

May 8, 1945.

M. G. HODSON

2,375,553

WINDOW CONSTRUCTION

Filed Jan. 9, 1943

2 Sheets-Sheet 1

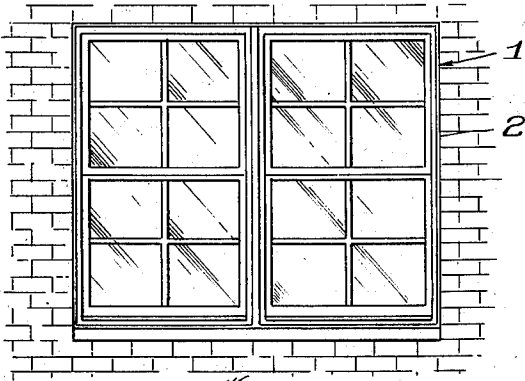


Fig. 1

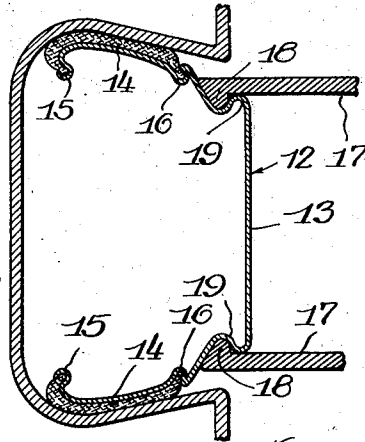


Fig. 4

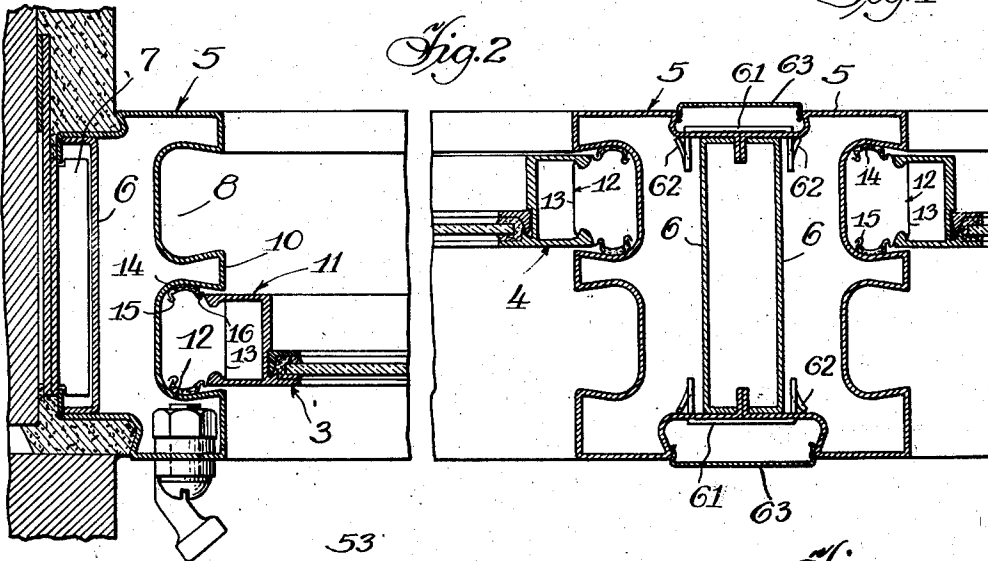


Fig. 2

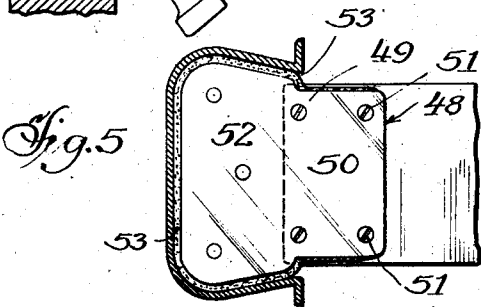


Fig. 5

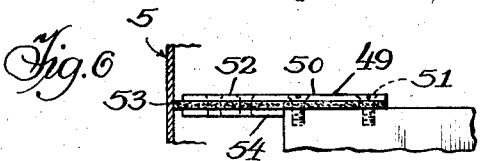


Fig. 6

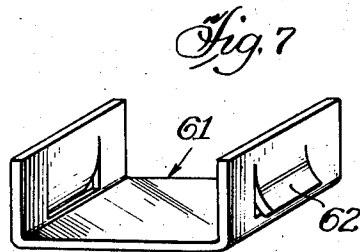


Fig. 7

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2 Sheets-Sheet 2

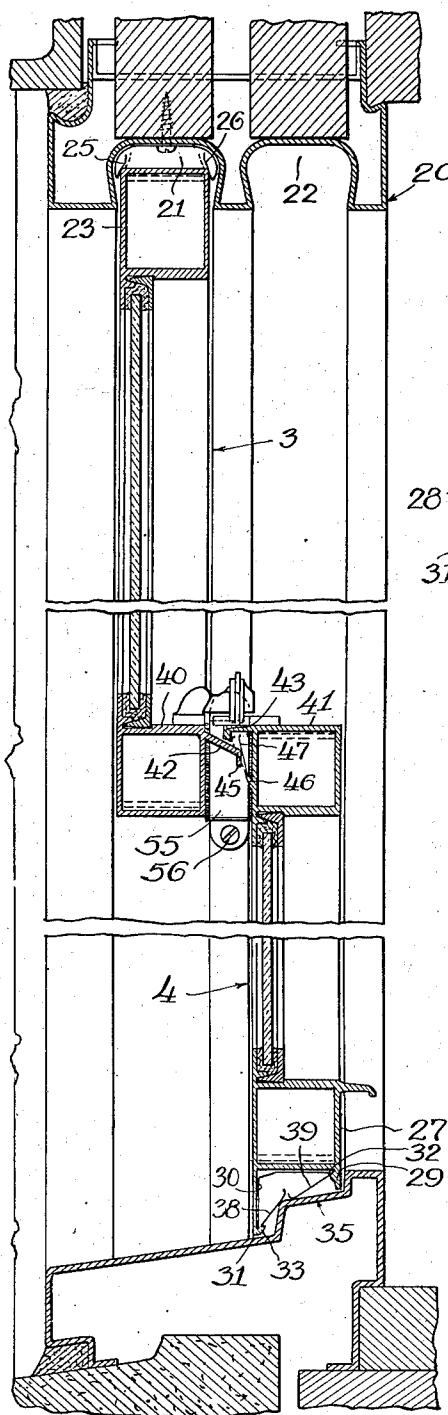


Fig. 3

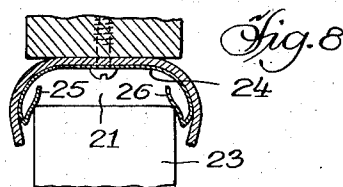


Fig. 8

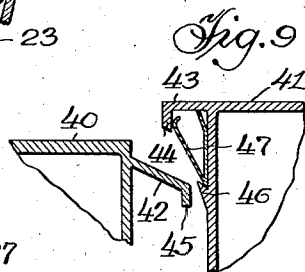


Fig. 9

