April 26, 1960 G. W. CORNELL 2,933,782

SEALING STRIP

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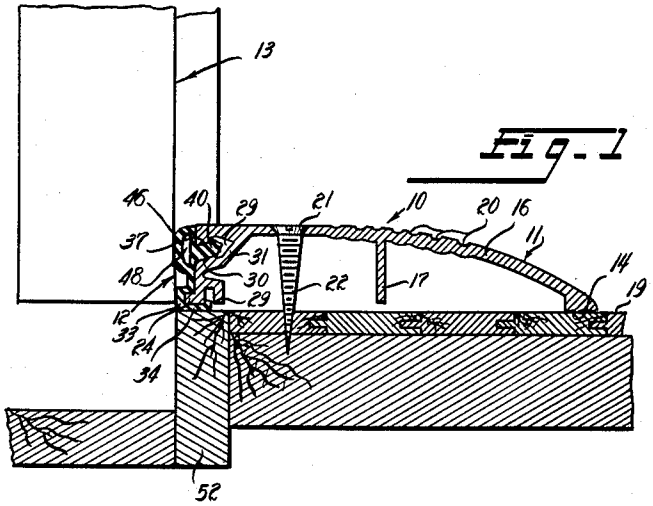


Fig. 1

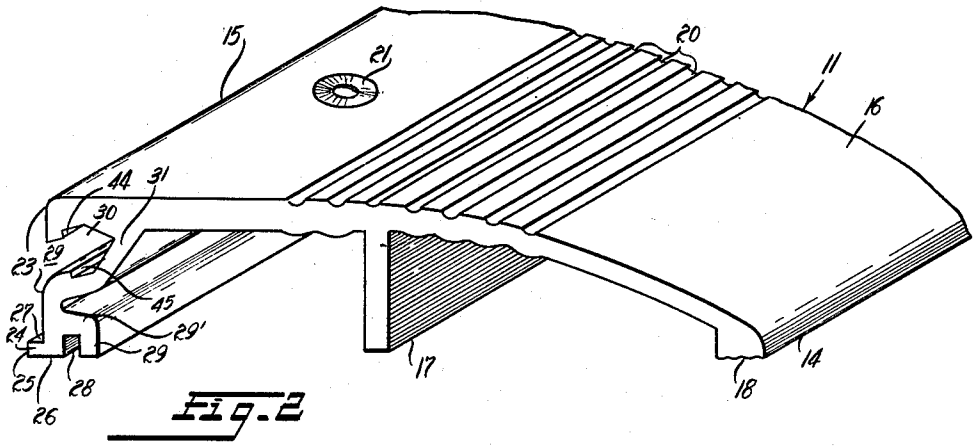


Fig. 2

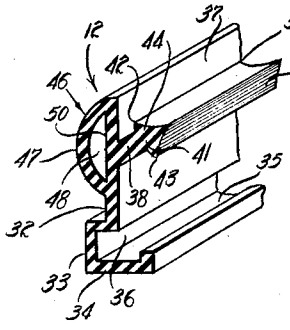


Fig. 3

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SEALING STRIP

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The present invention relates to sealing constructions and more particularly to abutment type door or window sealing means to be applied along the edges of door openings for the purpose of sealing the doorways of buildings or other structures to prevent the entrance of rain, water, dust, dirt and insects and the pasage of cold or warm currents of air either into or out of the inclosure with which the door is associated.

Many forms of sealing means have been devised in the past in attempts to provide a thoroughly satisfactory door sealing means. Some of these have come into use, but in general, most of them are subject to certain objections and none of the abutment type previously offered on the market provide full sealing. Other objections to many of the devices offered heretofore are inability to effectively seal the whole perimeter of the door opening, lack of good wearing qualities, difficulty of obtaining proper installation, difficulty of replacement. Further in many instances the apparatus which has been devised for this purpose has proved unsightly particularly after use for even a short while.

Examples of some of the seals heretofore proposed and some of which are in use are disclosed by United States Letters Patents to E. S. Torrey numbered 81,228 dated August 18, 1868, to F. J. Plym numbered 1,936,641 dated November 28, 1933 and to G. W. Cornell 2,718,677 dated September 27,1955. Except for the Cornell patent structure, which is now in wide satisfactory use and not capable of employment as an abutment type seal for outswinging doors or windows hung to dispose the door in overhanging relation to the doorsteps these prior art structures fail to seal satisfactorily. They have proved particularly unsuited for use in modern door structure such as glass doors or metallic doors used, for example, in enclosed porches, patios, store constructions or office buildings.

