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WEATHERSEAL CONSTRUCTION FOR CLOSURE MEANS

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2 Sheets-Sheet 1

Fig. 1.

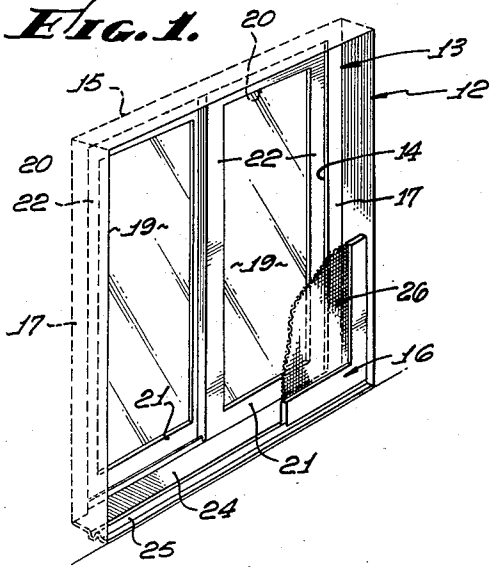


Fig. 2.

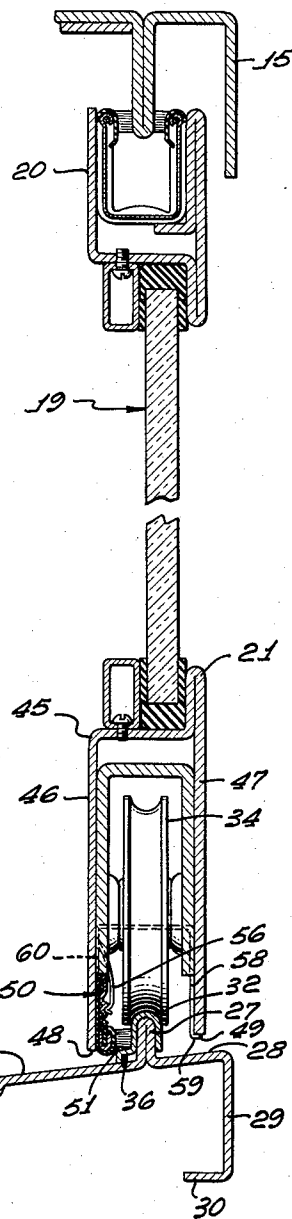


Fig. 3.

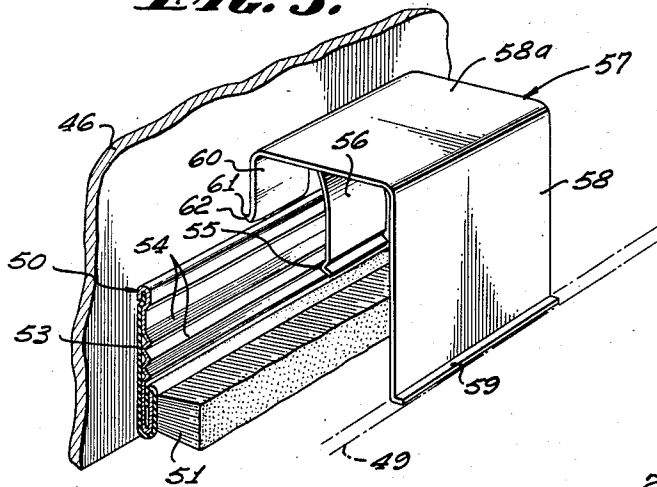
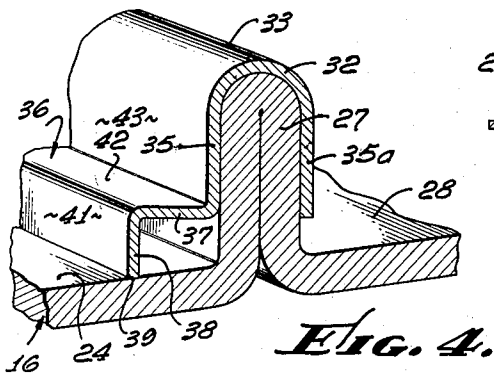


Fig. 4.

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WEATHERSEAL CONSTRUCTION FOR CLOSURE MEANS

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9 Claims. (Cl. 20—19)

This invention relates to a closure means and more particularly to an exterior frame member or sill construction which is cooperable in novel manner with weather seal means carried on a movable closure panel to effectively close space between said sill construction and a parallel adjacent panel member.