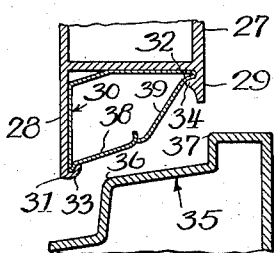


Fig. 10

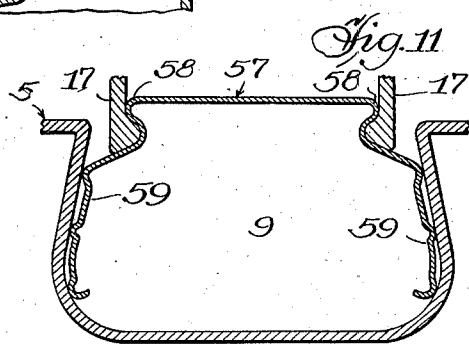


Fig. 11

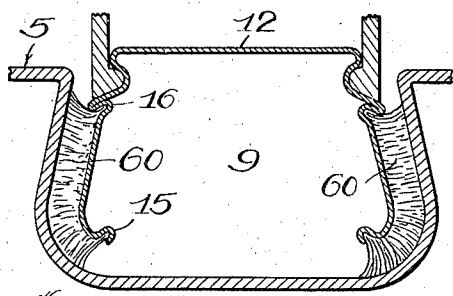


Fig. 12

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UNITED STATES PATENT OFFICE

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WINDOW CONSTRUCTION

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Application January 9, 1943, Serial No. 471,812

10 Claims. (Cl. 189—65)

The present invention relates to a novel window construction of the double-hung or slidable sash type and especially to a novel jamb construction and weathering means between the sliding sash and the surrounding window frame.

