

May 29, 1956

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WINDOW CONSTRUCTION

2,747,240

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2 Sheets-Sheet 1

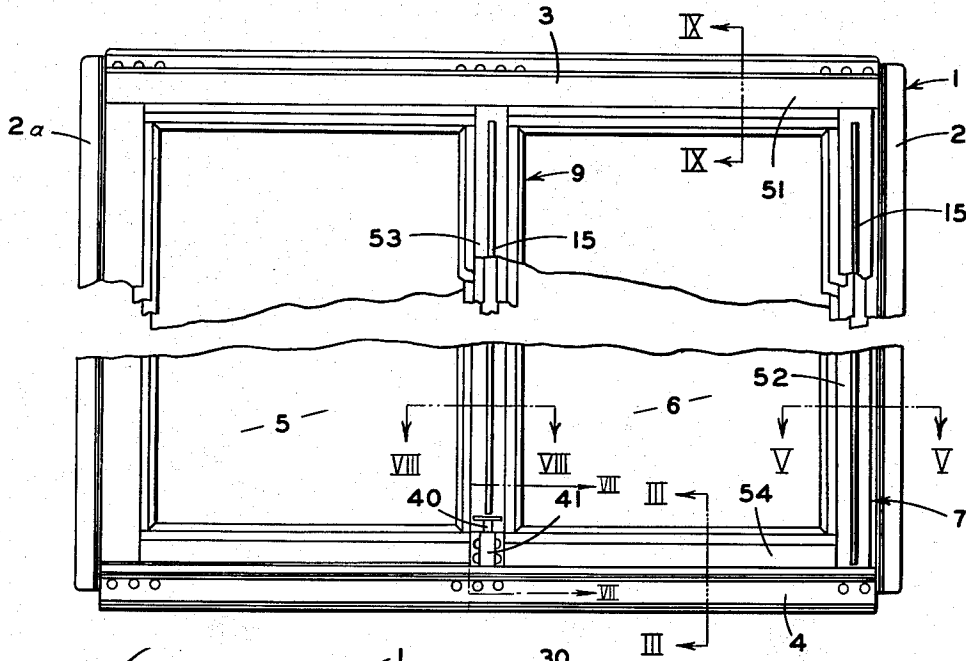


fig. 1

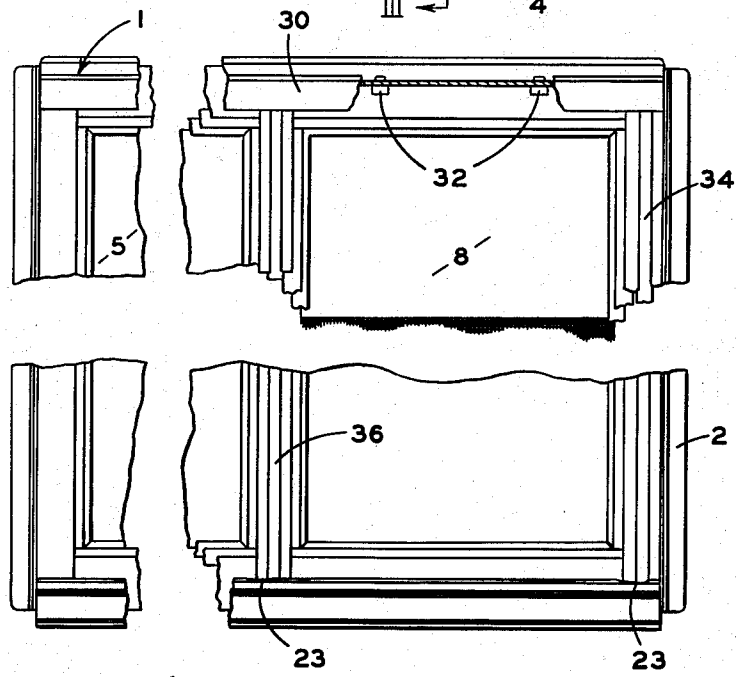


fig. 2

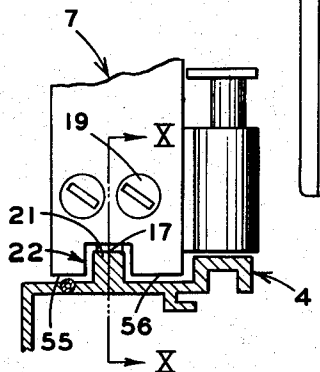


fig. 7

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2 Sheets-Sheet 2

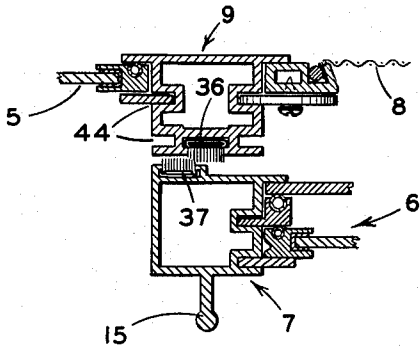


FIG. 8

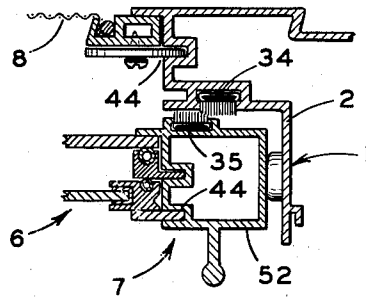


FIG. 5

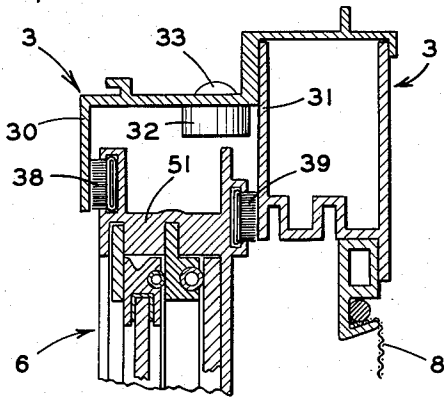


FIG. 9

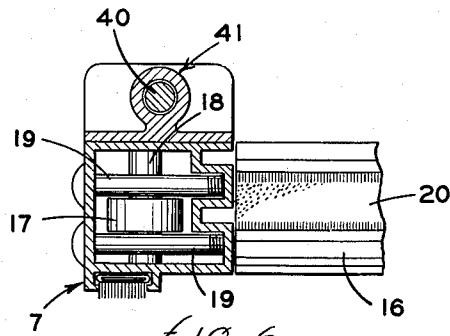


FIG. 6

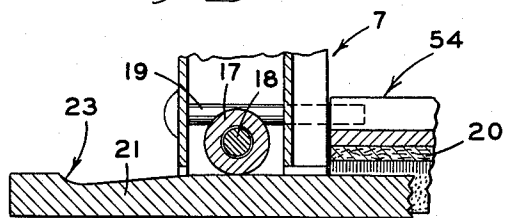


FIG. 10

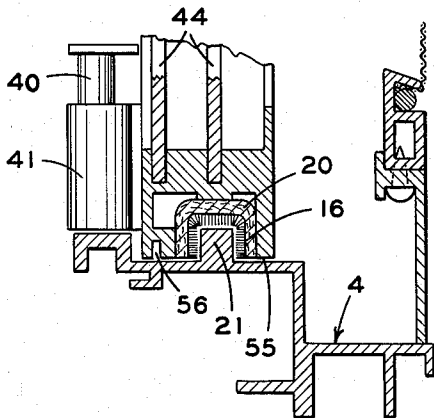


FIG. 3

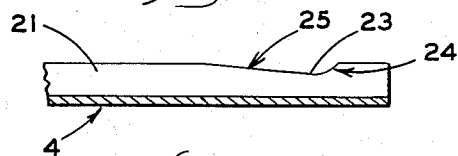


FIG. 4

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2,747,240

## WINDOW CONSTRUCTION

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Application February 18, 1953, Serial No. 337,492

2 Claims. (Cl. 20—52)

This invention relates to windows and more particularly to an improvement in the means for effecting a seal at the bottom of a horizontally slidable sash.

My invention is designed to be utilized in windows having a horizontally slidable sash wherein the sash rests upon and is guided by a ridge on the sill. Although this general type of structure has long been utilized in window construction, it has not been considered particularly desirable because of the difficulty of making the window both weathertight when closed and easily slidable when opened. In order to make such windows airtight at the joint between the sill and the sash, it is necessary to provide something other than a simple metal-to-metal contact. Conventional sealing materials such as rubber and felt have such a high co-efficient of friction that an attempt to slide two such surfaces, one of metal and the other of sealing material, while tightly engaged makes easy movement of the window substantially impossible.

