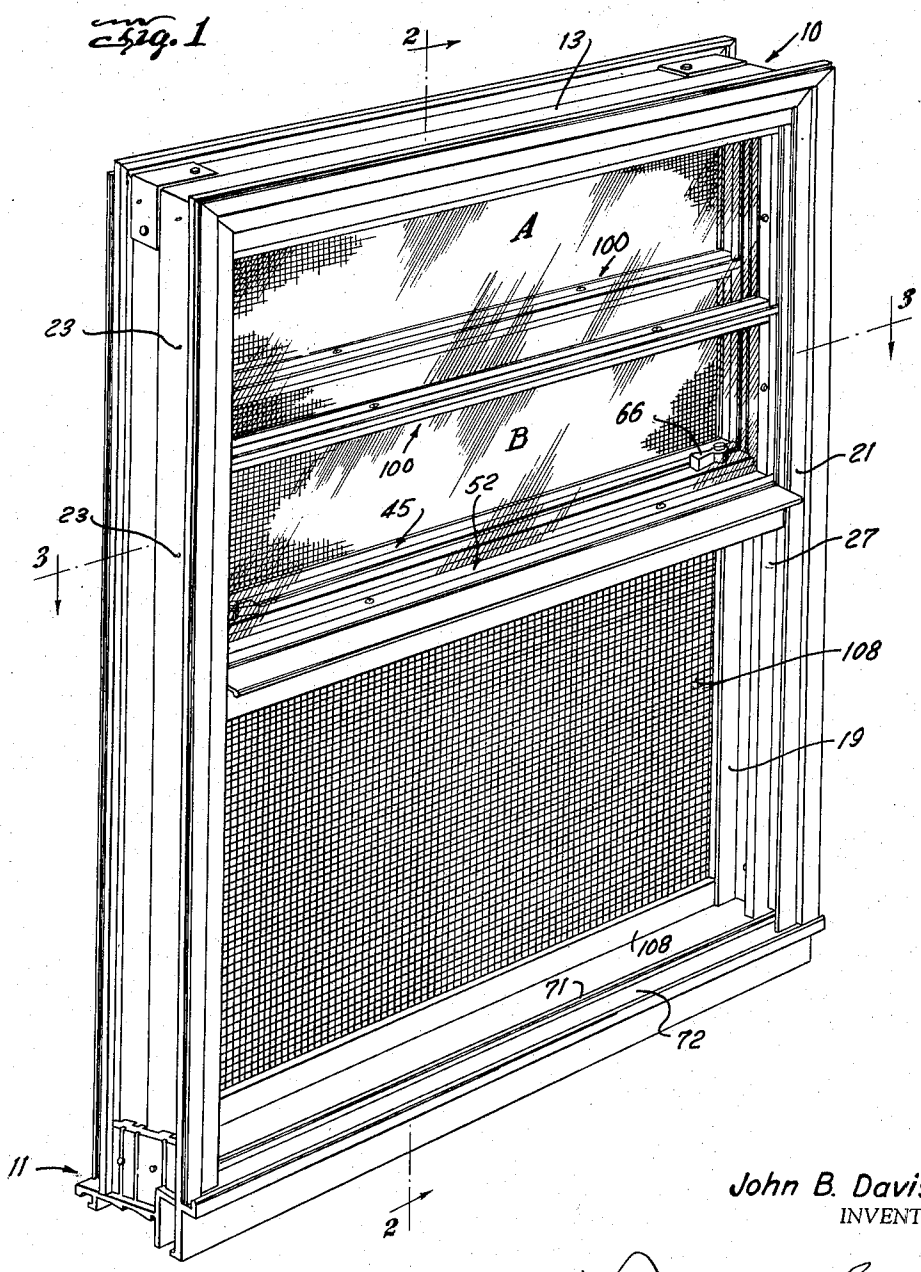
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DOUBLE HUNG WINDOW

