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WEEP HOLE CONSTRUCTION FOR WINDOWS AND THE LIKE

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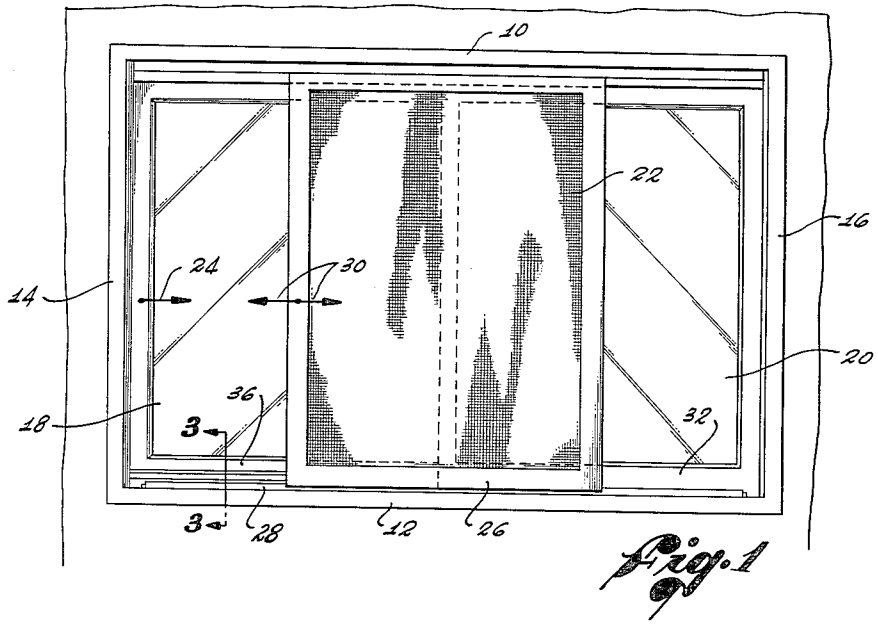

Fig. 1

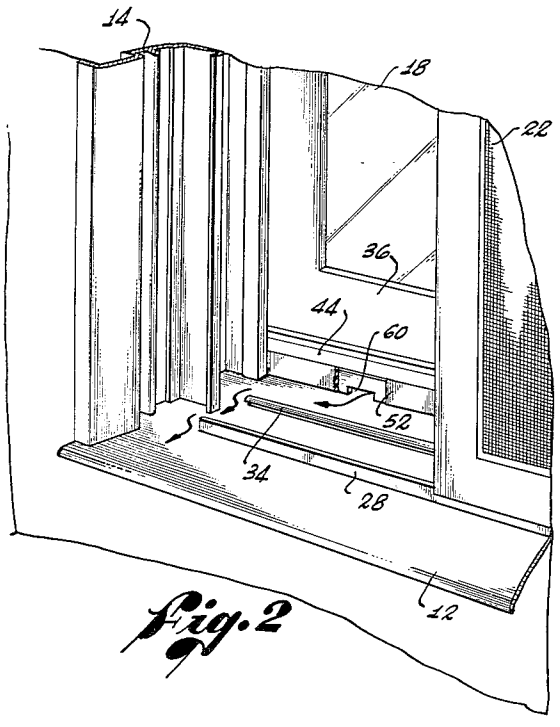

Fig. 2

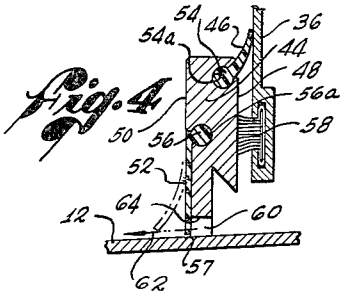

Fig. 4

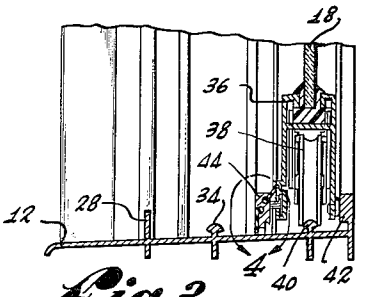

Fig. 3

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WEEP HOLE CONSTRUCTION FOR WINDOWS AND THE LIKE

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This invention relates generally to window construction and more particularly, to a weep hole construction in window frames for mounting laterally sliding vent panels or members.