Among the objects of the present invention is the provision of a novel weathering or sealing means for the side or vertical rails of the slidable sashes. This weathering is anchored to and carried by the side rails and has a wiping contact with a dovetailed sash-run jamb in a manner to effect optimum sealing with a minimum of frictional resistance to the raising and lowering of the sash.

The invention further comprehends novel resilient sealing members for the horizontal sash rails when the sashes are moved to closed position. This provides a most effective weathering between the upper sash and the head jamb, between the lower sash and the window sill, and between the meeting rails.

The novel invention further comprehends a mullion construction for rigidly connecting adjoining window frames including a novel mullion clip for connecting such adjoining frames.

Further objects are to provide a construction of maximum simplicity, efficiency, economy and ease of assembly and operation, and such further objects, advantages and capabilities as will later more fully appear and are inherently possessed thereby.

The invention further resides in the construction, combination and arrangement of parts illustrated in the accompanying drawings, and while there is shown therein a preferred embodiment, it is to be understood that the same is susceptible of modification and change, and comprehends other details, arrangements of parts, features and constructions without departing from the spirit of the invention.

In the drawings:

Figure 1 is a view in front elevation of the novel window construction.

Figure 2 is a fragmentary enlarged view in horizontal cross section through the window assembly.

Figure 3 is a fragmentary enlarged view in vertical cross section through the window assembly.

Figure 4 is an enlarged fragmentary view in horizontal cross section through the dovetailed sash-run jamb and weathering.

Figure 5 is a view, part in vertical cross section and part in plan, showing the plate retainer for the weathering.

Figure 6 is a view in side elevation of the retainer shown in Figure 5.

Figure 7 is a perspective view of a novel mullion clip.

5 Figure 8 is a fragmentary view in vertical cross section through the top jamb and weathering with the upper sash in elevated or closed position.

10 Figure 9 is a fragmentary view in vertical cross section through the meeting rails and showing the weathering when the rails are separated.

15 Figure 10 is a fragmentary view in vertical cross section through the bottom rail of the lower sash and sill, and showing the manner of mounting the weathering means in the bottom rail to prevent air infiltration and its position when the lower sash is raised.

20 Figures 11 and 12 are horizontal cross sectional views similar to Figure 4 but showing alternate forms of weathering for the side rails and side jambs.

Referring more particularly to the drawings and the embodiment therein illustrated, the invention comprehends a novel metal window construction 1 shown in front elevation in Figure 1. This window assembly comprises a metal frame 2 and slidable upper and lower sashes 3 and 4, respectively. The frame is preferably of rolled construction, suitably joined at the corners as by welding or the like, and includes side jambs 5 reinforced by a vertically arranged strengthening member or channel 6 and suitably anchored in the window opening by means of anchoring plates 7. The side jambs are formed or provided with vertically extending dovetailed sash-runs 8 and 9 separated by a parting strip 10. These dovetailed sash-runs or channels are adapted to receive the spaced sides or projections of the side rails 11 and weathering 12 carried thereby. This weathering is shown more clearly in Figures 2 and 4 of the drawings, and comprises a sheet or strip of resilient metal extending for the length of the rail and formed into the shape of a substantially U-shaped member 13 into which a strip of cloth 14 is rolled with the opposite ends of the cloth anchored at 15 and 16. This cloth may be of canvas duck and is preferably impregnated with paraffin or other permanent lubricant. In order to properly anchor the weathering upon the side rails 11 of the sash, the opposite sides 17, 17 of the rails are each provided with an inwardly and rearwardly sloping flange or projection 18 against and behind which the ribs 19 of the member 13 seat.

