securing the blocks 100 and 101 in position, the top window rail 33 is formed with a central upwardly directed ridge in the form of the pair of curved flanges 110 and 111 which form a generally cylindrical recess 112 for receiving a self-tapping screw as at 113. In order to accommodate the flanges 110 and 111, each of the blocks 100 and 101 is formed with a tunnel or downwardly facing channel 115 in the bottom. At the end, each block is formed with a depending flange such as that at 117 on the block 101 closing the end of the channel or tunnel 115 and engaging the end of the ridge formed by the upstanding flanges 110 and 111. The end of the block 101 including the depending flange 117 is positioned in the channel of the end rail 34 with the end of the block engaging the central wall of the side rail. The screw 113 passes through the end rail and the flange 117 and is threadably secured in the bore 112 so that the top rail, the mounting block and the end rail are securely held together. Entry of the screw 113 into the bore 112 expands the flanges 110 and 111 tightly against the block.

The upper portion of the block 100 is formed with a longitudinally extending bore as at 120 adapted to receive the pivot pin 103 in a position parallel to the top window rail 33. The pin 103 is mounted in the bore 120 for longitudinal adjustment to an extended position illustrated in FIGS. 3 and 5 where the pin extends outwardly beyond the end rail 34 to engage a vertically disposed slot 123 in the side stile 16 so that the upper end of the window is vertically guided by the pin 103 in the slot 123 to facilitate vertical movement of the window as well as pivotal movement of the window when that may be desirable. The pin 103 is adapted for longitudinal adjustment in the block 101 to a retracted position where the projecting end of the pin is substantially flush with the central wall of the end rail 34. In the latter position, the pin is out of the way to facilitate removal of the window from the window opening in the wall 10 and to permit initial installation of the window.

Adjustment of the pin 103 is facilitated by a lock pin 122 which is disposed transversely in the pivot pin 103 and contains a head portion disposed in a longitudinal slot 124 in the front of the block 101 and communicating with the bore 120 in which the pivot pin is located. Access to the lock pin 122 is provided through a front aperture in the flange 105 of the top rail adapted to be closed by a disc 125 having spring fingers releasably holding the disc in position. Preferably, the lock pin 122 is threadably mounted in the pivot pin 103. In

order to secure the pivot pin in longitudinally adjusted positions, the free end of the lock pin or screw 122 is receivable in either of a pair of longitudinally spaced recesses or apertures 126 in the block 101 opposite the slot 124.

In operation, it will be understood that, as viewed in FIG. 3, the lock screw 102 may be backed out of the recess 126 to a position to allow longitudinal retraction of the pivot pin 103 to a place where the free end is substantially flush with the end rail 34. With the pin in such retracted position, the lock screw may be adjusted to engage the other recess 126 and hold the pivot pin retracted.

In order to provide weather seals at the top of the window, the front flange 105 on the top rail 33 engages a weather stripping 130 secured on the head piece 14. Additionally, the back or outer face of the top rail 33 is formed with a T-slot 132 carrying a weather strip 133 adapted to engage the head piece 20.

It will be understood that the mounting blocks 100 and 101 provide for rigid connection between the top rail and the side rails of the window in a manner to provide a rigid structure capable of withstanding heavy duty operation required by the weight of the structure and the wind pressures to which it may be subjected. Additionally, the mounting blocks provide secure housings for the mounting pins 102 and 103 so that provision is made for vertical adjustment of the window. It should be understood that the pull bar 84 on the screen 82 may be disconnected from the lower window rail 32, and the screen guide 87 removed if desired for purposes of pivoting the window as permitted by the pivot pins in the guide slots in the side stiles. The mounting pins 102 and 103 are longitudinally adjustable and adapted to be locked securely in either position.

We claim:

1. A rigid rectangular window structure adapted to be mounted for elevation and pivotal movement, comprising spaced parallel top and bottom rails and spaced parallel end rails, said top rail comprising an elongated channel-shaped member having a central upstanding ridge extending longitudinally in the channel of the rail, each end rail comprising an upright inwardly turned, channel-shaped member having front and rear walls abutting the end of the top rail and a central wall connecting the front and rear walls, a block at each end of the top rail having a generally rectangular cross sectional configuration positioned in the channel of the top rail and having a channel extending along the bottom thereof receiving the ridge of the top rail, said block having an end portion engaging the end rail, said block having a flange depending from the outer end of the block at the end of the channel in the block and abutting the end of the top rail, a screw passing through the end rail and the flange on the block and into the top rail, a longitudinal bore through the upper portion of the block parallel to the top rail, a pivot pin positioned in the bore in a position projecting outwardly through an aperture in the end rail, and means for retaining the pivot pin in position.