Windows having a sliding or rolling vent panel usually have a metallic frame construction in which the head, sill and jambs are commonly made of extruded aluminum members. The head and sill members are formed with channels having vertical walls or flanges to accommodate and mount both the sliding or rolling sash and the fixed sash. Such constructions cannot avoid the collection of some water due to condensation and rain in the channels of the sill. In order to permit drainage of liquid collecting in the channels of the sill, the floor of the sill is sloped and properly positioned weep holes are normally provided in a staggered arrangement in the flanges or walls of the channels in the sill. Runoff of liquid trapped in the channels is thus possible, and the staggered arrangement of the weep holes prevents a direct inward flow of wind, sand, dust or water, and the like.

A staggered arrangement of weep holes is possible, of course, only where there are two channels having an inside and an outside flange, and a common flange between the two channels. A staggered arrangement of weep holes is possible because weep holes can be placed in the common flange as well as the outer flange. However, where only a single channel is used or available, weep holes can only be placed in the outer flange, and a staggered arrangement of weep holes is not available to prevent the direct inward flow of wind, sand, dust or water. In this instance, the weep holes are normally made much smaller which results in less effectiveness in rapid drainage or removal of condensation or rain.

The weep holes in the outer flange of a window sill are visible from the outside, and sometimes are unsightly in appearance, or do not blend in harmoniously with the rest of the window. Since it is desirable that the weep holes be made sufficiently large to permit rapid drainage, the weep holes are frequently partially concealed by means of an overhanging structure which can be, for example, a ledge having a vertical flange upon which a screen or storm sash slides. Such structure also shelters the weep holes and prevents the ready collection of clogging material before the drain holes. While the structure aids in concealing the weep holes and prevents material from falling down and accumulating before the weep holes, the weep holes are nonetheless visible at certain angles and, of course, are subject to a certain amount of inward flow of wind, sand, dust, water, etc.

Bearing in mind the foregoing, it is a major object of this invention to provide a weep hole construction in the sill of a window frame in which large and properly positioned weep holes are invisible and do not permit inward flow of wind, sand, dust, water and the like.

Another object of the invention is to provide a weep hole construction which will prevent inward flow of wind, sand, dust and water in a single channel sill member of a window frame.

A further object of this invention is to provide a highly effective weep hole construction for permitting rapid drainage of condensation and rain collected within channels of a window sill and yet prevent any inward flow of wind, sand, dust or water.

A still further object of the invention is to provide a simple weep hole construction in the sill of a window frame which results in an easily manufactured and more economical sill member.

These and other objects will be apparent from the following description of a preferred embodiment of the invention, reference being made to the attached drawings in which:

FIGURE 1 is a general side elevational view of a window construction in which the window frame includes a weep hole construction provided in the sill member according to this invention;

FIGURE 2 is a fragmentary, perspective view of the left corner of the window construction of FIGURE 1, a portion of the weep hole cover flap being cut away to show the relative position of a weep hole and the drainage of water therefrom;

FIGURE 3 is a cross-sectional view of the sill member and sliding or rolling vent panel shown in FIGURES 1 and 2, taken along the line 3—3 of FIGURE 1; and

FIGURE 4 is an enlarged view of the portion indicated by the numeral 4 in FIGURE 3.

The weep hole construction, according to this invention, is obtained in an outwardly downward sill member having a sloping floor by providing first, in an upstanding flange thereof, suitably spaced openings which communicate with the floor of the sill member. A flexible cover flap is then affixed on one edge throughout the length of the upstanding flange such that the flap extends generally vertically downwards to cover the openings or weep holes. The lower edge of the cover flap preferably has a very small clearance of approximately .005 inch, for example, from the floor of the sill member.

The cover flap is relatively thin, but has a height which, when the upper edge is affixed to the outside surface of the upstanding flange in the sill, establishes a pivot axis at such a distance or height above the floor of the sill member that any water accumulating within the channel can easily deflect the thin and flexible cover flap outwardly to permit draining of the accumulated water.

However, only the lower portion of the cover flap actually covers the weep holes so that the main part of the cover flap when in its normal vertical position, is backed by the structure of the upstanding flange to prevent inward flow of wind, sand, dust or water. That is, the upper edge of the opening of each weep hole establishes a pivot axis for inward movement of the lower portion of the cover flap. Since the upper edge of the weep hole is much closer to the lower edge of the cover flap, the moment arm of pressure or force against the cover flap with respect to the upper edge of the weep holes is relatively much less than when considered with respect to the upper edge of the cover flap. Accordingly, it is much more difficult to deflect the lower end portion of the cover flap into the opening of the weep holes to permit inward flow of wind, sand, dust or water.

