March 10, 1953 A. ZITOMER 2,630,891

WINDOW STRUCTURE

Filed Feb. 13, 1947 2 SHEETS—SHEET 1

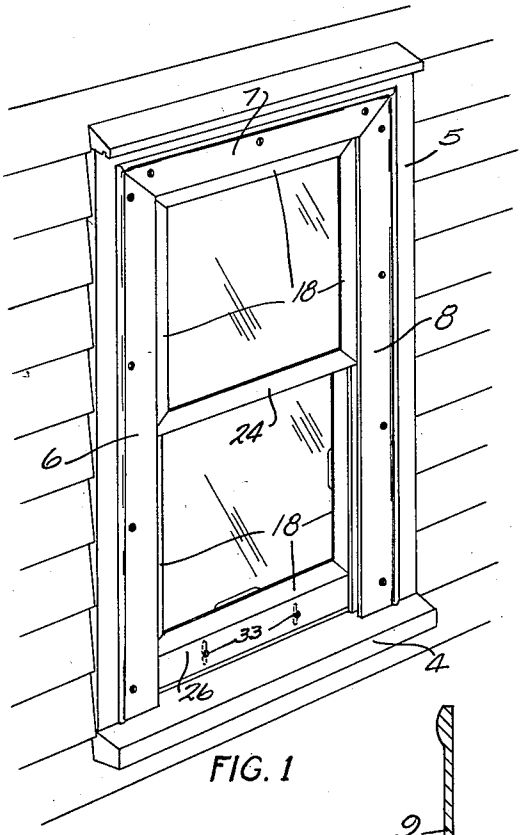


FIG. 1

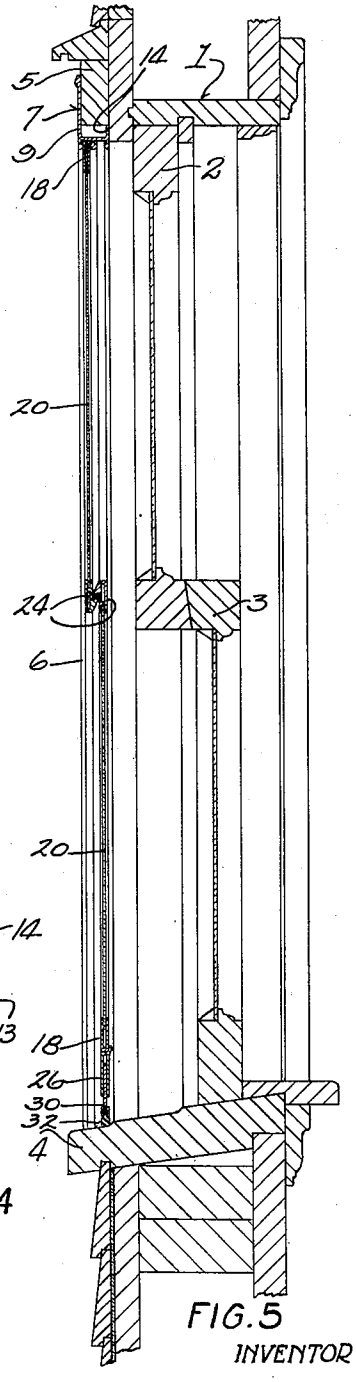


FIG. 5

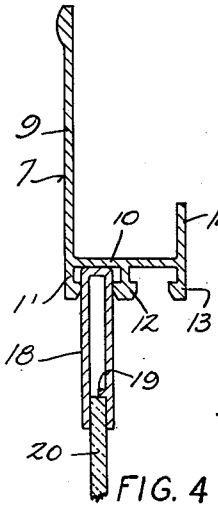


FIG. 4

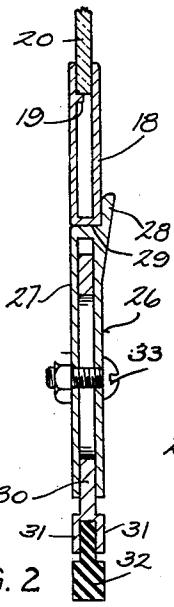


FIG. 2

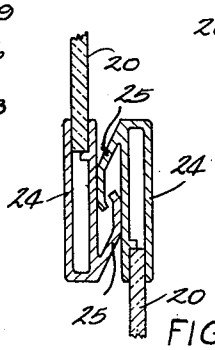


FIG. 3

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WINDOW STRUCTURE

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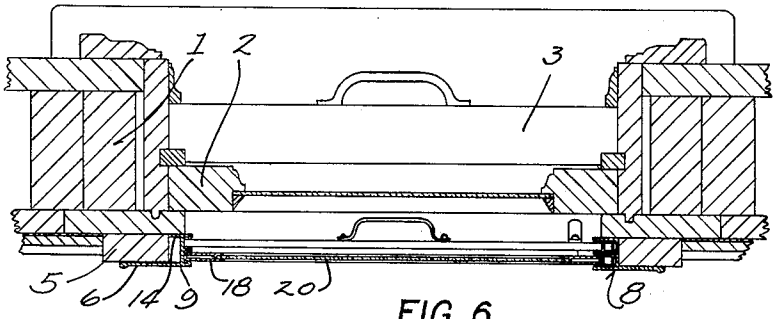


FIG. 6

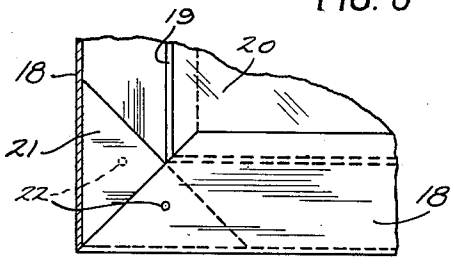


FIG. 7

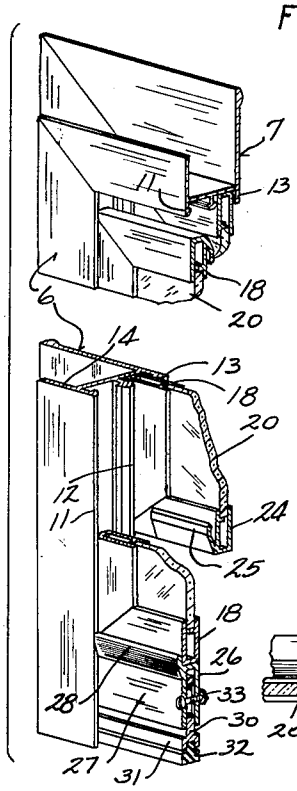