It is a primary object of my invention to overcome this difficulty by providing a positive and simple means for substantially disengaging the weather stripping material from the sill while the sash is being opened or closed.

It is a further object of my invention to provide such means which will at the same time function to positively locate the sash in closed position.

It is a further object of my invention to provide such means which does not in any way detract from the ornamental appearance of either the window frame or the sash.

It is a still further object of my invention to provide such a means which is quick and economical to construct and will provide dependable, trouble-free service.

These and other objects and purposes of my invention will be immediately seen by those acquainted with the design and fabrication of fenestration units upon reading the following specification and the accompanying drawings.

In the drawings:

Figure 1 is a broken elevation view of the inside face of a two sash window frame incorporating my invention.

Figure 2 is a broken elevation view of the inside face of a window incorporating my invention with the right-hand sash removed and a portion of the header broken out.

Figure 3 is a sectional view taken along the plane III—III of Figure 1.

Figure 4 is a fragmentary enlarged view of one of the depressions in the track of the sill of my improved window.

Figure 5 is a sectional view taken along the plane V—V of Figure 1.

Figure 6 is a fragmentary bottom view of one corner of the movable sash for my improved window.

Figure 7 is a fragmentary sectional view taken along the plane VII—VII of Figure 1 and showing the lower end of the movable sash for my improved window.

Figure 8 is a sectional view taken along the plane VIII—VIII of Figure 1.

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Figure 9 is a sectional view taken along the plane IX—IX of Figure 1.

Figure 10 is a sectional view taken along the plane X—X of Figure 7.

In executing the objects and purposes of my invention, I have provided a window having a pair of openings each closed by separate sash. These sash are staggered in an inward and outward direction and overlap when the window is closed. The inner of the two sashes is slidably movable laterally of the window whereby in open position it is super-imposed in front of the outer sash. The movable sash is provided with a channel in its lower edge into which extends a ridge or track extending upwardly from the sill. Rollers are mounted in the movable sash and support the sash on the ridge. The channel in the sash is lined with felt to effect a seal when the sash is seated closely about the ridge.

The ridge has a pair of depressions which receive the rollers and permit the sash to move downwardly when the sash is in its fully closed position so that the lower sash rail touches the sill substantially simultaneously with the arrival of rollers at the points of maximum depth in said depressions. When the sash is out of its fully closed position, cooperation between the track and rollers causes the sash to rise sufficiently from the ridge that the felt in the channel at the bottom of the movable sash is substantially disengaged from the ridge and the lower sash rail moves away from the sill, thus permitting easy sliding movement of the sash.

### Detailed description

In the following description the terms "inwardly" and "outwardly" are frequently used and are to be taken to mean "inwardly" toward the inside of a building and "outwardly" away therefrom. The terms "upwardly" and "downwardly" are also used and are to be taken to mean "upwardly" and "downwardly" in the direction as the frame appears in Figure 1. Since many of the details of the specific embodiment utilized to illustrate the invention are fully set forth in my co-pending application Serial No. 4,794 which has become Patent No. 2,663,917 patented December 29, 1953, it will be necessary here only to set forth the general construction of said embodiment and reference is accordingly made to said application for the details thereof.

Referring now specifically to the drawings, the numeral 1 indicates a window frame for mounting within a window opening and having a pair of sides 2 and 2a, a header 3 and a sill 4. The window frame 1 defines a pair of frame openings which are separated by a vertical center bar 9. A glass panel 5, single or double, is fixed to said frame permanently closing one of said frame openings and another glass panel 6, also single or double, is mounted within a horizontally slidable sash 7 for selectively closing the other of said frame openings. A screen panel 8 may also be fixed to said frame for permanently closing said other frame opening.

