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McAllister

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[54] **THRESHOLD WEATHERSTRIP**

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[22] Filed: **Apr. 18, 1973**

[21] Appl. No.: **352,263**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 179,935, Sept. 13, 1971, abandoned.

[52] **U.S. Cl.** **49/470,** 49/482, 49/488

[51] **Int. Cl.** **E06b 1/70,** E06b 7/22

[58] **Field of Search** 49/470, 475, 480, 482, 49/488, 490, 494, 493, 495, 498, 468

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[57] **ABSTRACT**

A threshold weatherstrip for an inswinging door which is characterized by a channel member of reinforced plastic material having a U-shaped cross section with the flanges thereof adapted to engage opposite faces of the door bottom and a resilient compressible means seated in the upwardly opening channel with screws or similar fasteners for adjustably attaching the assembly on the bottom edge of the door, the compressible means, in one form thereof, being a foam plastic strip which is compressed and fills the space between the top face of the channel web and the bottom edge of the door, and a sweep-forming strip member depending from the bottom face of the channel member for sweeping engagement wite the sill surface. In an alternative arrangement the compressible means takes the form of spaced coil spring members disposed between foam plastic blocks, the latter closing the openings at the ends of the channel member.

19 Claims, 10 Drawing Figures

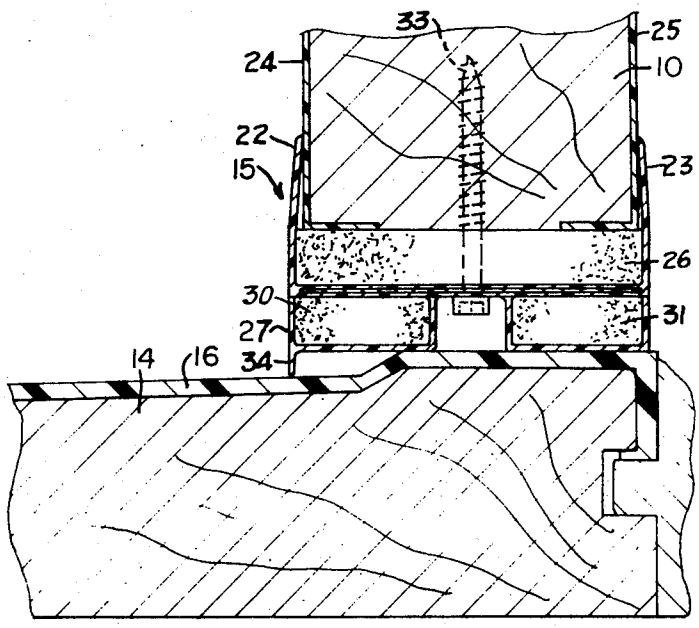


FIG-1

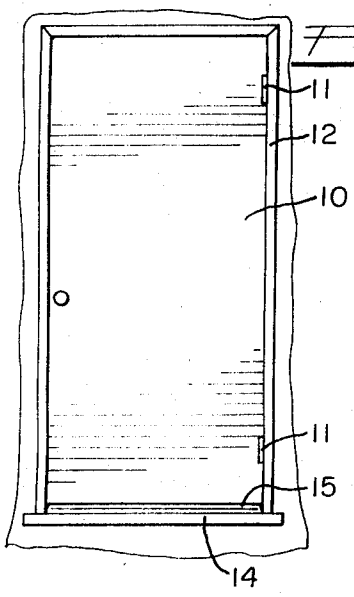


FIG-2

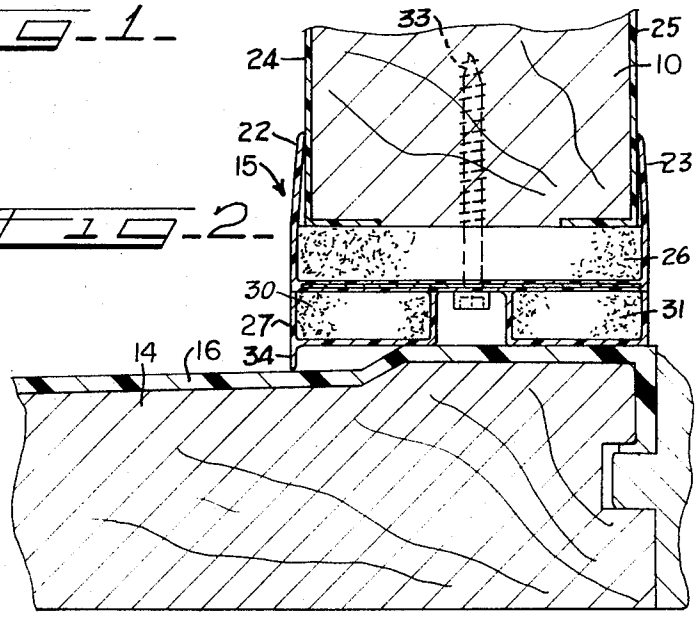


FIG-3

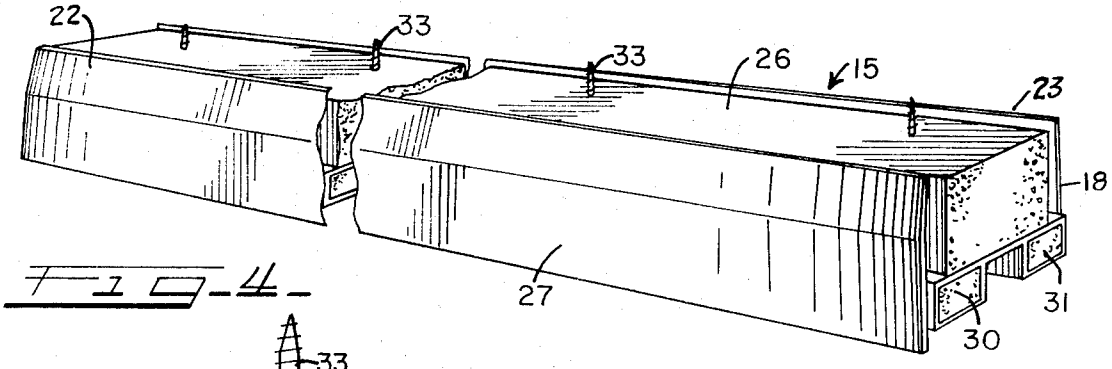


FIG-4

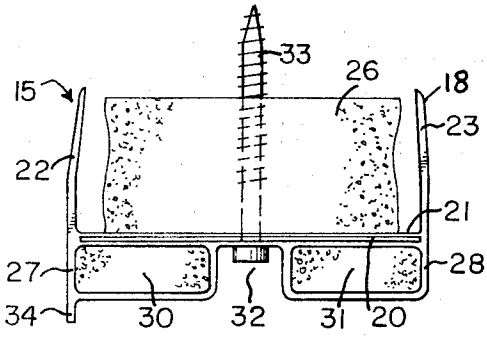


FIG-5

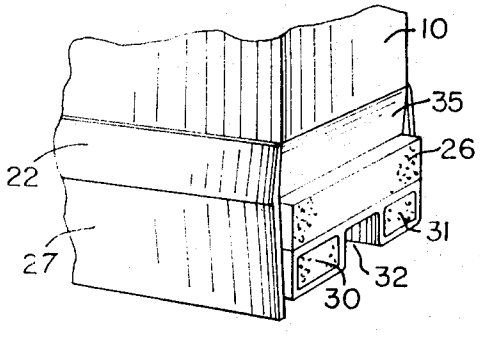
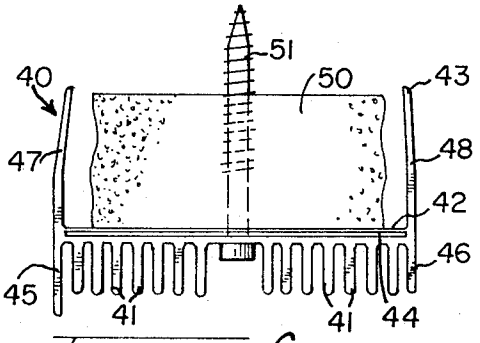