55 The head jamb 20 is formed in a manner simi-

lar to that of the side jambs and is provided with spaced dovetailed grooves or channels 21 and 22, the former adapted to receive the upper or top sash rail 23 when the upper sash 3 is in closed position. In order to most effectively seal the sash in this groove or channel 21, the invention comprehends mounting therein a resilient metal weathering 24, shown more clearly in Figures 3 and 8 of the drawings. The weathering 24 has its opposite resilient ends 25 and 26 turned inwardly and upwardly and so disposed that the upper sash rail 23 will contact or engage thereagainst and further movement of this sash upwardly will force these ends outwardly when the sash is raised into closed position, thereby forming a continuous sealing contact for the full length of the sash rail 23 and at both the interior and exterior surface thereof.

The bottom rail 27 of the lower sash 4 is provided with spaced projections 28 and 29 receiving and anchoring a resilient metal weatherstrip 30 therebetween. This weathering is so formed as to provide projections 31 and 32 adapted to seat behind and interlock with inwardly projecting flanges 33 and 34 provided on the spaced projections 28 and 29, respectively, as more clearly shown in Figure 10. In order that these projections 28 and 29, along with the weatherstrip 30, form a weather-tight seal with the sill 35 when in closed position, this sill is provided with spaced steps 36 and 37 with the inwardly extending ends 38 and 39 of the weathering 30 contacting the step 36, and due to the resiliency of the weatherstrip, the ends of the latter are moved or forced inwardly in the manner shown in Figure 3. When this weatherstrip 30 is not in engagement with the sill, the ends 38 and 39 thereof contact or close in lapped relation so as to provide an uninterrupted exposed surface (see Figure 10) which will exclude dust and dirt and will render it less subject to damage in use.

As more clearly shown in Figures 3 and 9, the meeting rails 40 and 41 of the upper and lower sashes are provided with overhanging ledges 42 and 43, respectively, and these ledges are each provided with a depending flange 44 and 45. Within the overhanging ledge 43 and mounted therein by means of an upwardly inclined projection 46, is a resilient substantially V-shaped weatherstrip 47. When the meeting rails are not in contact, one side of the weatherstrip 47 has its resilient free end 48 engaging against the depending flange 44, but when the sashes are moved to closed position, the ledge 42 engages against the weatherstrip and forces it inwardly as shown more clearly in Figure 3, to thereby provide a weather-tight seal for the length of the meeting rails.

Figures 5 and 6 show a plate retainer 49 for the weathering 12 in the side rails. This retainer comprises a preferably metal plate 49 having tongue 50 substantially conforming to the width of the upper and lower sash rails 23, 40, 41 and 27 of the upper and lower sashes 3 and 4, respectively, and anchored thereto by screws, bolts or the like 51. The enlarged projecting end 52 of this plate substantially conforms to the contour of the dovetailed sash runs 8 and 9 in the side jambs, but allows sufficient space therebetween for the edge of a sheet or strip of felt or the like 53 to project therebeyond and into wiping contact with the interior surface of the jamb run. This sheet or strip 53 is carried by the plate 49 and anchored between this plate and a stiffener plate 54. The opening between the sashes

3 and 4 and the parting strip 10 is closed by a rubbing block or plate 55. This plate is preferably of resilient metal secured at its opposite ends to the parting strip as by means of screws or other attaching means 56, and its spaced central portion housing a strip of felt or similar weathering projecting beyond the sides or edges thereof into contact with the sash rails.

Figure 11 discloses an alternate construction of weathering 57 having ribs 58, 58 for anchoring or attaching it to the projecting sides 17 of the side rails 11. This is of resilient metal with its opposite sides 59, 59 corrugated vertically for spaced line contact with the interior surfaces of the sash runs 8 and 9 in the side jambs.

In Figure 12 is disclosed a further alternate construction of weathering in which the resilient weatherstrip 12 is similar to that disclosed in Figure 4 but in which a pile cloth 60 is rolled into and anchored in the metal weathering in a manner similar to that of the cloth 14. In place of the cloth, an extruded plastic may be substituted.