FIG. 8

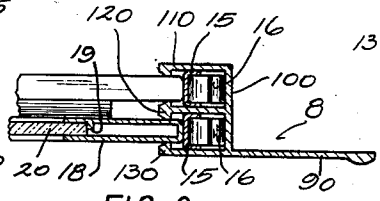


FIG. 9

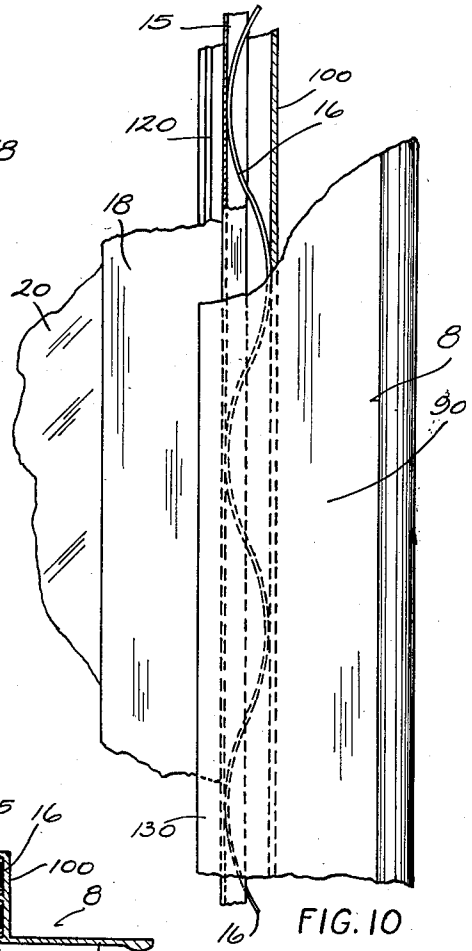


FIG. 10

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WINDOW STRUCTURE

Abe Zitomer, Milwaukee, Wis.

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13 Claims. (Cl. 189—72)

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This invention relates to improvements in window structures. It has particular reference to storm sash but the entire structure, or individual features thereof, may also be used interiorly of the window frame to provide the main sash.