FIG-6



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FIG. 7

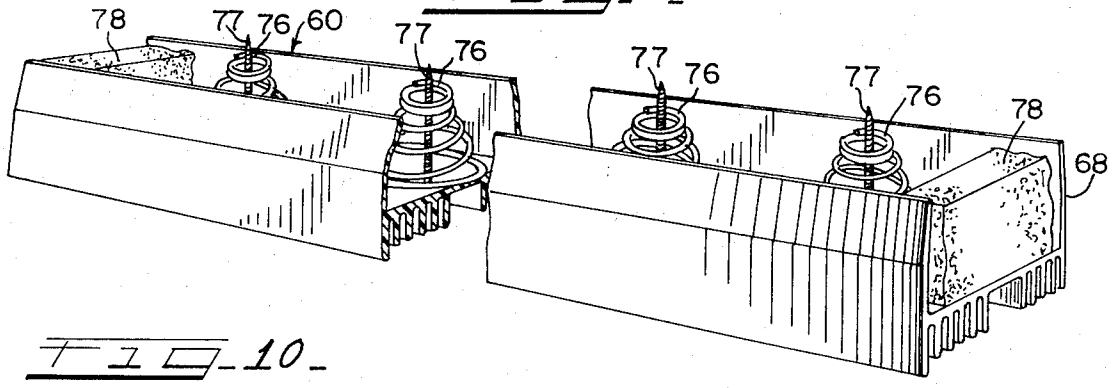
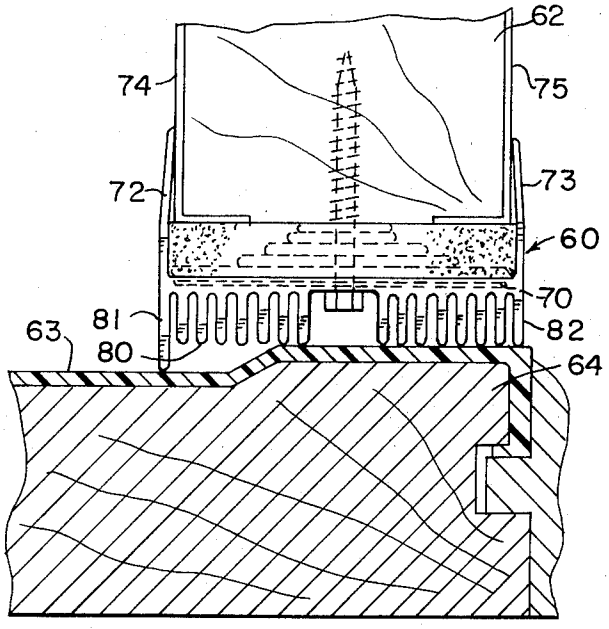


FIG. 10



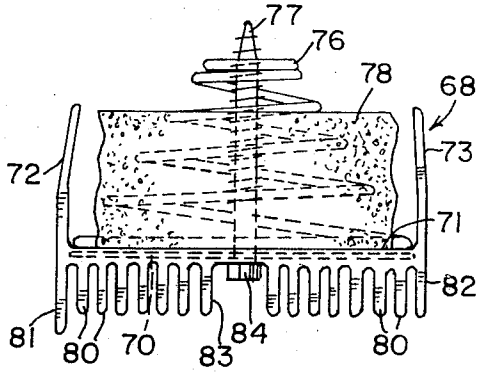
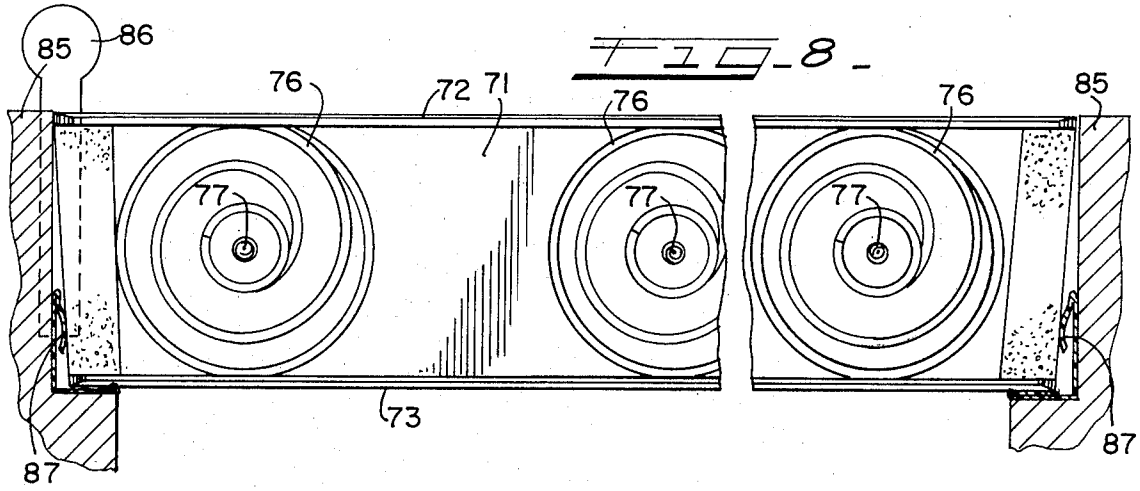


FIG. 9

FIG. 8



THRESHOLD WEATHERSTRIP

This application is a continuation-in-part of my application Ser. No. 179,935, filed Sept. 13, 1971, now abandoned.