It should also be noted that the flexible cover flap extends over substantially the entire length of the outer wall or flange such that the longitudinally extended backing provided by the outside surface of the outer flange against any inwardly directed force adds to the general rigidity and resistance of the cover flap over the openings of the weep holes.

FIGURE 1 shows a window construction having a laterally movable vent panel and screen. The window frame includes a head **10**, sill **12**, left jamb **14** and right jamb **16**. The head, sill and jambs are preferably extrusions of a tempered aluminum alloy having suitably formed flanges and channels to accommodate a movable vent panel **18**, a fixed panel **20**, and a movable screen **22**.

The vent panel 18 is shown in a fully closed position and can be opened by movement to the right as indicated by the arrow 24. The lower rail member 26 of the sash of screen 22 mounts a pair of rollers (not shown) which ride on an upright flange 28 to permit free lateral movement of the screen 22, as indicated by the arrows 30.

The movable vent panel 18 can be installed to open from left to right, as indicated in FIGURE 1, or from right to left, if desired. Accordingly, the fixed panel 20 is interchangeable with the vent 18 and can be either affixed in position on the right side as shown in FIGURE 1, or it can be affixed in position in the left side if it is desired that the vent panel 18 open from a right to left direction. The fixed panel 20 is therefore similar in construction to the vent panel 18, and includes suitable rollers (not shown) in the lower rail member 32 of the sash of the fixed panel 20. These rollers ride on a track 34 which is indicated in FIGURE 2. As can be seen in FIGURE 2, the track 34 extends almost to the left end of the sill member 12. The track 34 extends substantially from the right end of sill 12 to the left end thereof so that the fixed panel 20 can be positioned and affixed in place on either the right or left sides of the window.

The lower rail member 36 of the sash of vent panel 18 mounts a pair of rollers, such as roller 38 as shown in FIGURE 3, which ride on the track 40 within the channel having an inner flange 42 and an outer flange 44. As can be seen more clearly in FIGURE 4, the outer flange 44 is provided with an elongated slot mounting means for a flexible weather seal 46 near the top of the inside surface 48 of the outer flange 44. The outside surface 50 of the outer flange 44 is provided with an elongated slot mounting means for a flexible cover flap 52, as shown in FIGURE 4. Elongated slots or recessed openings, numbered 54*a* and 56*a*, thus run longitudinally down the length of the outer flange 44 in order to accommodate the enlarged beaded portions 54 and 56 of the weather seal 46 and cover flap 52, respectively. Suitable lengths of the weather seal 46 and cover flap 52 are then inserted endwise from one end of the outer flange 44 down the length thereof before the jamb members 14 and 16 are attached to the sill 12.

Supplementing the weather seal 46 is a weather strip 58 which is mounted to the lower rail member 36. A number of weep holes, indicated by the numeral 60, are provided along the lower edge of the outer flange 44. The cover flap 52 extends generally vertically downwardly over an undercut portion of the outer flange 44 such that the outside surface of the cover flap 52 is normally flush with the outside surface 50 of the outer flange 44. The enlarged beaded end 56 of the cover flap 52 is generally disposed at right angles to the generally vertical flap portion, the lower end of which has a very slight clearance 57 with the surface of the sill 12.

From FIGURE 4, it can be seen that a pivot axis is established substantially along the center of the enlarged beaded portion 56 of the cover flap 52 for discharge of water outwardly as indicated by the arrow 62. However, for inward flow of wind, sand, dust or water, a pivot axis is established on the cover flap 52 along a line where the upper edge 64 of the weep hole 60 meets with the cover flap. It is evident that the moment arm for the lower pivot axis is very much less than the moment arm for the upper pivot axis established for outward flow of water. Thus, the cover flap 52 is very easily deflected outwardly to permit rapid drainage, but is much more difficult to be deflected inwardly, which effectively prevents any inward flow of wind, sand, dust or water. Further, it can be seen that the outwardly downward sloping surface of the sill 12 would additionally resist and prevent inward movement of the lower end of the cover flap 52. In fact, the lower edge of the cover flap 52 tends to seal itself with the sloping surface of the sill 12 when sufficient wind or water pressure is applied inwardly against the lower end of the cover flap 52.