2. A window structure as defined in claim 1, including guide means on the top rail confining the block against movement laterally or vertically relative to the top rail.

3. A window structure as defined in claim 2, wherein the ridge in the top rail comprises spaced upright flanges adapted to receive said screw therebetween, so

that the screw expands the flanges against the walls of the block in the channel in the block.

4. A window as defined in claim 2, wherein the pivot pin is mounted in the block for adjustment longitudinally to a retracted position with the projecting end flush with the end rail.

5. A window structure as defined in claim 4, wherein the retaining means comprises a longitudinal slot in one side of the block opening to the bore, a transverse lock pin positioned in the pivot pin and extending into the slot, and recesses in the wall of the bore opposite the slot for receiving the end of the lock pin with the pivot pin in adjusted position.

6. A window structure as defined in claim 5, including an aperture in the front of the top rail providing access to the lock pin.

7. A window structure, comprising, spaced parallel top and bottom rails and spaced parallel end rails, said top rail comprising an elongated channel-shaped member, each end rail comprising an upright inwardly turned channel-shaped member, a block at each end of the top rail having a generally rectangular cross-sectional configuration positioned in the channel of the top rail, said block having an end portion projecting into the channel of the end rail including a flange depending from the outer end of the block and abutting the end of the top rail, a longitudinal bore through the upper portion thereof parallel to the top rail, a pivot pin positioned in the bore and movable to a position projecting outwardly from said block through an aperture in the end rail, and means for locking the pivot pin in the block, and a screw passing through the end rail and the flange and threaded into a generally cylindrical recess in the top rail, securing the end rail, the block and the top rail together.

8. A metal window structure adapted to be mounted for vertical movement and pivotal movement relative to a window opening in a wall, spaced parallel top and bottom rails and spaced parallel end rails, said top rail comprising an elongated channel-shaped member having a central upstanding ridge extending longitudinally in the channel of the rail, each end rail comprising an upright inwardly turned, channel-shaped member having front and rear walls engaging the top rail and a central wall connecting the front and rear walls, a block at each end of the top rail having a generally rectangular cross sectional configuration positioned in the channel of the top rail and having a channel extending along the bottom thereof receiving the ridge of the top rail, guide means on the top rail confining the block against movement laterally and vertically relative to the rail, said block having an end portion projecting into the end rail and engaging the central wall thereof, said block having a flange depending from the outer end of the block at the end of the channel in the block and abutting the end of the ridge in the top rail, a screw passing through the end rail and the flange on the block and into the ridge in the top rail, a longitudinal bore through the upper portion of the block parallel to the top rail, a pivot pin positioned in the bore and movable between an extended position projecting outwardly through an aperture in the end rail, and a retracted position flush with the end rail, and means accessible at the front of the frame for adjusting the pivot pin.

9. A metal block for use in a window structure, comprising, an elongated body of generally rectangular cross-sectional configuration having a channel extend-

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ing along the bottom thereof, a flange depending from one end of the block at the end of the channel, a longitudinal bore through the upper portion of the block parallel to the channel having a diameter less than the thickness of the body, an aperture through the depending flange parallel to the bore and communicating with the channel, a pivot pin positioned in the bore, and means for locking the pivot pin in the block.

10. A metal block as defined in claim 9, wherein the pivot pin is mounted in the block for adjustment longitudinally between an extended position projecting from said one end of the block and a retracted position

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within the block.

11. A metal block as defined in claim 10, wherein the lock means includes a longitudinal slot in one side of the block communicating with the bore, a transverse lock pin extending through the longitudinal slot and positioned in the pivot pin and recesses in the side of the block opposite from the slot and communicating with the bore to receive the end of the lock pin with the pivot pin in longitudinally adjusted positions.

12. A metal block as defined in claim 11, wherein the lock pin is threadably mounted in the pivot pin.

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