This invention relates to weatherstripping and is more particularly concerned with improvements in a threshold weatherstrip for mounting on the bottom of a door so as to afford a weather seal between the bottom edge of the door and the upward face of the sill.

Various weatherstripping arrangements have been devised for sealing along the bottom of an exterior door so as to prevent the passage of dirt, air and other undesirable substances into the building and in some constructions to prevent the loss of heated or cooled air to the outside when the door is closed. One common form of such device comprises a metal strip seated in a recess in the bottom edge of a door and having a flange which interlocks with a co-operating flange on a second metal strip which is fastened to the top face of the sill. In another common form of door bottom seal a collapsible rubber tube is mounted in a metal strip which is secured on the bottom edge of the door. These and other door sealing arrangements lack adjustability and are only partly effective in preventing the passage of air and other material which it is desired to block. It is a general object, therefore, of the present invention to provide a threshold weatherstrip arrangement which is adjustable and which is more effective in preventing the passage of undesirable materials through the doorway.

A more specific object of the invention is to provide a door bottom weatherstrip structure which may be adjustably mounted on the bottom edge of the door and which provides an effective seal between the door bottom and the sill across the entire width of the opening.

It is another object of the invention to provide a weatherstrip structure for the bottom of an exterior door which is in the form of a channel constructed to encompass the bottom margins of the exterior and interior faces of the door with a compressible filler and sealing means interposed between the channel and the bottom edge of the door and having a depending flexible sweep for engaging the top surface of the sill in sealing relation.

It is still another object of the invention to provide a threshold weatherstrip structure which comprises a channel-shaped base member adapted to be positioned on the bottom edge of the door and enclosing a strip of foam plastic material which is compressible by taking up on adjustable fasteners securing the assembly to the door bottom, together with a strip of material depending from the bottom face of the channel which is compressible and resilient to a degree sufficient to enable it to sweep across the top surface of the sill and provide a seal when the door is closed.

A further object of the invention is to provide a threshold weatherstrip assembly which comprises a channel shaped base member for fastening, by means of screws or the like, in adjustable relation on the bottom edge of a door, with a resilient and compressible means seated in the channel which is effective for sealing the space between the bottom of the channel and the bottom edge of the door while permitting adjustment, together with a compressible and resilient sweep depending from the bottom face of the channel for cooperation with the top face of the sill so as to provide a seal when the door is closed.

A still further object of the invention is to provide a threshold weatherstrip wherein a channel shaped base member is provided for adjustably mounting by means of screws or similar fastening elements on the bottom of the door with compressible spring members in the space between the bottom edge of the door and the bottom of the channel member and compressible end sealing means together with a resilient sweep forming member depending from the channel member for cooperation with the top face of the sill in forming a seal upon the door being closed.

These and other objects and advantages of the invention will be apparent from a consideration of the several forms of the threshold weatherstrip which are illustrated in the accompanying drawings wherein:

FIG. **1** is an elevational view showing an inswinging, hingedly mounted, door structure installed in an exterior opening on the bottom of which there is mounted a threshold weatherstrip which embodies the principles of the invention;

FIG. **2** is a cross section, to an enlarged scale, taken on the line **2—2** of FIG. **1**;

FIG. **3** is a perspective view, with portions broken away showing one form of the threashold weatherstrip structure;

FIG. **4** is a cross section taken on the line **4—4** of FIG. **3**, to an enlarged scale;

FIG. **5** is a fragmentary perspective view showing a bottom corner of a door with the weatherstrip structure of FIG. **3** secured thereon;

FIG. **6** is a cross sectional view similar to FIG. **4** showing a modified form of the weatherstrip structure;

FIG. **7** is a perspective view, with portions broken away, showing another form of the weatherstrip structure;

FIG. **8** is a partial plan view of the structure shown in FIG. **7**, a portion of the door jamb being shown in section;

FIG. **9** is an end elevation of the structure shown in FIG. **7**; and

FIG. **10** is a view similar to FIG. **9** but showing the weatherstrip structure of FIG. **7** mounted on the bottom of the door.