The slidable sash 7 designed to be slidable laterally of the frame whereby it may be moved from its closed position where it is substantially side by side with the panel 5 to a position where it overlays the panel 5 to open nearly one half of the window opening. The sash 7 is designed with a rigid frame and provided with a vertically extending handle 15 at each end (Figures 1 and 8). The bottom rail 54 of the sash 7 is at its lower end provided with a U-shaped, downwardly facing opening 22 (Figure 7) extending the full width of the sash and a substantial portion of its thickness. Into this opening there is inserted a U-shaped, weather stripping channel 16 consisting of a metal backing member lined with a sealing material, as felt. The channel 16 extends less than the entire width of the sash.

Adjacent each end of the sash 7 and between the ends of the sash and the ends of the channel 16, there is provided a roller 17 mounted for free rotation on a shaft 18 (Figures 6 and 10). The thickness of the roller 17 is substantially less than that of the sash 7. Travel of the roller 17 axially of the shaft 18 is limited by the bolts 19. The bolts 19 serve the double purpose of limiting axial movement of the roller 17 and joining the vertical members of the sash frame to the bottom member of the sash frame. Each roller 17 is also so located (Figure 10) that it projects slightly below the web 20 (Figure 3) of the channel 16, the web 20 being the upper portion of the channel since the channel opens downwardly. The purpose of this relationship between the web 20 and the roller 17 will appear more fully under "Operation."

The sill 4 has an upwardly projecting track or ridge 21 of such size and shape that it is snugly received into the channel 20 (Figure 3). The track 21 serves not only as the cooperating male member of the weather seal by its engagement with the channel 20 but also as the guiding and supporting track for the sash 7. The sash is supported upon the track 21 by means of the rollers 17.

The track 21 has a pair of depressions 23 (Figures 2, 4 and 10) so located that they receive the rollers 17 when the sash 7 is in closed position. The depressions 23 are preferably so shaped that their ends adjacent the frame jamb 2 form an abrupt wall 24 while the wall 25, in the direction of movement of the sash 7 as it is opened, is a gradually sloping surface. As clearly appearing in the drawings, particularly Figures 4 and 10 thereof, the abrupt wall 24 of each of the depressions is preferably defined by a curved surface extending from the lowermost part of each of said depressions upwardly on a radius substantially equal to the radius of the rollers. The purpose of the depressions 23 will appear more fully under "Operation."

The upper rail of the inner or movable sash 7 is seated within a channel formed between the inner flange 30 (Figure 9) and the inner wall 31 of the header 3. This channel holds the upper end of the sash against inward and outward movement. In closed position, vertical upward movement of the inner sash 7 is limited by the two stops 32 secured by means of the screws 33 to the top web of the header 3 (Figure 2). The stops 32 are of such thickness that they do not contact the sash 7 when it is in motion, making contact with the sash 7 only when raised slightly from the track 21. No such stops are provided in the upper channel in the area of the glass panel 6. This permits the movable sash 7 to be raised until it clears the track 21 and it is then readily removed from the frame 1.

The jamb 2 of the frame 1 is provided with an inwardly extending weatherseal strip 34, here of felt (Figures 2 and 5). The stile 52 of the movable sash 7 is provided with a cooperating weather strip 35 also here of felt, which, when the sash is in closed position, engages the weather strip 34. The center bar 9 is on its inward face provided with an inwardly projecting weather strip 36 (Figures 2 and 8) which, when the movable sash 7 is in closed position, engages the outwardly projecting weather strip 37 on the movable sash 7. Along its upper edge the movable sash 7 is provided with an inner weather strip 38 to engage the flange 30 and an outer weather strip 39 to engage the wall unit 31 of the frame 1 (Figure 9). The movable sash 7 is locked in closed position by means of the plunger 40 guided by the fitting 41 secured to the lower end of the sash 7 near the center of the window. To lock the window, the plunger 40 is pressed downwardly until it passes through a suitable opening in the sill 4.

The sash 7 is suitably glazed, preferably by means of double panes, each anchored in one of the grooves 44 provided for that purpose in the sash frames. The glass panel 6, with or without supporting sash structure, may be similarly mounted onto said frame structure 1. The various components making up the frame 1 and the frame of the inner sash 7 are preferably made of aluminum be-

cause of its corrosion resistance, ease in machining and adaptability to complex extruded shapes. The weather stripping, while it is described as being felt, may be made from any suitable, resilient material which will serve the same purpose.