Accordingly, it is a principal object of the present invention to provide an abutment type door sealing unit which will overcome the objections noticed in the heretofore known sealing means, which is attractive, which will not deteriorate, and which embodies structure that is easily placed in position and adjusted to the door frame.

Another object of the invention is to provide an abutment type door sealing structural unit embodying a support strip, and a resilient generally flexible deformable sealing member, adapted to sealingly abut the face of a door to seal the latter and through a thin walled chamber-like portion formed in part by a bowed portion of the sealing member which is readily deformable and which due to the chamber-like structure also cushions the closing of a door.

Yet another object of the invention is to provide a door sealing unit of the abutment type, which abuts against the face of the door and embodies a threshold forming seal support strip attachable adjacent to a door and a resilient readily deformable abutment type sealing member positioned vertically along one edge of the seal strip supporting structure.

It is also an object of the invention to provide an abutment type sealing member comprising a strip embodying a chamber-like construction formed in part by an outwardly bowed portion adapted to engage the door as it is closed and to partially collapse thereby cushioning the closing thereof and yet provide a strong and satisfactory sealing means which is operative in a vertical position with the bowed portion projecting outwardly to one side of the strip.

A further object of the invention is to provide a door sealing unit including a support strip and a removable reslient deformable sealing strip adapted to be placed, through positioning of the support strip, so as to abut the face of a door and in which said support strip includes a horizontally extending outwardly opening undercut groove in a vertical face and a vertical groove positioned in an angularly related horizontal face and a strip sealing means having mating configurations for reception into the grooves to lockingly yet removably engage the sealing strip and maintain it in an operative position.

A still further object of the invention is to provide a sealing strip supporting means embodying an outwardly opening undercut groove along a vertical edge thereof extending inwardly of the face of said vertical edge and a second groove positioned in a face angularly related to the first mentioned vertical edge face and a sealing strip having angularly related formations thereon for cooperating with said grooves to removably fix said sealing strip with respect to said supporting means.

A further object of the invention is to provide a sealing strip supporting means having a vertical face, an undercut groove extending inwardly from said vertical face, a second groove formed adjacent said face and extending at an angle to said first groove and a horizontal flange extending outwardly with respect to said vertical face, and a sealing strip having a mating projecting portion adapted to be received in the first mentioned groove and a second projecting portion adapted to be received in said second groove, and a channel like formation adapted to receive the horizontal flange to matingly cooperate with said supporting means.

Still another object of the invention is to provide a door seal of the abutment type embodying a resilient chamber-like formation formed in part by a bowed deformable wall and having, spaced vertically with respect thereto, a relatively rigid abutment offset inwardly of the outer extremity of the bowed member when the bowed member is in its normal position.

A still further object of the invention is to provide a door seal construction embodying a resilient sealing means provided with an upper outwardly bowed resilient deformable wall, and vertically spaced with respect thereto, a relatively rigid offset stop portion adapted to limit the movement of a door in compressing and deforming the resilient bowed means.

An additional object of the invention is to provide a door sealing construction of the vertical abutment type including a resilient hollow bumper seal mounted in a supporting means and, vertically positioned with respect thereto, an integral resilient bumper stop also rigidly positioned in the supporting means.

A further object of the invention is to provide a door sealing means having an upper resilient, hollow, thin walled chamber-like construction, a relatively outwardly projecting securing formation adapted to secure said sealing means to a supporting structure in a vertical position and a depending portion including a channel section adapted to receive a portion of said supporting

structure and provide a seal between the supporting structure and the surface upon which it is mounted.

It is also an object of the invention to provide a sealing means embodying a deformable door sealing portion having positioning means extending laterally therefrom and adapted to securingly cooperate with a mating formation provided by a seal support structure and a depending portion formed to extend down and around a portion of the support structure and terminating in an upwardly extending flange for interfitting engagement in a securing groove in the support structure to form a combined support structure seal and an additional securing means.

These and other objects of the invention will become apparent from the following description when read in conjunction with the appended claims and accompanying drawings wherein;

Figure 1 is a sectional elevational view illustrating a sealing structure made in accordance with this invention applied as a threshold seal for a door.

Figure 2 is a fragmentary perspective view of the seal supporting strip illustrated in Figure 1 and forming a part of the door sealing structure of the present invention.

Figure 3 is a fragmentary perspective view of a preferred form of a novel resilient sealing strip provided by this invention and adapted for positively sealing the space between the door and door frame as illustrated in Figure 1.