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Fig. 1




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Fig. 2

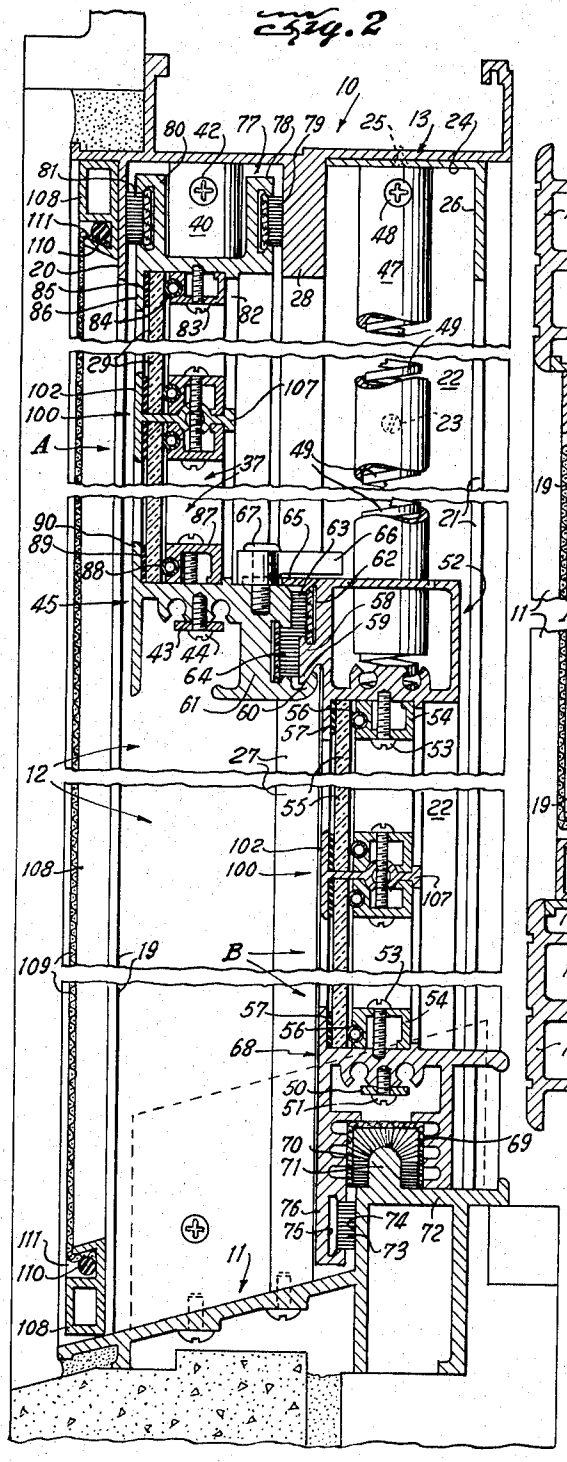


Fig. 3

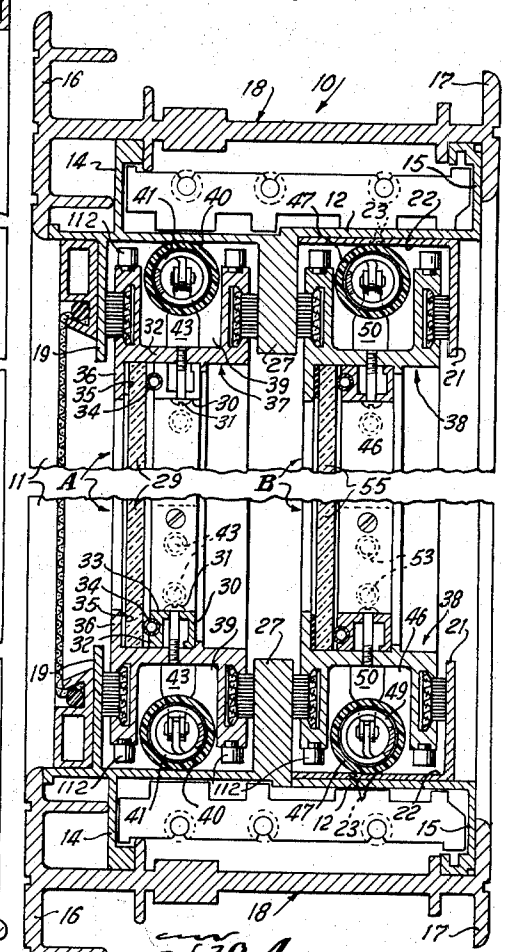
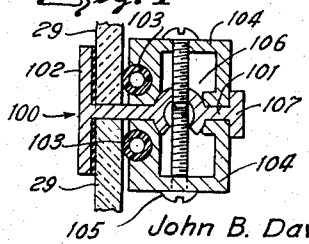


