Aug. 11, 1959 R. A. GILLESPIE 2,898,646

METAL WINDOW

Original Filed July 15, 1954 2 Sheets-Sheet 1

Fig. 1.

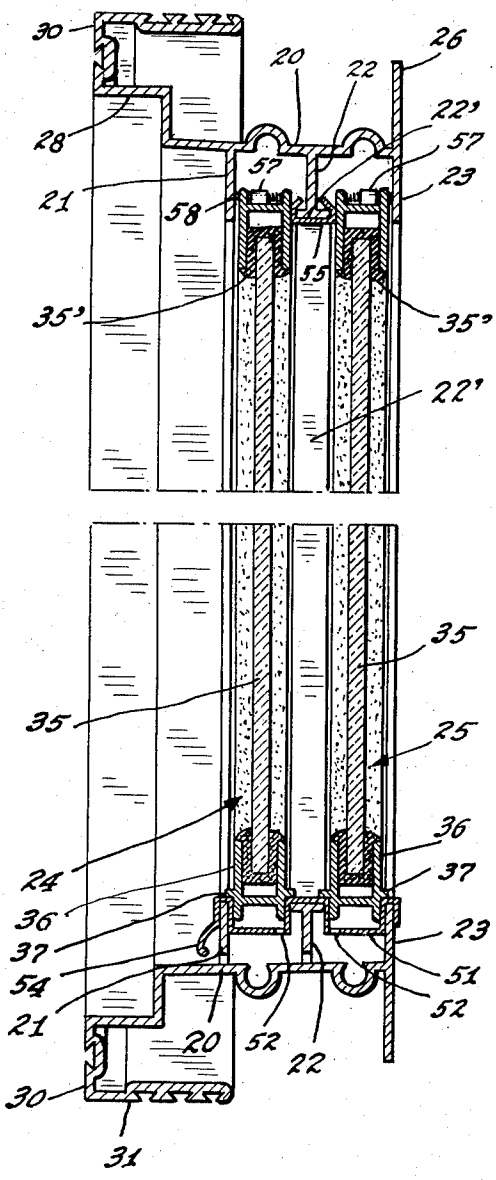
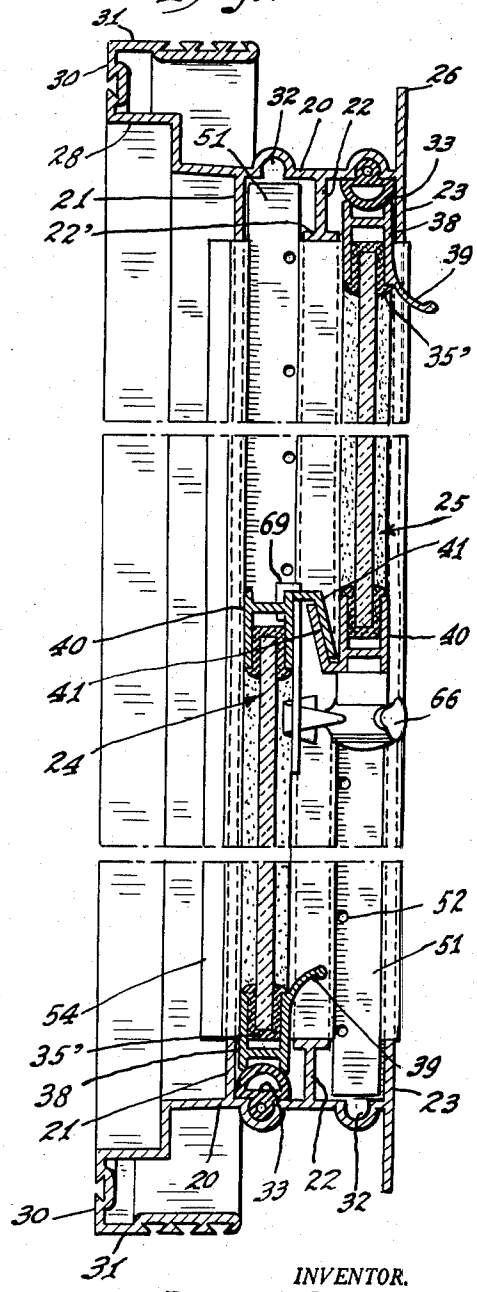


Fig. 2.



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Fig. 3.

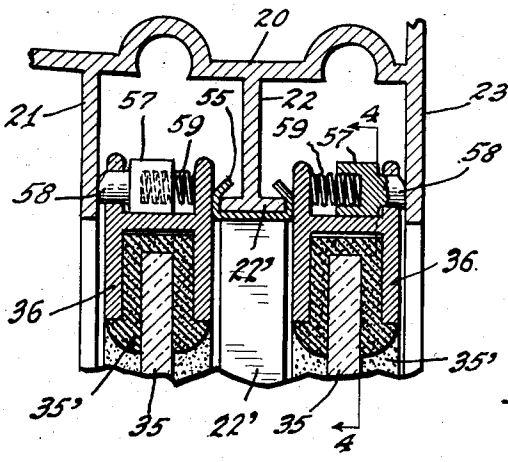


Fig. 4.