With continued reference to the drawing wherein like parts throughout the several figures of the drawing are identified by the same reference numeral a preferred sealing unit 10 of the present invention in the form of unitary threshold assembly is illustrated. This unit 10 comprises a seal strip support or saddle 11 and a seal strip 12 formed of a resilient deformable material such as a vinyl plastic. Both strips are continuous extrusions so that they may be readily cross cut at desired longitudinal intervals to provide sealing units of predetermined and varying lengths. Thus the need of forming strips of desired short and varying lengths is obviated.

The seal support 11 has an arched body terminating along one edge 15 in a vertical face. The seal strip is mounted on this vertical face to provide a vertically disposed abutment type seal means for engaging a face of a door 13 adjacent its lower edge.

The seal strip support 11 is preferably formed as a continuous extrusion of a relatively rigid material, such as aluminum or other rigid or semi-rigid material. It is provided with a longitudinally extending support face 14 at the edge remote from the edge 15 upon which seal strip 12 is mounted. The two edges are connected by a longitudinally extending arched central portion or body 16. Thus the seal strip support means is arch shaped. Approximately midway of the body 16 there is provided a depending reinforcing rib 17. Face 14 is preferably longitudinally serrated or scored as indicated at 18 to facilitate gripping cooperation with the flooring such as 19. The scores increase the bite or friction between the face 14 and the floor surface and help to securely position the seal unit 10 in place. Body 16 is scored longitudinally as indicated at 20 to assure a non-skid footing on the exposed face of the body so that accidents due to slipping are eliminated.

A series of longitudinally spaced screw holes 21 are provided in body 16 for receiving screws 22 for securing the sealing unit 10 in a fixed relationship with respect to the door opening. Bolts or other fastening means may be used in place of screws 22 if the floor is a terrazo or concrete floor into which screws cannot be threaded.

The edge 15 of support strip 11 is formed as shown in Figure 2 by a laterally facing wall 23 and an intersecting, right angularly related, undersurface wall 26. As there shown wall 23 extends downwardly to a right angular, laterally outwardly extending flange 24. The flange 24 forms wall 26 and is preferably formed as a plain flat flange having an outer edge 25 and an upper surface 27. Lower surface 26 extends laterally beneath the wall 23 and terminates inwardly of the plane of the outer face of wall 23 in a downwardly opening longitudinally extending groove 28 formed by a downwardly extending laterally inwardly spaced rib 29 supported from the back of the wall 23 by a longitudinally continuous, horizontally disposed flange 29'.

Wall 23 of seal support strip 11 adjacent its upper end is intersected by the longitudinally continuous narrowed mouth of an undercut seal strip securing groove 30 the axis of which inclines upwardly and inwardly from its intersection with the plane of the outer face of wall 23. The enlarged portion of groove 30 is definfied along one side by the arched body of strip 11 and along its other side by an integral downwardly and outwardly inclined wall section 31. The groove 30 opens outwardly through wall 23 at a point slightly above the vertical centerline of wall 23.

The sealing member or strip 12 is a longitudinally continuous extrusion having a main body portion made up of vertical body web section 32 integrally joined at one end to a horizontally extending leg which projects outwardly from one side of web 32 integrally joined to a vertically extending body web section 33 substantially paralleling web 32. Section 33 connects to a right angularly related lower horizontal under saddle sealing web 34 which extends beneath the horizontal leg and terminates at its free end in an upstanding lip or flange 35 projecting away from the inner face of web 34. Flange 35 extends parallel to vertical section 33 and web 32 and lies in a plane offset from the side of web 32 opposite that from which the horizontal leg extends. Section 33, webs 32 and 34 and flange 35 define a horizontal, longitudinally extending channel 36 complementary to that portion of the supporting strip 11 formed by flange 24 and groove 28 and is adapted to snugly receive this portion of the supporting strip including flange 24. As a result it is seen that when the elements are positioned as illustrated in Figure 1 the seal strip webs forming the channel 36 will interlockingly encompass the lower support strip corner at the outer end of surface 26 thereby firmly securing the lower portion of the seal strip 12 to support strip 11 with seal strip web 34 in position to form an under saddle seal along the outer weather exposed edge of the seal unit 10.