Where adjoining side jambs are to be connected, the novel invention comprehends the use of substantially U-shaped mullion clips 61. Each clip has its opposite sides provided with outwardly and oppositely projecting flanges 62 punched or otherwise formed from the opposite sides thereof. When the sides of the clip are projected through spaced openings in the adjoining side jambs 5, 5, the flanges 62 will lock against the rear surface of the jambs and anchor these parts together. Any desired number of these clips may be provided in vertically spaced relation to provide a rigid connection. A suitable snap-on trim 63 formed of any resilient metal suitable for the purpose, may be provided.

From the above description and the disclosure in the drawings, it will be apparent that the novel construction comprehends novel dovetailed sash-runs which are wider at the back than at the front and rounded at the back edge. These novel sash runs in combination with the novel weathering, will substantially and automatically eliminate sidewise motion of the sash as it operates vertically within the side jambs while the rounded edge at the back of the sash runs will cushion any slight endwise motion of the sash that may occur. The weathering will hold itself smoothly, easily and automatically to the contour of sash runs and thereby permit easy movement of the sash, as well as provide sealing action against the passage of air from within or without.

The novel weathering for sealing the top rail of the upper sash, the bottom rail of the lower sash and the horizontal meeting rails of these sashes, provides a most effective seal thereat.

The horizontal weathering for the top and bottom rails is so disposed and related that effective sealing is accomplished even though the sashes are not completely closed. For example, the weathering 30 in the bottom rail of the lower sash is so constructed that as this sash is lowered into closed position, the end 38 of the weathering will come into sliding contact with the sill 35 first and be forced out of contact and closure with the end 39 when it comes into compression contact with the sill. This provides dual weathering seals between the bottom sash and sill, in addition to the metal-to-metal contact between the spaced projections 28 and 29 and the sill 35. One purpose of this construction is to compensate for possible irregularities in building constructions in which the windows are used. Another feature of the weathering 30 is that it

is so designed as to provide a strong tension against the base of the bottom rail 27 and against which the upper surface of the weathering rests to insure permanent and positive engagement between the lower edge of the sash and the lower corner of the weathering.

The horizontal weathering for the meeting rails in addition to that provided by the overlapping flanges or projections on these rails, comprises a metal weathering carried in one of the sash rails which is substantially V-shaped and in spring or resilient contact with the projection on the other sash rail, whereby when the window is closed and these sash rails are in contact or substantial contact, the resilient metal weathering will prevent infiltration of air in either direction. The shape of this resilient weatherstrip is such as to include an angular portion at its upper edge which insures complete and positive retention of the weathering within the appointed space.

The head weathering 24 provides a double seal spring contact that closes tightly before the sash is completely closed. This weathering being anchored by screws or other attaching means within the dovetail sash-run, has its opposite sides so contoured and arranged as to normally project inwardly and away from the sides of the sash-run until the sash is sufficiently raised as to engage the ends 25 and 26 and force these ends outwardly and the integral sides of this weathering back into the recesses provided therefor.

It is to be understood that the sashes will be counter-balanced by suitable means to facilitate vertical operation. Also these sashes will be locked in closed position by suitable locking mechanism, and glazing will be accomplished and the window frame sealed in place in the wall by caulking in any conventional manner.

It will also be apparent that the invention comprehends the manufacture of single windows that can be assembled into groups of two or more without change in their construction. All that is necessary is to punch or provide openings in the adjoining side jambs or frame members 5 and these jambs when butted together and strengthened by the channel members 6 which are preferably spot welded thereto, are locked in that position by mullion clips having their opposite ends projected through these openings. These mullion clips may be spaced apart vertically a suitable distance, for example, twelve to twenty-four inches, and when the resilient flanges or retainers which are shown as punched out of the side walls, are forced through the openings in the jambs, lock the frames together. These mullions and the channels formed by the abutting side jambs are then closed and concealed by the snap-on trim 63.

Having thus disclosed the invention, I claim:

1. In a metal window construction, a frame therefor having side jambs, dovetailed sash-runs in the jambs, sashes slidable in the sash-runs and concealed weathering carried by the sashes and having a wiping contact with the interior of the dovetailed sash-runs, said weathering comprising an outwardly opening, substantially U-shaped member of resilient metal having its opposite resilient projections extending into the sash-run for the greater part of its depth and conforming substantially with the contour of the opposite inner surfaces of the sash-run, and fabric rolled into each projection for resilient, sealing contact with said opposite surfaces.