Prior proposed closure means such as sliding doors for exterior installation have included a frame means defining a rectangular opening in which may be mounted at least one movable closure panel. The frame means includes a sill frame member provided with an upstanding track to guide the movable panel. In such prior constructions the space between a bottom panel member, the sill frame member, and the track was generally ineffectively sealed by weather seal means which engaged only side surfaces of the track. Such prior construction included several disadvantages; namely, the weather seal means after a period of use became worn and was not adjustable against the side surface of the track so as to effectively sealingly engage said track surface. Another disadvantage was that in a severe driving rain storm, water striking the movable panel would flow downwardly in substantial quantities along the glass surface of the panel to the sill frame member. A driving wind against the closure panel would cause such quantities of water to flow underneath the bottom panel member and upwardly over the track on the sill. Once water passed over the track to the interior side thereof, the water accumulated on the interior top sill surface and against the track. Prior proposed weather seal means have heretofore been ineffective to stop or divert water driven under such conditions.

This invention contemplates a weather strip means which is designed and capable of sealing the space between the bottom panel member and the sill frame member so that water driven toward said space is effectively obstructed and diverted and is not driven over the track for accumulation on the interior side thereof. The invention includes a novel sill construction which is cooperable with a weather seal means carried on the panel member to effectively seal the space therebetween, said weather seal means being adjustable and in one embodiment biased toward the sill frame member so as to maintain positive sealing contact therewith.

It is therefore a primary object of this invention to disclose and provide a weather strip means for a sliding closure means which obviates the disadvantages of prior proposed weather strip means and which seals against wind, rain, dust and foreign matter the space between a movable panel member and a sill frame member and which is effective for a substantially long period of time.

An object of this invention is to disclose and provide a novel sill frame member presenting a selected arrangement of angularly disposed longitudinal faces to be engaged by a weather seal means.

Another object of this invention is to disclose and provide a weather seal means mounted on a movable panel member which is cooperable with the above described sill construction.

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Another object of this invention is to disclose and provide a weather seal which is carried by the movable panel member and which is adjustable for wear.

A further object of this invention is to disclose and provide a novel weather seal means for a sliding closure means which is automatically biased against selected faces of a sill construction.

A still further object of this invention is to disclose and provide a novel design of a track cap for a track means on a sill frame member.

More particularly one of the objects of this invention is to disclose a sill construction wherein a top surface portion of the sill frame member and an upstanding track flange provided thereon and joined or interconnected by a longitudinally extending step, said step having a face angularly disposed with respect to a contiguous face on the track means.

Generally speaking, the invention contemplates a sill frame member having a top sill surface portion and an upstanding flange thereon forming a track means. A longitudinally extending step joins the sill surface portion and the track means whereby continuous, angularly disposed longitudinal faces are provided for engagement with a weather seal means carried by a bottom panel member of the closure panel. The weather seal means includes resilient bristles which extend from the panel member into sealing engagement with said faces, said weather seal means being adjustable to maintain said seal. In one embodiment of this invention a track means is provided with a face contiguous to the face on such step and the weather seal means is provided with angularly disposed resilient means for engagement, respectively, with the face on said step and the inclined face on said track. In this latter embodiment the weather seal means may be biased downwardly into engagement with the faces on the step and the inclined track means.

These and many other objects and advantages of this invention will be readily apparent from the following drawings in which exemplary embodiments of the invention are shown.

In the drawings:

Fig. 1 is a diagrammatic perspective view of a closure means embodying this invention.

Fig. 2 is a sectional view of said closure means shown in Fig. 1, the section being taken in a vertical plane passing through the head frame member and the sill frame member.

Fig. 3 is a fragmentary enlarged perspective view of the weather seal means carried by the movable panel member, portions of the panel member being broken away to more clearly show the weather seal means and mounting thereof.

Fig. 4 is a perspective view of a track cap embodying this invention.

Fig. 5 is a fragmentary vertical sectional view illustrating a different embodiment of this invention, only the sill frame member and the bottom panel member being shown.

Fig. 6 is a perspective view of a portion of the sill frame member; and

Fig. 7 is a perspective view showing a weather seal carried by the movable panel member, portions of the panel member being broken away.

Fig. 8 is a fragmentary sectional view taken in the plane indicated by line VIII—VIII of Fig. 5.

Referring first to the embodiment of this invention shown in Figs. 1 to 4, there is shown a sliding closure means generally indicated at 12 comprising a rectangular frame means 13 defining an opening 14 to be closed. The frame means 13 may be constructed in well known manner and generally comprises a head frame member 15, a sill frame member 16 and jamb frame members 17. The

head and jamb frame members 15 and 17 are not described in detail because in this example, this invention is not embodied therein. The sill frame member 16 embodies this invention and is described in detail hereinafter.