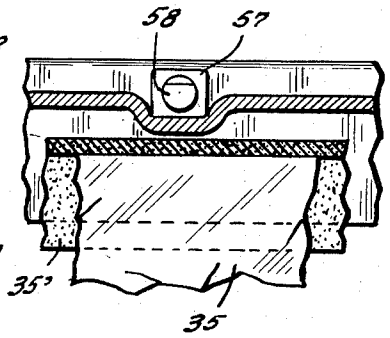


Fig. 6.

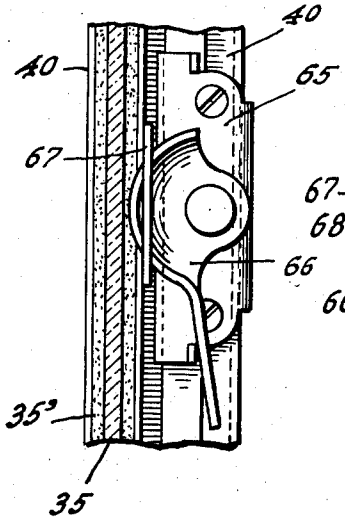


Fig. 7.

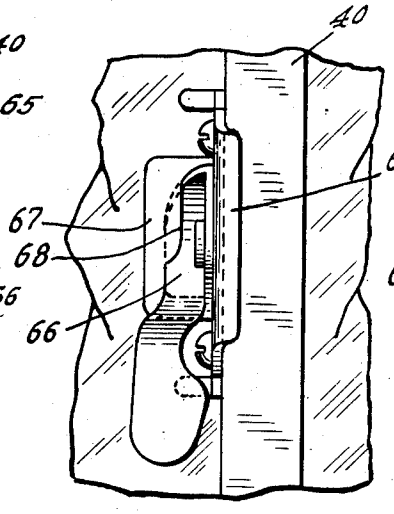


Fig. 8.

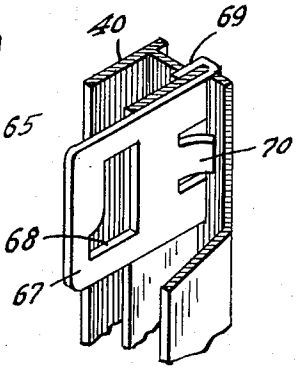
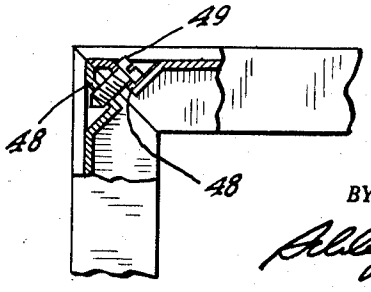


Fig. 5.



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METAL WINDOW

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Original application July 15, 1954, Serial No. 443,675, now Patent No. 2,804,954, dated September 3, 1957. Divided and this application July 25, 1955, Serial No. 523,955

4 Claims. (Cl. 20—52.2)

This invention relates to windows, particularly metal-frame windows. Some features of the invention are particularly applicable to windows in which the sash slide horizontally, while other features are as readily usable with windows of other types.

The general object of the invention is to improve and simplify the construction and mounting of the sash in metal-framed windows thereby reducing cost of manufacture, promoting free sliding of the sash, and improving the weather seal.

In carrying out my invention, I employ a metal window frame, having spaced, peripherally extending flanges projecting into the window opening to provide channels or grooves in which the sash are slidable. In the case of a window having horizontally slidable sash, the sill of the window carries a friction-reducing metal strip which is grooved for sliding reception of the sash and which can be readily removed from the frame for purposes of cleaning when the sash are removed. To permit removal of a sash, the head of the window frame is arranged to permit upward movement of the sash to the extent necessary to allow the lower edge of the sash to clear the groove in such strip, thus permitting the sash thereafter to be lowered out of association with the frame-head. To take up clearances necessary for such operation and provide a weather seal, the upper rail of each sash is equipped with buttons of antifriction material which are spring-pressed against one wall of the sash-receiving groove to force the rail into sealing engagement with the opposite groove-wall. Desirably the latter groove-wall is the intermediate one of the three flanges defining the two sash-receiving channels and is embraced by a friction-reducing metal strip.