Fig. 4



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2,886,148

# DOUBLE HUNG WINDOW

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Application October 24, 1955, Serial No. 542,339

4 Claims. (Cl. 189—65)

This invention relates to metal window and sash frames and it has particular reference to improvements in double hung, vertically sliding sash windows.

The principal object of the invention is to provide a window in which the contour design of the extruded elements making up the window and sash frames is especially created to accommodate double and triple weather seals at vulnerable points, such as at the sill, meeting rail, muntins and header, thus to positively insure against infiltration of moisture and file dust particles. Also, the arrangement is such that the elements of the upper and lower sash frames are easily assembled and when assembled, the sash frames are as easily mounted in the window frame with all parts coordinating to provide a window adequately sealed against driving rain and blowing dust storms.

A particular object of the invention is to provide a lower sash rail incorporating a channel and a depending skirt or flange, both carrying pile weatherstripping, the weatherstripping in the channel being of substantially U-shape in transverse section and receiving a longitudinally coextensive rib formed on the stool while the weatherstripping of the depending flange engages the rear face of the stool in closed position of the lower sash, the arrangement providing triple sealing against water and dust which would otherwise enter below this sash.

Still another object of the invention is to improve the meeting rails of the sash frames through the provision of a horizontal upper flange integral with the meeting rail of the lower sash frame which overlies the confronting edge of the meeting rail of the upper sash frame in closed position of the sashes and a pair of horizontal interlocking lower flanges longitudinally coextensive with the lower edges of the meeting rails, there being provided between the upper horizontal flange and the lower interlocking flanges longitudinally parallel grooves, one in each meeting rail and vertically offset to provide double weathersealing between the meeting rails.

Other objects will appear as the description proceeds when considered with the annexed drawings, wherein:

Figure 1 is a perspective view of a window constructed according to the invention.

Figure 2 is a vertical sectional view taken in line 2—2 of Figure 1, with intermediate portions broken away for compactness.

Figure 3 is a view in transverse section taken on line 3—3 of Figure 1, with intermediate portions broken away in the manner of Figure 2, and

Figure 4 is a fragmentary view showing one of the muntins in transverse section.

Continuing with a more detailed description of the drawing, reference numeral **10** denotes generally the fully assembled window, composed of a sill **11**; parallel jambs **12** and a header **13**. The jambs **12** and header **13** are identical in transverse section, each being extruded. Each jamb **12** is formed with longitudinally parallel and spaced apart exterior flanges **14** and **15** which engage the stiles and trim (not shown) of a window opening, or in



the case of double or multiple windows, these flanges **14** and **15** interlock with inner and outer facings **16** and **17**, respectively, of a mullion **18**, as shown in Figure 3.

Each jamb **12** and **13** has a longitudinally coextensive and perpendicular interior flange **19**. These flanges **19** form continuations of a like flange **20** (Figure 1) formed on the header **13**, producing an outer stop for the upper sash frames, generally indicated by reference character A. Opposite end outer stop or flange **19** is an inner stop or flange **21** which is formed by one flange of an angle member **22**, secured to the jamb by vertically spaced screws **23**. These angle members **22** are identical to angle member **24** (Figure 2) secured to the lintel **13** by horizontally spaced screws **25**. The stop or flange **26** of the angle member **24** constitutes a continuation of the stops **21** of the jambs **12**.