Within opening 14 may be closure panels 19, said closure panels being generally rectangular and adapted to completely close opening 14. One of closure panels 19 may be fixed in frame means 13 while the other panel member 19 may be movable therewithin. It is understood that both panel members 19 may be movable within frame means 13 if desired. The movable closure panel member 19 comprises top and bottom panel members 20 and 21 and vertical stiles or panel members 22 joining said top and bottom panel members. The manner in which the stiles 22 and the top panel member 20 cooperate with the frame means is not described in detail because their construction is well known, may include several different arrangements, and in this example do not embody this invention.

This invention is particularly directed to the cooperable arrangement of weatherstrip means on the sill frame member 16 and on the bottom panel member 21 to close space therebetween to provide an effective weather seal. The sill frame member 16 in this embodiment may extend longitudinally between side jambs 17 and may be provided with a top inclined sill surface portion 24. Outwardly of sill surface portion 24 the sill frame member may include a guide 25 for cooperation with a screen 26. Inwardly of sill surface portion 24 may be provided an upstanding track flange 27 and projecting inwardly from flange 27 may be an interior sill surface portion 28. The interior surface portion 28 is integral with a depending sill support flange 29 having an turned lip 30 lying in the same plane as the lower portion of screen guide 25 for positioning and supporting the sill frame member. The sill frame member 16 may be formed as by rolling suitable metal stock.

A track cap 32 of selected non-corrosive metal fits over and covers track flange 27 and provides a convex track surface portion 33 for engagement with wheels or rollers 34 carried by panel member 21. The track cap 32 includes a U-section defined by depending flanges 35a and 35, said flanges 35a and 35 extending from the track surface portion 33 in parallel relation and spaced apart so as to snugly grip track flange 27. The depending exterior flange 35 is integrally joined with a longitudinally extending step means 36, said step means 36 including a horizontal section 37 and a depending vertical section 38. The bottom edge of depending vertical section 38 contacts and seats on the top sill surface portion 24 as at 39. The step means 36 thus provides a vertically disposed exteriorly directed longitudinal face 41 and upwardly directed face 42, said face 42 being disposed in angular relation to a longitudinal face 43 on exterior track cap flange 35. As described later, the longitudinal faces 42 and 43 are arranged to engage seal means carried by the panel member.

The panel member 21 may comprise a downwardly facing U-section housing 45 within which may be mounted in suitable manner the spaced wheels 34. Walls 46 and 47 of housing 45 enclose track flange 27 and terminate in parallel longitudinal edges 48 and 49, respectively, spaced a selected distance from top sill surface portions 24 and 28.

Within housing 45 and extending for the entire length thereof may be provided weather seal means 50 adjustably carried on the interior face of wall 46 of the panel member 21. Weather seal means 50 includes an inwardly directed longitudinal resilient portion 51 of bristle, pile or other suitable resilient yieldable material positioned to sealingly contact and slidably engage faces 42 and 43 on track cap 32. In this example, the pile lies horizontally, ends thereof contacting face 43 and sides thereof contacting face 42.

Means to adjust the vertical position of weather seal means 50 may include a longitudinal member 53 carrying at its bottom resilient portion 51 and provided with a plurality of longitudinally extending parallel inwardly facing serrations 54. Serrations 54 are selectively cooperably engaged by a plurality of outwardly biased projections 55 carried by spring arms 56 of a plurality of longitudinally spaced spring clips 57. Spring clips 57 are mounted as by snapping within housing 45 and each may include arm 56 and a wall 58 which bears against interior wall 47, said arm and wall 58 being joined by a top wall 58a. Member 57 may be provided with an outwardly directed lip 59 engaging bottom edge 49 of housing wall 47. On each side of spring arm 56 may be provided positioning and retaining tabs 60 having points 61 to tightly grip into the interior surface of wall 46 as at 62. Spring clips 57 are thus tightly retained within housing 45.

Weather seal means 50 may be readily adjusted downwardly by varying the position of projections 55 on spring arms 56 in serrations 54. It will thus be apparent that as resilient portion 51, which slidably contacts horizontal face 42 on the step means 36, becomes worn, the weather seal means 50 may readily be adjusted downwardly for such wear.