2. In a window construction, a frame there-

for provided with side jambs, vertical sash-runs in the side jambs, a sash slidable in the sash-runs and concealed weathering movable with the sash and comprising an outwardly opening, substantially U-shaped member of resilient metal carried by the side rails of the sash and having its opposite sides projecting into the sash-run, and a cloth facing on each of the projecting sides of the member and pressed into and maintained in resilient, sealing contact with the interior of the sash-run by the resiliency of the sides.

3. A weathering for a sash slidable in a window frame, comprising a substantially U-shaped resilient metal weatherstrip having its base anchored onto and carried by the sides of the sash and a fabric strip impregnated with lubricant and secured upon each of the opposite resilient projections of said weatherstrip for maintaining the fabric in wiping and sealing contact with adjacent surfaces of the window frame.

4. In a metal window construction including a frame, a slidable sash therein, and a weathering carried by the slidable sash and comprising a resilient metal weatherstrip having spaced, outwardly expanding resilient legs projecting into the window frame, and a strip of cloth anchored at its opposite edges onto each of the resilient legs for maintaining these strips in yielding wiping contact with adjacent surfaces of the frame.

5. In a window construction, a frame therefor having side jambs, dovetailed sash-runs provided in the side jambs, a slidable sash having channel-shaped side rails movable in the sash-runs, and an outwardly opening, substantially U-shaped weatherstrip anchored upon the side rails and its opposite sides providing oppositely contoured resilient projections substantially conforming with the shape of the sash-runs and extending for a considerable portion of their depth for eliminating sidewise motion of the sash in its operation within the sash-runs.

6. In a window construction, a frame therefor having side jambs, dovetailed sash-runs provided in the side jambs, a sash having side rails slidable vertically in the sash-runs, a resilient weathering carried by and extending for the length of the sash rails and provided with resilient legs substantially conforming to and projecting into the sash-runs, and a retaining plate mounted at the upper and lower ends of the sash for supporting the ends of the weathering and substantially conforming to the shape of the sash-runs for sealing the ends against the infiltration of air.

7. In a window construction, a frame having side jambs, dovetailed sash-runs provided in the opposite side jambs, a pair of sashes slidably mounted in the sash-runs, a weathering carried by the opposite sides of the sashes and movable vertically therewith, resilient projections on the weathering having a contour substantially conforming with the dovetailed sash-runs to provide a continuous sealing contact with the frame, and retaining members secured to the opposite ends of the sashes and substantially conforming to the shape of the sash-runs for supporting and enclosing the vertically spaced ends of the weathering therebetween and thereby sealing these opposite ends.

8. In a metal window construction, a frame therefor including a head jamb provided with a dovetailed channel, a sash slidable in the frame and having a top rail adapted to be received within the channel when the sash is moved to closed position, and a resilient weathering anchored

within the channel and having a contour approximating the contour of the channel but with its opposite sides normally spaced inwardly from the channel and each provided with an upwardly and inwardly disposed spring contacting end adapted to be engaged by the top rail as the sash is raised to closed position to thereby provide a double sealing contact at the opposite sides of the sash.

9. In a metal window construction, a frame therefor including a head jamb provided with a dovetailed channel formed with a recess at its opposite sides, a sash slidable in the frame and having a top rail adapted to be received within the channel when the sash is moved to closed position, and a downwardly opening, substantially channel-shaped resilient weathering secured within the dovetailed channel but with its opposite sides normally spaced from the interior of the sides of the channel, each of said sides of the weathering being provided with an upwardly and inwardly disposed spring contact adapted

to be initially engaged by the top rail as the sash engages thereagainst and as the sash is further raised to closed position, the sides of the weathering are forced into the recesses of the dovetailed channel.

10. In a window construction, a frame therefor, an upper and a lower sash slidably mounted in the frame, a horizontal rail on each sash adapted to be moved into meeting relation, coacting inwardly and downwardly extending projections at the upper ends of the meeting rails, so disposed as to overlap to prevent accumulation of dust and foreign particles, and a substantially V-shaped resilient weathering carried in the rail of the lower sash and adapted to contact the inwardly and downwardly extending projection on the rail of the upper sash when these meeting rails are moved to coacting position and thereby seal against the infiltration of air between these rails.

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