Formed integrally on each jamb **12** midway between the outer stop **19** and inner stop **21** is a vertical parting strip **27**, separating the upper sash frame A from the lower sash frame, broadly designated by reference character B. In like manner, a horizontal parting strip **28** (Figure 2) is made integral with the lintel **13** and constitutes a continuation of the parting strips **27** of the jambs **12**.

A glass pane **29** for the upper sash frame A is held in place by a glazing strip **30**, secured to opposing faces of the jambs **12** by screws **31**. These glazing strips are identical and in each, the wall **32** thereof next adjacent the glass pane **29** is thicker than the companion wall to provide sufficient stock for a groove **33**, in which is pressed a plastic glazing tube **34**. A glazing strip **35** is interposed between the outer surface of the pane **29** and a glazing flange **36** formed on the stiles of the upper sash frame A and generally designated by reference numeral **37**. The stiles **37** of the upper sash frame A are identical to each other and to the stiles **38** of the lower sash frame B. Each stile is substantially U-shape in transverse section and each confronts a jamb **12**, thus provide a vertical chamber **39** in which is longitudinally disposed a flexible tubular housing **40** containing a spiral balance spring **41**. These spiral balances are of conventional manufacture. The upper end of the spiral balance spring **41** which balances the upper sash frame A is fastened in the tubular housing **40** and the latter is secured at its upper end to the top of a jamb **12** by a screw **42** (Figure 2). The lower end of the spiral tape **41** which extends out of the bottom of the tubular housing **40** is anchored to a bracket **43** (Figure 2), one of which is secured by screws **44** to the underside of the bottom rail **45** of the upper sash A adjacent each side thereof and which protrudes into the sash channel defined by the stops **19** and parting strip **27**.

The lower sash frame B is balanced in like manner. The stiles **38** of the sash frame B are also substantially U-shaped and each confronts a jamb **12** and are retained for sliding movement by the stop **21** and parting strip **27**. In the compartment **46** defined by the stiles **38** and jambs **12** is mounted a flexible plastic tube **47**, secured to a jamb **12** at its upper end by a screw **48** (Figure 2). A spiral balancing tape **49** is secured at its upper end in the housing **47** and extends from the lower end thereof where it is anchored to the bottom of the lower sash frame B by means of a bracket **50** (Figure 2), one of which is secured by screws **51** to the underside of the bottom rail of the lower sash frame B adjacent each side thereof. In this manner, the sash frames A and B are balanced for free sliding movement in their respective sash channels defined by the stops **19** and **20** on the outside; stops **21** and **26** on the inside and the parting strips **27** and **28** between.

The meeting rail **52** (Figure 2) of the lower sash frame is substantially square in transverse section and to

its underside is secured, by screws **53**, a glazing strip **54**. The wall adjacent the glass pane **55** is grooved in a manner identical to the glazing strips **30** on the jambs **12** and a plastic glazing tube **56** is pressed into the groove to engage the inner surface of the glass. This tube is a continuation of the glazing tube **33**, previously described. A flat glazing strip **57** opposes the glazing tube **56** on the outer surface of the glass **55** and is held in place by the depending glazing flange **58** integral with the meeting rail **52**.

The meeting rail **52** has a longitudinally coextensive rib **58** (Figure 2), provided with an undercut lip **59** which engages an upturned lip **60** formed on a horizontal depending leg **61** of the meeting rail **45** of the upper sash frame A. Formed in the side of the meeting rail **52** which confronts the meeting rail **45** is an elongate, horizontal groove **62** which contains the pile weatherstrip **63**, bearing against the inner face of the meeting rail **45** of the upper sash frame A in closed position of the two sashes. Immediately below the weatherstrip **63**, the meeting rail **45** is grooved longitudinally to receive pile weatherstrip **64**. These weatherstrips are brought into contiguity when the two sashes are closed so that moisture, in order to enter between the two sashes, would be required to travel a circuitous course. To further preclude any such likelihood, the meeting rail **52** is formed with a horizontal, outwardly projecting flange **65** whose outer edge overlies the space between the two meeting rails and rests on the inner edge of the meeting rail **45** in closed position of the sashes.