When rain is driven against closure panel 19 so that substantial quantities of water flow downwardly from the exterior face thereof to the top surface portion 24 of the sill frame member and a driving wind forces such water toward track flange 27 and beneath the panel member 21, such flow of water along the top surface portion 24 is first obstructed and diverted by face 41 on the vertical section 38 of the step means. Tendency of water to climb up and over the edge of the step means is resisted by resilient portion 51 of the weather seal means 50. The resilient portion 51 also diverts such water outwardly. Water which may penetrate portion 51 must climb face 43 on the track cap and flow of water upwardly along this face is further resisted by the portion 51. In addition, the portion 51 reduces the driving effect of the wind with the result that the force of the wind is dissipated so that water is not driven over track cap 32 to the interior side thereof. It has been found in practice that step means 36 in cooperation with weather seal means 50 has effectively prevented flow or penetration of water over track flange 27 under such conditions.

The embodiment of this invention shown in Figs. 5 to 7 inclusive, illustrates an exemplary application thereof to sliding door closure having somewhat different structural sections. In Fig. 5, sill frame member 70 and bottom panel member 71 may be made of extruded aluminum alloy metal. The sill frame member 70 includes a top sill surface portion 72 integral with an upwardly facing channel section 73, said channel section being reinforced and supported by a depending inverted T-section 74. Interiorly of channel section 73 is provided an interior top sill surface portion 75 which may merge with a depending support flange 76. The channel section 73 provides a longitudinally extending groove 78 which may receive a track means 79.

The track means 79 comprises a top inverted V-section 80 providing a top track surface 81. The inverted V-section 80 terminates in parallel side walls 82, each provided with an outwardly and upwardly folded margin 83 having a top edge adapted to abut as at 84 an overlying lip 85 on each side of the channel section 73. This abutment with lips 85 serves to retain track means 79 in groove 78.

Exteriorly of track means 79 the channel section 73 provides step means 87 which extends between and joins top sill surface portion 72 and an inclined face 88 provided on the exterior wall portion of the inverted V-section 80. Step means 87 includes a vertically disposed longitudinal face 89 and a horizontal longitudinally disposed face 90. It will thus be apparent that the sill

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construction of the embodiment of the invention shown in Figs. 5 to 7, inclusive, includes a step means integrally formed in the sill frame member which is provided with faces arranged with respect to the top sill surface portion and the track surface portion in a manner similar to that of the prior embodiment.

The panel member 71 includes a U-section downwardly facing housing 92 having exterior and interior walls 93 and 94 terminating in parallel longitudinal edges 95 and 96 in selected spaced relation to sill surfaces 72 and 75, respectively. The exterior wall 93 carries weather seal means 98 which in this embodiment includes a resilient sealing portion 99 having downwardly projecting pile 100 for engagement with face 90 on the step means and angularly disposed pile 101 for engagement with inclined face 88 on the track means.

The weather seal means 98 may be biased downwardly to provide positive engagement with said faces 90 and 88 by a plurality of longitudinally spaced bent wire-type spring clips 102. Each spring clip 102 includes an upwardly directed central tapered looped retaining portion 103 which may be inserted through a port 104 in an inverted L-section retaining member 105 integral with wall 93, said L-section member 105 having a depending leg 106 lying parallel to and spaced from wall 93. Each clip 102 includes sidewardly extending semi-elliptical spring arms 107, each arm 107 terminating beneath retaining portion 103 in an outwardly turned hook 108. Hooks 108 extend through a tab 109 punched from metal backing member 110 of weather seal means 98. The metal backing member 110 seats against and is slidable on the interior face of wall 93.

It will be apparent that the mounting means for weather seal means 98 downwardly biases the resilient portions 100 and 101 into sliding sealing engagement with longitudinal faces 90 and 88 of the step means and track, said biasing force being exerted by the spring arms 107 of each spring clip 102. Replacement of weather seal means 98 when worn may be readily made by compressing spring clips to permit the removal of retaining portion 103 through its respective port 104.

The weather strip means provided in the embodiment shown in Figs. 5 to 7, inclusive, functions in substantially the same manner as that described in the prior embodiment. Under conditions of driving rain, water will be first obstructed and diverted by vertical face 89 of step means 87. Any water which reaches the face 90 of the step means will have increasing difficulty in flowing across face 90 and up the inclined face 88 on the track means, such increased difficulty being evident from the increasing restriction on flow of air through the pile 100 and 101 and by the step means over which the water must travel. The cooperable arrangement of the weather seal means and the step means dissipates the water and wind driven against the panel and sill, and positively seals the space therebetween.