#### Operation

As the sash 7 is moved toward its closed position, it runs easily along the track 21 since its only contact with this ridge is by means of the rollers 17 and some engagement between a portion of the lower end of the sides of the felt of the channel 20 and the sides of the track 21. The rollers 17, in this position, hold the sash 7 sufficiently above the track 21 that there is no appreciable contact between the felt on the web 20 of the channel 16 and the top of the track 21. As the sash 7 approaches its closed position, the rollers 17 on each end of the sash enter the depressions 23 simultaneously. The gradual slope 25 on the approach side of the depressions 23 causes the window to drop smoothly, and without tilting as the rollers enter the depressions. The sash 7 is finally halted when the rollers 17 contact the abrupt wall 24 of each of the depressions. At this point the sash is lowered to a point where the felt of the web 20 of the channel 16 tightly engages the top of the track 21, and the lower edges 55 and 56 (Figures 3 and 7) of the lower rail 54 snugly engage the upper surfaces of the sill on either side of the track 21. Thus, a tight weather seal is formed in the bottom of the sash.

When the sash 7 is opened, the initial movement of the sash causes the rollers 17 to leave the depressions 23, raising the sash. This results in disengagement of the web 20 of the channel 16 from the ridge 21. Thus, during opening movement of the sash there is no appreciable resistance caused by tight contact between the ridge and the weather stripping.

When the sash is in fully closed position, the weather stripping felts 36 and 37 and the felts 34 and 35 are engaged, forming a seal along the sides of the window. The felts 38 and 39 engage along the top of the sash, forming a seal in this area.

The depression adjacent the center of the window may be made of such length that the roller at the leading edge of the sash 7 will seat in this depression when the window is fully opened. Should this be done, the abrupt wall may be eliminated from this depression and it will be provided with a gradual slope on both sides. An abrupt wall is only necessary in one of the depressions to provide a suitable stop where such stop cannot be otherwise readily provided.

Various minor modifications of my invention may be made each without departing from the principle thereof. Each of these modifications, however, is to be considered in the hereinafter appended claims unless these claims by their language expressly state otherwise.

I claim:

1. In a window frame having an opening therethrough, said frame having a sill and a pair of panels for closing said opening, said panels being arranged in a generally side-by-side relationship laterally of said window frame, at least one of said panels being held in a horizontally movable sash to overlay the other of said panels, the improvement therein comprising: an upstanding ridge extending longitudinally of said sill; a bottom rail on said sash having a resiliently lined, downwardly opening channel adapted to embrace said ridge; a pair of rollers on said movable sash, said rollers bearing on said ridge, said rollers being positioned respectively adjacent each end of the bottom of said movable sash; the top of said channel being vertically spaced above the bottom of said rollers, whereby said rollers are adapted to support said sash with said top surface of said channel out of engagement with said ridge when said sash is moved horizontally; a pair of depressions in said ridge spaced apart the same distance as said rollers and each adapted to receive one of said rollers when said movable sash is in closed position,

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the depth of said depressions being at least equal to the spacing of said rail from said sill when said rollers are out of said depressions, whereby said resilient lining in said channel engages said ridge when said movable sash is in closed position.

2. In a window frame having an opening therethrough, said frame having a sill and a pair of panels for closing said opening, said panels being arranged in generally side-by-side relationship laterally of said window frame, at least one of said panels being held in a horizontally movable sash to overlay the other of said panels, the combination comprising: an upstanding ridge extending longitudinally of said sill; said sash including a bottom rail, said rail having a downwardly opening channel adapted to surround said ridge, weather strip means mounted in said channel along the entire length thereof and adapted to engage said ridge in weather sealing relationship; said sash including a pair of stiles secured to the ends of said rail, a roller mounted for rotation in each of said stiles, said rollers bearing on said ridge, the portion of said rollers contacting said ridge being vertically spaced below the lower surface of said weather strip means whereby said rollers are adapted to support said sash with said weather strip means out of engagement with said ridge when said sash is moved horizontally; a pair of depressions in said ridge spaced apart the same distance as said rollers, each of said depressions being adapted to receive one of said rollers when said movable sash is in closed position, the depth of said depressions being at least equal to the spacing between the portion of said rollers contacting said ridge

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and the lower surface of said weather strip means whereby said weather strip means engages said ridge in weather sealing relationship when said movable sash is in closed position.

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