A locking lever **66** is pivotally mounted on the meeting rail **45** adjacent each end thereof by means of a stud **67** and is rotatable in a direction away from the jambs **12** to overlie the meeting rail **52** of the bottom sash B to secure the same against upward displacement.

The bottom rail **68** (Figure 2) of the lower sash frame B is triple sealed against moisture and dust infiltration. A horizontal channel **69** is formed in the underside of the rail **68** to accommodate a pile weatherstrip **70** which is of modified U-shape in transverse section. In lowered position of the sash B, the weatherstrip **70** receives a horizontal rib **71**, longitudinally coextensive with the stool **72**. Since the weatherstrip **70** snugly embraces both sides of the rib **71**, a double seal at this point obtains. A third seal is provided by virtue of the engagement of a pile weatherstrip **73** with the vertical outer surface **74** of the stool **72**; the weatherstrip **73** being retained in a groove **75** extending longitudinally in a horizontal flange **76** integral with and depending from the bottom rail **68** of the lower sash B.

Driving rain or blowing dust impinging the sill **11** are first resisted by the horizontal weatherstrip **73** but if any such moisture, dust or cold air should rise above the weatherstrip **73**, it would not be possible for them to penetrate beyond the double seat created between the weatherstrip **70** and the rib **71**.

The top rail **77** of the upper sash frame A (Figure 2) is identical in transverse section to the stiles **38** and **39** of both frames A and B. The inner side **78** of the top rail **77** is longitudinally grooved to receive the pile weatherstrip **79** which bears against the parting strip **26** on the lintel **13**. The opposing side **80** of the rail **77** is similarly grooved to receive the pile weatherstrip **81** which bears against the outer stop **20** of the upper sash frame. This identical sealing arrangement is continuous throughout the entire perimeter of both the upper and lower sashes, hence a double seal exists except at the point where the lower sash engages the sill **11** and at this point a triple seal is provided, as explained.

A glazing strip **82** is secured by screws **83** (Figure 2) to the top rail **78** and is grooved to receive the glazing tube **84** which bears against the inner surface of the glass pane **29** of the upper sash frame A. A flat weatherstrip **85** is interposed between the outer surface of the pane **29** and a glazing flange **86** integral with and depending from the top sash rail **78**. An identical glazing strip **87** is affixed to the meeting rail **45** and is identical to the upper glazing strip **82**, the same having a glazing tube **88** bearing against the pane **29** while a flat glazing strip **89** is interposed between the outer surface of the glass **29** and a glazing flange **90**, formed on the outer edge of the meeting rail **45**.

Both sash frames A and B are shown as being provided with muntins, generally identified in both cases by reference numeral **100**. For the sake of clarity, reference numerals identifying parts of the muntins will be applied to the enlarged view in Figure 4.

The muntin **100** is comprised of a horizontal, substantially T-shaped rail **101** which lies between the upper and lower sections of the glass panes **29** and **55**. To illustrate the muntin in Figure 4, an enlarged view is taken of the muntin shown in the upper sash frame A in which the pane is indicated by reference numeral **29**. The same references will be used to identify like parts in the muntin of the lower sash frame B. The transverse flange **102** bears against the confronting edges of the sections of the glass pane **29** while glazing tubes **103**, embedded in grooves in glazing strips **104**, bear against the opposite sides of the glass sections. The glazing strips **104** are not unlike the glazing strips about the perimeter of the sashes but are held by screws **105** threaded into a longitudinally coextensive enlarged portion **106** extending between the flange **102** and a similar but narrower flange **107** on the edge of the rail **101** opposite the flange **102**.

In order to limit lateral displacement of the two sash frames A and B, the stiles of each frame are provided adjacent their upper and lower ends with recesses in which are mounted studs **112** of nylon. These studs are interposed between the sash frames and the sash channels and function as guides to insure positive rectilineal travel of the sash frames in their respective channels.