Like the window frame, the sash rails are metal, are mitered at the corners of the sash, and at each corner the stock of meeting rails is formed, as by a stamping operation, to provide walls parallel to the miter joint, and screws extend through such walls to hold the meeting rails together. The meeting rails of the two sash are provided with interengaging flanges and with a locking device for locking the sash in closed position.

Other objects and features of the invention will become apparent as the detailed description of a preferred embodiment thereof proceeds.

The accompanying drawings illustrate the invention:

Fig. 1 is a vertical section through a window in a plane perpendicular to the wall in which the window is located;

Fig. 2 is a horizontal section through the window of Fig. 1;

Fig. 3 is a fragmental vertical section through the head of the window frame;

Fig. 4 is a vertical section on the line 4—4 of Fig. 3;

Fig. 5 is a fragmental elevation of one corner of a sash with portions of the joined rails broken away;

Fig. 6 is a fragmental vertical section illustrating details of a preferred form of window lock;

Fig. 7 is a fragmental elevation corresponding to Fig. 6; and

Fig. 8 is a fragmental isometric view illustrating the mounting of the keeper of the window lock.

The window illustrated in the drawing is of a type embodying horizontal slidable inner and outer sash. Conveniently, the head, side jambs, and sill of the window frame are all made of extruded metal stock having the same cross-section. Such section embodies a web **20** adapted to extend generally in a plane perpendicular to the plane of the window opening. Projecting into the window opening from such web are three spaced flanges **21**, **22**, and **23** defining two channels in which outer and inner sash, designated in their entirety by the reference numerals **24** and **25**, are slidable. The middle flange **22** is preferably provided along its edge with a head **22'** which increases the space between the sash **24**, **25**. The interior flange **23** is desirably located at the interior edge of the web **20** and is coplanar with a flange **26** which projects outwardly. The web **20** continues exteriorly of the window beyond the outer flange **21** for a distance and there is provided with an offset portion **28** which, in the assembled frame, provides a rabbet groove for reception of storm sash. Outwardly beyond the offset portion **28**, the stock has a flange **30** extending in a plane parallel to that of the window opening, and from the outer edge of such flange there extends interiorly of the opening a flange **31**. In the bases of the channels defined by the flanges **21**, **22**, and **23**, the web is formed with inwardly opening longitudinal grooves **32** which (Fig. 2) are adapted to receive resilient sealing strips **33** co-operating with the adjacent ends of the sash. Such sealing strips will ordinarily be provided only in the side jambs, as other means are employed for providing a weather seal along the other edges of the sash.

Each sash of the window comprises a pane of glass **35** bordered by top, bottom, and side rails all formed with inwardly opening channels to receive the edge of the pane and a sealing strip **35'** which embraces the pane-edge. The lower rail **36** of each sash is provided exteriorly with longitudinal flanges **37** through which the weight of the sash is supported from the sill of the window frame. The vertical sash rail **38** at the jamb end of the sash is conveniently provided with a longitudinal flange-extension **39** serving as a finger piece for use in sliding the sash within the window frame. The vertical end rails **40** remote from the jamb-ends of the two sash are meeting rails and are provided with obliquely disposed flanges **41** which, in the closed position of the sash, engage each other to provide a weather seal. Like the side members of the window frame, the various sash rails are conveniently formed as aluminum or aluminum-alloy extrusions.

At the corners of each sash, the joining side rails are conveniently mitered and secured together in a manner illustrated in Fig. 5. As there shown, the web of the rail stock is deformed inwardly to provide parallel walls **48** perforated for the reception of a screw **49**. One of the holes provided for each screw is a clearance hole while the other is of smaller diameter, and the screw is preferably of the self-tapping variety.

To reduce friction and facilitate sliding movement of the sash, I preferably associate with the sill of the window frame a bearing strip **51** (Fig. 1) formed of a metal different from that of the lower sash-rails **36**. If such sash rails are formed of aluminum, the bearing strip is conveniently formed of zinc. In cross-section, the strip **51** is shaped to provide three downwardly opening grooves which respectively receive the three frame-flanges **21**, **22**, and **23** of the frame-sill and two upwardly opening grooves into which the lower sash-rails extend. The strip **51** lies loosely on the upper edges of the flanges **21**, **22**, and **23** so that it can readily be removed for cleaning

when the sash are removed in a manner to be described hereinafter. To provide for the escape of any moisture collecting in the sash-receiving grooves of the strip **51**, such grooves are provided in their bottoms with holes **52**, and the flanges **21** and **22** are provided adjacent the web **20** with openings through which any collected moisture can escape to the outside of the window frame. If desired, the exterior edge of the strip **51** may terminate in a flange **54** concealing the openings in the flange **21** but spaced upwardly slightly from the web **20** so as not to trap any moisture. The lower sash rails fit snugly within the grooves of the strip **51** to provide a weather seal.