It is the object of the invention to provide a window structure which will be so weathertight in use as to be practically hermetically sealed; which provides for sliding sash without requiring window weights or the like; from which the individual sash may be removed for washing or interchange with screen sash with the utmost ease; in which the sash guides have the appearance of a metallic frame but are in fact fabricated from extruded sections attached individually to a permanent wooden frame or the like; and to make the organization adaptable to any existing window frame structure.

Other objects of the invention can best be explained in connection with the following disclosure thereof.

In the drawings:

Fig. 1 is a view in perspective showing the exterior appearance of my improved window structure as applied to a building.

Fig. 2 is an enlarged detail view in transverse section through the bottom of the lower sash and through an adjustable sill provided as a part of the invention.

Fig. 3 is a detail view in transverse section through the lower rail of the upper sash and the upper rail of the lower sash.

Fig. 4 is a detail view in transverse section through one of the sash guides and the top of one of the sash.

Fig. 5 is an assembly view in longitudinal section through the window shown in Fig. 1 on a larger scale than that of Fig. 1 but a smaller scale than that used in Figs. 2 to 4.

Fig. 6 is an assembly view in transverse section through the window structure of Fig. 1.

Fig. 7 is a fragmentary detail view on an enlarged scale through the corner of one of the sash, with one of the side rails broken away to show the interior.

Fig. 8 is a fragmentary detail view in perspective showing sections of the sash and one of the sash guides.

Fig. 9 is a fragmentary detail view in section through the sash and the other sash guides.

Fig. 10 is an enlarged fragmentary detail view partially in elevation and partially in section showing a sash guide illustrated in Fig. 9 and its relation to the sash.

In the embodiment in which the invention is illustrated, it is particularly designed for application to existing window frames. The generally conventional frame shown at 1 in Figs. 1, 5 and 6 provides channels or ways for the conventional double-hung sash which includes upper sash 2 and lower sash 3. The frame comprises a sill at 4 and external facing trim 5.

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To such a frame I have applied a set of sash guides 6, 7 and 8 which, assembled as illustrated in Fig. 1, have the appearance of constituting a frame but are, in fact, separate pieces, having no connection except such as is derived from their individual mounting on the external finish 5 of the wooden frame shown.

The sash guide members 6, 7 and 8 are preferably all made of extruded sections. Members 6 and 7 may be identical in cross section as shown in Figs. 4 and 8. Each includes a flange 9 of substantial width which overlies the face of the frame trim member 5 and is individually screwed thereto. To the flange 9 is integrally connected the base web 10 from which projects the flanges 11, 12, 13 in which the sash move. From the inner edge of the base web 10 extends a short flange 14 preferably parallel to flange 9, the end of which abuts the bottom or inner edge of the trim member 5, as shown in Fig. 5 and Fig. 6.

The guide member 8, at the opposite side of the window opening, is of modified construction. It has at 90 a flange substantially identical in width and form to the flange 9. Like flange 9 it is screwed at intervals to the window trim or facing 5. Its base web 109 corresponds in function to the base web 10 but is set back to dispense completely with the short flange 14. The flanges 110, 120 and 130 are correspondingly elongated to provide deeper ways than those shown in Fig. 4. In each such way is placed a channel-shaped slide 15 which extends the full height of the window and is biased laterally by a convoluted spring 16 which likewise extends the full height of the window, this arrangement being best shown in Figs. 9 and 10.

The sash are preferably also made of extruded metal sections. These sections may be uniform around three sides of each sash, using the construction shown at 18 in Figs. 2, 4, 8 and 9. Each of the sash rails thus formed is channel-shaped in cross section and provided interiorly with an integral rib 19 against which the glass 20 seats, as also shown in Fig. 7. The extruded rails are mitered together at their corners and the corner is spanned by a gusset 21 engaged from both sides by a boss 22 produced by punching inwardly on the metal walls of the hollow rails 18. This holds the rails tightly together at the corner and they may also be soldered or brazed if desired.

The top rail 24 of the lower sash and the bottom rail 24 of the upper sash (Fig. 3) are identical with each other but different from the rails 18 already described. Each is extruded to provide integrally a weatherstripping flange 25, the respective flanges passing each other in the closed position of the sash and each having face bearing contact with the inner surface of the rail of the opposite sash as shown in Fig. 3.