From FIGURE 2 it can be seen that the weep holes 60 are preferably rectangularly shaped and that the cover flap 52 extends completely over the length of the outer flange 44 so that the cover flap normally rests flatly against the outer flange 44 flush with the outside surface 50 thereof. Thus, the weep holes 60 normally remain well covered with minimum warping or bending of the cover flap to expose any part of a weep hole. Further, on account of the fact that an extended length of flexible cover flap material is used, there is the added rigidizing effect of the cover flap 52 against any inward flow or pressure from any source. Of course, the cover flap 52 is relatively thin and sufficiently flexible so as to permit the easy and rapid drainage of any condensation and rain collected in the channel behind outer flange 44.

It is noted that large weep holes can be properly positioned along the outer flange 44 to permit easy and rapid drainage of water, yet these large weep holes are fully invisible and effectively sealed against the inward flow of wind, sand, dust and water. This weep hole construction also avoids the need of staggering the weep holes in an outside and an intermediate flange in order to prevent a direct inward flow of wind, sand, dust or water. As was mentioned previously, this weep hole construction permits complete weather sealing of a window sill having only one channel with an inner and outer flange. A much more economical structure is also obtained since it is not necessary to make the screen flange or track in the form of an overhanging structure in order to shelter and conceal a series of weep holes.

The weep hole construction has been described mainly with respect to windows having a laterally movable vent panel only as an example of its utility, and such description is not intended to limit the scope of the invention in any way. The construction is, of course, useful in other structural forms wherein rapid and effective outward drainage of liquid is desired while preventing an inward flow of wind, sand, dust or water.

It is to be understood that the particular embodiment of the invention described above and shown in the drawings is merely illustrative of and not restrictive on the broad invention, and that various changes in design, structure and arrangement may be made in the disclosed embodiment without departing from the spirit and scope of the appended claims.

I claim:

1. In a window frame including a sill having an outwardly downward sloping upper surface and an upright fixed flange disposed longitudinally on the upper surface of said sill and generally laterally to said sloping surface, a weep hole construction comprising: at least one aperture provided within the lower surface of said fixed flange, said aperture meeting with the sloping upper surface of said sill; a longitudinally recessed channel provided in the outer surface of said flange and spaced apart a predetermined distance above an upper edge of said aperture; an undercut area provided below said channel in said flange; and flexible aperture sealing means substantially wider than the width of said aperture engaging said channel and seating within said undercut area to provide a pair of pivot axes about which said sealing means moves out of and into said aperture, one axis being adjacent to said channel and the other axis being adjacent said upper edge of said aperture, whereby the deflection resistance of said sealing means to liquid passing outwardly through said aperture is considerably less than the deflection resistance to materials attempting to pass inwardly through said aperture.

2. In a window frame including a sill having an outwardly downward sloping upper surface and an upright fixed flange disposed longitudinally on the upper surface of said sill and generally laterally to said sloping surface, a weep hole construction comprising: at least one rectangular aperture provided in said fixed flange, a lower

edge thereof meeting with the sloping upper surface of said sill; a longitudinally recessed channel provided in the outer surface of said flange and spaced apart a predetermined distance above an upper edge of said aperture; an undercut area provided below said channel in said flange; and a flexible aperture cover flap substantially wider than the width of said aperture and having an enlarged bead on one edge engaged by said channel and securing said cover flap substantially flush within said undercut area, said cover flap extending downwardly just short of the upper surface of said sill and having a pair of axes about which said cover flap pivots, one pivot axis being adjacent said channel and the other pivot axis being adjacent said upper edge of said aperture, whereby minimal deflection resistance of said sealing means is presented to liquid passing outwardly through said aperture while maximum sealing and deflection resistance is encountered by materials attempting to pass inwardly through said aperture.

3. A weep hole construction, comprising: a fixed wall structure having at least one aperture therein; flexible sealing means substantially wider than the width of said aperture; means to pivotally mount said sealing means for

freedom of movement transversely outwardly from said wall about the axis of a first moment arm and for freedom of movement in an opposite direction into said aperture about the axis of a second moment arm, said first moment arm being substantially greater in length than said second moment arm, said sealing means in its normal undeflected position overlying a substantial portion of said aperture without closing off said aperture completely, whereby freedom of movement of said sealing means into said aperture is enhanced.

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