A screen frame **108** is adapted to be seated in a recess provided therefor between the sill **11**, jambs **12** and lintel **13**. The screen **109** is stretched in the frame by means of a rod **110** thrust into a perimetrical recess **111** formed in the extruded frame **108** and which bears against the edges of the screen lying in the recess **111**.

Manifestly, the construction as shown and described is capable of some modification and such modification as may be construed to fall within the scope and meaning of the appended claims is also considered to be within the spirit and intent of the invention.

What is claimed is:

1. In a window structure having a frame comprising a header, sill and jambs of extruded metal, the header and jambs being of identical profile in transverse section and each having longitudinally coextensive stops and a parting strip defining parallel sash channels, and upper and lower glazed sash frames each having a top rail and stiles of identical profile in transverse section, a meeting rail on the bottom of the upper sash frame having a longitudinally coextensive upturned lip on its lower edge, a longitudinally coextensive lip on the top rail of the lower sash frame, said top rail being a meeting rail, adapted to inter-engage the lip of the upper sash frame meeting rail in closed positions of the sash frames, weather strips retained in longitudinally coextensive grooves in each side of the top rail of the upper glazed sash and stiles of each of the sash frames in slidable engagement with the stops and parting rail, weather strips disposed in vertically offset, longitudinally coextensive grooves in the confronting faces of the meeting rails, a bottom rail on the lower sash frame having a longitudinally coextensive channel and a grooved, depending flange, a stool integral with the sill, a longitudinally coextensive rib on the stool adapted to be received in the channel, a weatherstrip in the channel of inverted U shape in transverse section adapted to embrace the rib, and a weather strip in the groove of the depending flange

adapted to engage a vertical portion of the stool below the plane of the rib.

2. In a window structure having a frame comprising a header, sill and jambs of extruded metal, the header and jambs each having longitudinally coextensive stops and a parting strip defining parallel sash channels, and upper and lower glazed sash frames each having a top rail and stiles, a meeting rail on the bottom of the upper sash frame having an upturned lip on its lower edge, a lip on the top rail of the lower sash frame, said top rail being a meeting rail, adapted to inter-engage the lip of the upper sash frame meeting rail in closed positions of the sash frames, weather strips retained in grooves in each side of the top rail of the upper glazed sash and stiles of each of the sash frames in slidable engagement with the stops and parting rail, weather strips disposed in grooves in the confronting faces of the meeting rails, a bottom rail on the lower sash frame having a channel and a grooved, depending flange, a stool integral with the sill, a rib on the stool adapted to be received in the channel, a weather strip in the channel adapted to embrace the rib, and a weather strip in the groove of the depending flange adapted to engage a vertical portion of the stool below the plane of the rib.

3. In a window structure having a frame comprising a header, jambs and a sill having a stool, and stops carried by the header and jambs, and having a parting strip intermediate the stops and defining therewith slide channels for an upper and a lower glazed sash frame, a weather stripping carried by each of the sash frames in frictional engagement with the stops and parting strips, a meeting rail on the upper sash frame, a meeting rail on the lower sash frame, the meeting rails having confronting slots, one above the other, a weather strip in each of the slots, one being in frictional engagement with the contronting face of each meeting rail in closed positions of the sash frames, a bottom rail on the lower sash frame having a longitudinal channel confronting the stool, a longitudinal depending flange on the bottom rail having a longitudinal groove, a longitudinal rib on a horizontal portion of the stool, a weather strip in the longitudinal channel engageable with the top and sides of the rib, and a weather strip in the groove of the flange frictionally engageable with a vertical portion of the stool in closed position of the lower sash frame.

4. The structure of claim 3 wherein the sash frames have stiles each apertured adjacent their upper and lower ends in the portions thereof confronting their respective channels, the apertures retaining self lubricating, replaceable studs adapted to insure rectilinear travel of the sash frames in their respective channels while at the same time permitting free movement of the sash frames relative to the channels, the arrangement being such that the weather strip in the longitudinal channel is positively aligned with the top and sides of the rib, in effective sealing engagement therewith, when the lower sash frame is in its closed position.

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