To reduce sliding friction at the top of the sash, the head **22'** of the flange **22** on the top member of the window frame may be embraced by a bearing strip **55** (Fig. 3), the edges of which are bent around the head **22'** to hold the strip in place. To facilitate removal of the sash, the upper sash rails do not fit snugly between the bearing strip **55** and the flanges **21** and **23**. To provide a weather seal between the upper sash rails and the bearing strip **55**, I may use the arrangement illustrated in Figs. 3 and 4. As there shown, the web of each upper sash rail is off-set downwardly at intervals to provide recesses each receiving the head of a wear button **57** having a shank **58** projecting through an opening in that flange of the sash-rail which is remote from the frame-flange **22** for engagement with the other sash-guiding frame-flange **21** or **23**. The head of each button **57** is recessed for reception of a compression spring **59** which urges the button-shank **58** into engagement with such frame-flange **21** or **23** and, by reacting on the sash-rail, resiliently forces the latter into contact with the bearing strip **55**.

As will be clear from Figs. 1 and 3, there is a substantial gap between the upper sash rails and the bases of the channels in the frame-head which slidably receive them. The extent of this gap is such as to permit each sash to be raised until the lower sash rail clears the walls of its groove in the bearing strip **51**, whereupon the lower edge of the sash can be swung inwardly and the sash lowered to remove it from the window frame, as for purposes of washing. Conveniently, the heads of the buttons **57** are non-circular and engage the sash-rail to prevent rotation of each button about the axis of the shank **58**, and the upper edges of the button-shanks **58** are chamfered to facilitate re-insertion of the sash in the frame.

A preferred form of means for locking the sliding sash in closed position is illustrated in Figs. 6, 7, and 8. As there shown, the meeting rail **40** of the inner sash carries a lock-base **65** upon which is pivotally mounted a cam-like locking member **66** co-operating with a keeper **67** secured to the meeting rail **40** of the outer sash. The keeper **67** is conveniently formed of a rectangular plate of resilient metal, preferably stainless steel, and is provided at one end with an opening **68** for the reception of the cam of the locking member **66**. At its opposite end, the keeper **67** is bent back on itself, as indicated at **69** (Fig. 8) to embrace the edge of the intermediate flange on the meeting rail **40**, the web of the meeting rail being perforated adjacent such flange to receive both the body of the keeper and the in-bent portion **69**. At that end of the keeper remote from the opening **68** slots are provided defining a tongue **70** which is struck from the plane of the keeper, as shown in Fig. 8. The keeper is brought into association with the meeting rail **40** of the outer sash by passing it through the slots in the web of such rail. The slot which receives the body of the keeper has a width only slightly greater than the thickness of the material from which the keeper is formed so

that, as the keeper approaches its final position, the out-struck tongue **70** engages the side of such slot and is resiliently deflected into the plane of the keeper. When the keeper reaches its final position, the free end of the tongue **70** clears the side of the slot, and the tongue springs back to its original position to engage the web of the rail **40** at the side of the slot and prevent removal of the keeper from association with the rail.

In the window shown in the drawing and above described, both sash are slidable. However, many features of my invention are usable with equal advantage in a window having one sash slidable and the other fixed. One such latter arrangement is shown in my prior, co-pending application Serial No. 443,675, filed July 15, 1954, which became Patent No. 2,804,954 on September 3, 1957, of which this application is a division.

I claim as my invention:

1. A window structure, comprising a rectangular frame having sides surrounding a central opening and provided with three longitudinal flanges projecting into said opening in parallel spaced relation to define two sash-receiving grooves, the intermediate one of said flanges having a head extending along its free edge, a metal bearing strip embracing said head and having edge portions bent behind said head to hold it in place thereon, sash respectively slidable in said grooves, and yielding means carried by each of said sash for resiliently urging the sash into contact with said bearing strip.

2. A window structure comprising a rectangular frame having sides surrounding a central opening and provided with first and second longitudinal frame-flanges projecting into said opening in parallel spaced relation to define a sash-receiving groove, a sash slidable longitudinally of said frame and having a side rail slidably received in said groove, said side rail having first and second spaced flanges extending parallel to and respectively adjacent said first and second frame-flanges, said first rail-flange having an opening extending through it, a member slidably received in said opening and projecting therethrough for engagement with said first frame-flange, and yielding means acting between said member and said second rail-flange for urging said member against the first frame-flange and the sash rail into engagement with said second frame-flange.

3. A window structure as set forth in claim 2 with the addition that said member is provided between the sash rails with a recessed head, said yielding means being a helical compression spring received in the recess of said head.

4. A window structure as set forth in claim 2 with the addition that the opening in said first rail flange is circular, said member being provided between said rail flanges with a head having a flat side, said sash rail having a web interconnecting said rail flanges and engageable by the flat side of said head to prevent rotation of the member in said opening.

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