In order to facilitate fitting the sash to any conventional window opening, while allowing for inevitable differences in dimension, I provide a special adjustable sill or seat best shown in Figs. 2 and 8 and designated generically by reference character 26. This also is made of extruded sections. The generally T-shaped section 27 has an angularly divergent flange 28 providing a straight sided shoulder at 29 upon which the lower window sash seats, when closed. Within the channel 27 is the slotted plate member 30 of the other extruded section, such plate being bifurcated at 31 to receive elastic weatherstripping 32. Clamping bolts 33, extending through the opposing sides of the channel-shaped outer member 27, hold such sides in clamping adjustment upon the inner slotted plate 30. The slots accommodate a considerable range of adjustment between the plate 30 and the channel 27 so that the composite sill 26 may be so fixed as to height that the seat 29 will, in each installation, receive the lower sash when the weatherstripping flanges 25 are engaged substantially as shown in Fig. 3.

The thickness of the supplemental sill member 26, and its width, are substantially the thickness and width of the sash. Consequently, the ends of the sill 26 are received into the ways of the sash guides 6 and 8 and are detachable therefrom in the same manner as the sash, as will presently be described. The flange 28 must necessarily be cut off to permit the ends of the sill 26 to be received into such ways.

Whether the sash as herein described are glazed or fitted with screen cloth, their weight is extremely slight as compared with conventional window structures. The extruded metal is preferably aluminum or magnesium alloys and its mass is small. Consequently no sash balances of any kind are required. The sash moves freely up and down in the ways provided by the sash guides 6 and 8 and are held by the bias of their respective springs 16 in any position of adjustment.

The beaded edges of the flanges 11, 12, 13 and 110, 120, 130 fit very closely to the rails of the sash and the channels 15 which bear against the sides of the sash under the thrust of springs 16 hold the sash tightly engaged at their edges to provide substantially hermetic sealing.

Yet the sash may be removed almost instantly by pressing it to the right to displace its associated thrust channel 15 by compressing the convoluted spring 16 until the left hand side of the sash clears the way in which it slides in the guide member 6. Thereupon the sash may be lifted bodily from its guides, the bead of flanges 110, 120, 130 restraining the channels 15 from escaping from the righthand ways in guide member 8 when the sash is removed. As the sash are normally positioned for sliding movement in their respective ways, they are centered in the window opening, there being approximately the same portion of the sash concealed behind the flange 11 of guide member 6 as is concealed behind the flange 130 of guide member 8. The ability of the spring biased channel 15 to yield when the sash is thrust to the right must be such that the lefthand margin of the sash will completely clear flange 11.

Upon withdrawal of the sash, the channel 15 moves out under thrust of spring 16 to the full limit permitted by the marginal beads. It will be noted from Fig. 9 that the beads are tapered to guide the sash as it is being reintroduced into the way in which it slides.

If the main window sash 2 and 3 meet at a point such as to preclude manipulation of the lower sash in the manner above described, it is only necessary to raise the lower sash slightly and then remove the sill unit 26 by impressing it to the right and withdrawing its lefthand end. The lower storm sash may then be lowered to clair the main window sash 2 completely and may readily be withdrawn through the opening provided by raising the main lower sash 3. The upper storm sash may then be lowered to the same level and removed through the same opening. This makes it possible to wash the glazed sash at the kitchen sink, if desired, or to replace them with screen sash with equal facility. Yet the assembled window structure is more weathertight than the average storm sash equipped with weatherstripping.

Due to the use of standardized extruded sections, my improved window may be applied to practically any conventional window regardless of its size. The members 6, 7 and 8 may be cut and mitered on the job and simply screwed in place, giving the appearance, however, when assembled, of a complete metal frame.

The slidable sash used in the guides may likewise be assembled on the job if so required to fit an odd shaped window, although it is normally intended that these be manufactured in stated sizes.

Not only does the adjustable sill make possible the application of my improved window structure in windows having minor variations in dimensions, but it will also be noted that the screwing of the guide members 6, 7, 8 to the window frame trim permits my guide members to be mounted in accurate relationship to each other, regardless of inaccuracies in the spacing, or lack of parallel of the sides of the wooden frame.

I claim:

1. In a window structure, a pair of spaced window sash guides each comprising mounting means in combination with a pair of spaced flanges, and a sash wider than the spacing between said guides whereby to be mounted within said flanges for lateral confinement thereby, the flanges of one of said guides being provided with marginal beads defining the channel width, a pressure plate confined between the flanges and wholly within the beads, and a spring between the mounting means and the pressure plate and acting upon the pressure plate in a direction to urge it toward the beads but yieldable under pressure of said sash on movement of the sash toward the spring and as guided by said flanges.