Web 32 is provided on its inner face 37 with a longitudinally extending flange 38 which projects away from said inner face 37 at an inclination complementary to that of groove 30 and terminates at its free end in an integrally formed arrow headed portion 40 the transversely enlarged portion 41 of which lies immediately adjacent the free end of flange 38. The flange 38 up to the point of juncture with the enlarged portion 41 of arrow headed portion 40 is dimensioned to have a complementary fit in the narrowed mouth of securing groove 30 defined by lateral shoulders 44 and 45 formed outwardly of the juncture of the narrowed mouth of groove 30 and the enlarged portion of groove 30. Preferably, as shown in the drawing, the arrow headed portion 40 of flanges 38 is formed to provide mating shoulders 42 and 43 interlockingly engaged behind shoulders 44 and 45 of groove 30.

Seal strip 12 is further provided with a deformable, resilient, bumper-like, bulbous sealing formation 46 formed by a bowed resilient and deformable wall 47 arching outwardly from face 50 of web 32 in the direction in which the horizontal leg extends and forms with web 32 a longitudinally extending opening 48 continuous from end to end of the extruded strip. In its free uncompressed state the bowed wall 47 projects outwardly of face 50 a greater distance than does the depending web 33. The seal strip securing grooves of strip 11 are designed to maintain this relationship when the seal strip is supportingly engaged therewith. Therefore, when the elements are assembled, wall 47 (the upper-bumper seal), projects outwardly of the outer face 23 a greater dis-

tance than the distance between the outer web 33 and face 23.

With the elements positioned as in Figure 1 on the floor 19 and the upper end of the vertical riser 52 normally provided for outswinging porch and patio doorways, this construction seals and cushions the closing of the door 13 in the following manner:

As the door 13 is closed wall 47 is first contacted and then depressed and deformed to flatten out along the inner door face. The bulbous shape, due to the opening 48, together with the resilient deformable nature of bowed wall 47 cushions as well as seals the closing of the door. Since vertical section 33 of strip 12 is substantially complementary to the vertical face 25 of flange 24 and abuts against the face 25, section 33 acts as a resilient stop and limits the closing movement of the door. Section 33 also forms an auxiliary bumper seal, which, so long as the door does not warp and if the seal unit 10 is secured in exact parallelism to the inner door face, will provide an effective seal. The primary sealing wall 47, however, remains in sealing contact with the door and effectively seals the door against dirt, drafts, etc. while the door is closed irrespective of reasonable warpage or misalignment between the door and sealing unit 10 due to its resiliency and the bulbous nature of the primary seal. Furthermore, due to the characteristic slow recovery rate of properly formulated vinyl seal strips the seal of this invention will assume the shape of the portion of the inner door face with which it engages and in normal opening and closing of the door will not offer any appreciable resistance to full closing of the door. In other words, it will remain in the shape it assumes for proper sealing during normal opening and closing movements of the door ready to resume a proper sealing contact upon closing of the door without expanding to its original bowed shaped to possibly interfere with full closing of the door.

Further since the material is all formed of a resilient deformable material, the longitudinally extending flange 38 can be pushed inwardly through mouth 29 into groove 30, and the channel 36 can be matingly engaged with horizontally extending flange 24 through manual manipulation and deformation of the lower webs 32 to 34 of the sealing strip or, if preferred, the seal strip may be drawn lengthwise into assembled relation with saddle strip 11 by touching one end in a lubricating bath of light oil and entering the lubricated end in the saddle grooves and grasping the lubricated seal strip end to slide it lengthwise into assembled relation. Assembly of the two is thus achieved in an easy and effective manner.

A noticeable added advantage of the threshold sealing means described is its dampening or cushioning action. This results in the elimination of the usual slamming noise to which we are all accustomed. Further, it should be noticed that the edge 14 of the sealing support strip and the lower web 34 of the seal strip firmly abut the floor surface. As a result, there are no crevices where dirt will or can accumulate and cleanliness is more easily achieved than with the conventional weather seal means such as shown in Plym Patent 1,936,641 to which we are all presently accustomed. The threshold of this invention thus provides a more sanitary installation and also eliminates pockets for housing ants or other insects as well as preventing their entry when the door is closed.

It will be appreciated that an abutment seal strip of this type can be readily provided for the vertical edges and top edge of the door merely by cutting down the width of the saddle body and moving face 14 closer to edge 15. For example, face 14 could be formed on the end of reinforcing rib 17 which would then become the inside edge of the seal. Substitution of such a modified seal for the usual door stops would in no way mar the appearance or alter the customary use of the doorway.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiment is therefore considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are, therefore, intended to be embraced therein.