It will be readily understood by those skilled in the art that a novel improved construction of a frame sill member has been described above which cooperates with a weather seal means to effectively close the space between a sill and a panel member of a closure panel. While the operation and function of the weatherstrip means has been described with respect to obstructing and preventing penetration of water between the bottom panel member and sill member, such weatherstrip means effectively seals against dust, dirt, wind, and other foreign matter. It is understood that the step means of the invention may, if desired, be employed on other frame members of a door closure to improve the weather sealing characteristics and the invention contemplates that the step means may be used on any of the other frame members.

It will be understood by those skilled in the art that various modifications and changes may be made in the sill construction and weather strip means described above

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and all such changes and modifications coming within the scope of the appended claims are embraced thereby. I claim:

1. In a closure, the combination of: a frame means including a frame member provided with a track means; a panel movable in said frame means and provided with rollers engaging said track means and including a panel member having depending wall portions disposed in parallel spaced relation on opposite sides of said track means; and means on said panel member and on said frame member to seal the space therebetween including a longitudinal step between said wall portions and alongside said track means on said frame member.

2. Weatherstrip means for sealing space between a frame member and a closure panel member disposed parallel thereto, comprising in combination: a longitudinal surface and an upstanding longitudinal flange provided on said frame member serving as a track for a roller carried by the closure panel member; a longitudinal step means extending between and connecting said surface and upstanding flange; and resilient weatherseal means carried by the panel member in engagement with an exterior face of said flange and with a face of said step means contiguous to said exterior face.

3. A weatherstrip means as stated in claim 2 wherein the upstanding flange includes an inclined exterior face engaged by said weatherseal means.

4. A weatherstrip means as stated in claim 2 wherein the weatherseal means is in engagement with contiguous faces on the step means and flange.

5. In combination with a frame member for an opening to be closed, said frame member including a longitudinal track flange and a sill surface extending outwardly from the flange, the provision of: a track cap comprising a track surface portion; and a surface portion adapted to be engaged by weatherseal means, said surface portion comprising angularly disposed faces extending between and connecting the sill surface and the track surface portion, one face joining said track surface portion and the other face extending downwardly from said one face to said sill surface.

6. In a closure, the combination of: a frame means including a frame member provided with a track means; a panel laterally movable in said frame means on said track means and including a panel member having depending spaced apart wall portions disposed in parallel relation on opposite sides of said track means; weatherstrip means to seal the space between the exterior wall portion of said panel member and the exterior face of said track means, said weatherstrip means including a longitudinal step alongside the exterior face on said track means, a weatherseal means carried by said panel member and provided with resilient means extending from the interior face of the external wall portion into sealing engagement with contiguous surfaces on said step and on said track means, and means for biasing said weather seal means against said surfaces on said step and track means including a plurality of spaced spring elements carried by the panel member and supporting said weatherseal means in assembly with said panel member.

7. In a closure, the combination of: a frame means including a frame member provided with a track means; a panel movable in said frame means on said track means and including a panel member having a depending wall portion disposed in parallel spaced relation to an exterior longitudinal face of said track means, weatherstrip means between said wall portion and said track means, said weatherstrip means including a longitudinal step below and adjacent the exterior face of the track means, a weatherseal means carried by said panel member and provided with resilient means in sealing engagement with the exterior face on said track means and with the contiguous outwardly extending surface on said step, and means for biasing the weatherseal against said exterior face and against said surface on said strip.

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8. Weatherstrip means for sealing space between a frame member and a closure panel member movable parallel thereto comprising, in combination: a longitudinal surface and an upstanding longitudinal flange provided on said frame member serving as a track for a roller carried by the closure panel member; a longitudinal step means extending between and connecting said surface and upstanding flange within the included angle formed by said surface and flange; and resilient weather seal means carried by the panel member in slidable engagement with an exterior face of said flange and with an upwardly directed face of said step means contiguous to said exterior face; and means on the panel member to adjustably position the weatherstrip means in relation to said face on said step means.

9. Weatherstrip means for sealing space between a frame member and a closure panel member movable parallel thereto comprising, in combination: a longitudinal surface and an upstanding longitudinal flange provided on said frame member serving as a track for a roller carried by the closure panel member; a longitudinal step means extending between and connecting said surface and upstanding flange; and resilient weatherseal means

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carried by the panel member in slidable engagement with an exterior face of said flange and with an upwardly directed face of said step means contiguous to said exterior face; and spring clip means on the panel member for biasing the weatherseal means toward and against the face on the step means.

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