2. The combination set forth in claim 1 in which said spring comprises a convoluted spring strip extending substantially the length of the space between the flanges.

3. The combination with opposed sash guide members each provided with inturned flanges with beaded extremities providing ways in which the sash is slidable, of a bearing plate in one of said ways and a spring confined in the way last mentioned behind said bearing plate and providing thrust in a direction to engage a sash in

said way, together with a sill member spanning the space between said sash guide members, said sill member being slidably engaged at its ends within the respective ways under the thrust of said spring.

4. The device of claim 3 in which said sill member comprises vertically slidable parts and screw clamps for holding said parts in relative adjustment.

5. The device of claim 3 in which said sill member is provided with a sash receiving shoulder along its upper margin and with weather stripping along its lower margin.

6. In a window structure, the combination with separately fabricated opposing sash guide members independently applicable to existing window frame structures whereby said members are independently supported in natural alignment by said window frame, said sash guide members being each provided with a plurality of mutually spaced flanges affording a pair of opposed sash guide ways, of separate sash reciprocable in the respective ways and provided with weatherstripping flanges normally interlocked in the closed position of the sash, means for adjustably predetermining said closed position, said means comprising a detachable sill slidably engaged at its ends in the opposed ways of the respective sash guide members and having one part with a sash receiving upper margin and another part slidable respecting the first part and adapted to engage the permanent sill of the window frame, together with a clamp adjustably connecting said parts, and lateral thrust means biased against said sash and against said sill whereby said sash and sill are held snug in said ways regardless of their position.

7. The device of claim 6 in which one of the parts comprises a downwardly opening channel and the other comprises a slotted plate telescopically slidable within the channel, said clamp comprising a bolt extending across the channel and through the slot.

8. A metal window structure comprising in combination first and second laterally spaced guide members each provided with a mounting and face flange, a base element and guide flanges projecting toward each other and providing ways, a sash wider than the spacing between said guide members and slidable in said ways between said flanges whereby to be firmly laterally supported by said flanges in all positions of the sash, a third guide member spanning the space between the first and second guide members at the top of the window, the several guide members having mitered corners and the third guide member having flanges corresponding in position to the flanges of the first and second guide members to continue the ways across the window, the guide flanges of one of the guide members first mentioned being provided with beads to define channel width between flanges and against which the sash laterally bears, flat surfaced thrust elements wholly within and slidable in the ways between the flanges last mentioned to and from said beads, and a convoluted strip spring confined behind said elements throughout the length of the guide member last mentioned and biasing said elements toward said beads whereby movement of the sash within said bead channel against the bias of the strip spring will compress the spring as the sash is firmly guided in the bead channel.

9. The device set forth in claim 8 in which the respective guide members comprise integral extruded sections and are provided with individual mountings.

10. The combination set forth in claim 8 in further combination with a detachable auxiliary sill having its ends slidably engaged in the ways of opposite guide members first mentioned.

11. The combination set forth in claim 8 in further combination with a detachable auxiliary sill having its ends slidably engaged in the ways of opposite guide members first mentioned, together with upper and lower sash slidable in the ways of the respective first and second guide members and together fitting the space between the third guide member and said auxiliary sill, said first and second sash having weatherstrip flanges interlocking centrally of the window in the closed position of said sash.

12. The combination set forth in claim 8 in further combination with a detachable auxiliary sill having its ends slidably engaged in the ways of opposite guide members first mentioned, together with upper and lower sash slidable in the ways of the respective first and second guide members and together fitting the space between the third guide member and said auxiliary sill, said first and second sash having weatherstrip flanges interlocking centrally of the window in the closed position of said sash, said auxiliary sill comprising relatively slidable parts, and a clamp connecting such parts in adjusted relation to engage the lower sash when the weatherstripping flanges of the sash are interlocked as aforesaid.

13. A window structure providing ways for sliding sash, said structure comprising separately fabricated and independently mountable top and side members each of which is channeled to provide a way and each of which comprises a face flange independently applicable to a window frame whereby each of said members is independently supported by the frame and is held by the frame in alignment with the other said member, the respective side members having flanges offset within the facing and providing said sash channels, the flanges of one of said side members having marginal beads to define channel width, together with a flat thrust strip confined between said flanges and within said beads, and resilient means biasing said strip outwardly toward said beads.

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