What is claimed and desired to be secured by United States Letters Patent is:

1. A seal strip for use in a door, window, or like seal assembly comprising a body web, an outwardly bowed resilient and deformable wall member connected at its ends to said web and extending longitudinally therealong, said wall member forming a door, window, or like seal element and cooperating with said web to define a longitudinally continuous opening, a right angularly related web connected to said body web and extending outwardly therefrom on the same side of said body web as said bowed wall member and terminating inwardly of the outer extremity of said bowed wall member in a depending resilient abutment web forming a door, window, or like closure member stop spaced below said bowed wall member, a web extending inwardly from said abutment web to a point beyond the other side of said body web forming a resilient sealing member engageable with the door, window or like opening defining framing and a longitudinally extending flange projecting outwardly from said body web on the side opposite that containing said bowed wall member, said flange having an enlarged extremity adapted to be received in a mounting groove for supporting said seal strip body web on an edge wall of a mounting member with said resilient sealing member web extending under the mounting member.

2. The seal strip of claim 1 wherein said resilient sealing member web at its free edges has a longitudinally extending upwardly directed lip cooperating therewith to form an upwardly opening channel spaced below said body wall and adapted to matingly encompass a portion of the seal strip mounting member to assist in supporting said seal strip on said mounting member.

3. As an article of manufacture, a sealing assembly for attachment to one or more of the four opening defining faces of a conventional door, window or like opening defining framing to sealingly cooperate therewith and with the adjacent inner opposed face margins of the closure member provided to close such a frame opening comprising an elongated support strip having first and second laterally spaced, longitudinally extending edges, an elongated seal strip of resilient and deformable seal material and longitudinally continuous securing means for securing said seal strip along one of said longitudinal edges of said support strip to form a unitary assembly for marketing and installation wherein said one of said longitudinal edges of said support strip comprises longitudinally continuous, right angularly intersectingly related, laterally outwardly and downwardly facing grooved planar surfaces; wherein said seal strip comprises longitudinally continuous, right angularly related, generally planar body and sealing webs the inner faces of which lie respectively in surface engagement with the planar areas of said grooved support strip surfaces and a longitudinally continuous resilient bumper sealing and cushioning formation in the form of an integrally formed, transversely arched, resilient and deformable wall element longitudinally continuously extending along the outer face of said seal strip body web for cushioning cooperation with and inward deformation and displacement toward said seal strip body web upon being contacted by the opposing face margin of said closure member during closing movement of said closure member to effect and resiliently maintain a positive sealing engagement with the full contacting area of said opposing face margin of said support strip, and wherein said securing means comprises the grooves of said support strip right angularly related planar surfaces and respective integral, longitudinally

continuous, flange-like means formed on and projecting away from said inner seal strip web faces into said respective support strip grooves to interlockingly secure said seal strip in encompassing relation to said support strip corner formed by said support strip planar surfaces with said seal strip sealing web disposed along said downwardly facing planar surface in position to be clampingly sealingly secured between said last mentioned planar surface and said opposed face of said opening defining framing when said unitary assembly is secured to said framing face.

4. The article of claim 3 wherein said support strip comprises an extruded shape of arched shaped configuration in cross-section having a generally laterally centered, longitudinally continuous, depending rib adapted to reinforce said support strip against end-to-end downward bowing and dimensioned to provide a longitudinal floor engaging support wall effective to resist permanent deformation of said support strip under extreme loads sufficient to stress the cross-sectional arch of said support strip beyond the elastic limit of the material used in its formation.

5. The article of manufacture set forth in claim 3 wherein said groove in said laterally outwardly facing planar surface of said support strip comprises an upwardly inclined undercut groove and said flange-like means on said seal strip body web comprises a rearwardly and upwardly extending securing formation terminating at its free end in a transversely enlarged head portion matingly interlockingly cooperating with said undercut groove to interlockingly secure said strips together along the face of said laterally outwardly facing support strip surface to prevent disassociation of said seal strip body web from said engaged support strip surface by downwardly directed force components due to shear forces applied to said arched wall.

6. The article of claim 5 wherein said downwardly facing support strip surface groove comprises a longitudinally extending plain groove positioned in vertically downwardly spaced relation with respect to said undercut groove and opening through said downwardly facing surface and said seal webs and said projecting flange-like means on said seal strip sealing web defines an upwardly facing channel and said seal strip body web at its lowermost edge intersects an abutment wall section the laterally facing surface of which lies in a plane paralleling said seal strip body web and located to provide a limiting stop to determine the fully closed position of said closure member and the inward displacement of said arched bumper sealing and cushioning wall.

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