Referring first to FIG. **1**, there is illustrated an inswinging door structure **10** which is mounted by means of hinges **11** on a vertical jamb member of a mounting frame **12** so as to swing inwardly to close an exterior opening defined by the frame **12** and a bottom sill structure **14** (FIG. **2**). The door **10** is provided on its bottom edge with a threshold weatherstrip structure **15** which embodies the principal features of the invention and which is designed to provide a seal between the bottom of the door **10** and the top surface **16** of the sill structure **14** and thereby prevent the passage of dirt, air or the like, when the threshold structure **15** is properly installed and adjusted and the door is closed.

The threshold weatherstrip structure **15** (FIGS. **2** to **5**) comprises an elongate strip member **18** of relatively stiff or rigid material and having a channelshaped cross section. Preferably, the channel member **18** is made of a continuous plastic material, for example, 40 mil. P.V.C. with a metal strip imbedment **20** in the bottom forming web portion **21** and upstanding side flange por-

tions 22 and 23 which have their bottom edges connected by the web 21 and which are bowed slightly towards each other and the web 21 so as to snugly engage the outer and inner faces 24 and 25 at the bottom of the door 10 when installed thereon as shown in FIG. 2. The metal reinforcing strip or imbedment 20 is preferably aluminum. A strip of medium density closed cell foam plastic 26 is seated on the top face of the web section 21. The foam strip 26 is of substantial thickness with a width somewhat less than the width of the channel. The side flanges or side walls 22 and 23 of the channel member are extended below the web section 21 and merge into side wall or outside face portions 27, 28 of compressible bottom strips 30, 31 which are in the form of tubular members of generally rectangular cross section filled with a medium density plastic foam. The curtain forming "filled foam" or foam filled tubular strips 30 and 31 have their top sides or faces secured to the bottom face of the web section 21 leaving an open center channel space 32 for accommodating fastener members 33. The fastener members 33, as illustrated, are in the form of sheet metal screws spaced at a plurality of points along the length of the channel member 18. The one side wall portion 27 on the outer side is extended somewhat below the bottom face of the bottom tube strip 30, as indicated at 34, and has a sufficient degree of flexibility to enable it to sweep across the portion of the top face 16 of the sill 14 which, as shown, generally slants or drops away toward the outside.

The compressible insert 26 and the bottom strip members 30 and 31 are extended a short distance at the ends of the assembly as shown in FIG. 5 so as to insure sealing at this point where the bottom edge of the door may be tapered inwardly slightly as indicated at 35.

In installing the assembly 15 on the bottom edge of the door the fastening screws 33 may be taken up so as to compress the strip 26 allowing the assembly to be adjusted to the proper height or position where it will provide the best contact with the top face 16 of the sill 14 as illustrated in FIG. 2. The compressible strip 26 fills at least in part the space which would otherwise be empty and forms an effective seal extending between the bottom edge of the door and the upwardly facing portion of the assembly 15.

There is illustrated in FIG. 6 a modified form 40 of the weatherseal assembly. In this form of the device a series of laterally spaced, strip members 41 depend in the form of spaced fingers on the bottom web 42 of a channel member 43. The web 42 may have a reinforcing metal strip 44 incorporated therein and the finger forming flexible strip members 41 are made to depend from the bottom face of the web section 42 a sufficient distance to sweep across the top face 16 of the sill 14, with the front and rear strips 45 and 46 forming continuations or bottom extensions of the flange members 47 and 48. The front or outside strip finger 45 has a vertical dimension which is greater than the remainder of the finger forming strips 41 and 46 in the same fashion as 27 and 34 in the form of the assembly shown in FIGS. 2 to 5. A compressible foam strip 50 and spaced fasteners 51 complete the assembly 40 and correspond to the foam strip 26 and fasteners 33 of the assembly shown in FIGS. 2 and 4, the materials employed and the application of the assembly 40 to the door bottom being the same as described with respect to the assembly 15.

In FIGS. 7 to 10, there is illustrated a further modified form of threshold weatherstrip structure 60, which embodies the principal features of the invention, and which is adapted to be mounted on the bottom of an inswinging door structure 62 so as to provide a seal between the bottom of the door 62 and the top surface 63 of the sill structure 64 in the same manner as the form of the device shown in FIGS. 1 to 6.

The illustrated weatherstrip structure 60 comprises an elongate strip member 68 of relatively stiff or rigid material and having a channel-shaped cross section. The channel member 68 is made of a continuous plastic material, such as, 40 mil. P.V.C. with a metal strip imbedment 70, preferably aluminum, in the bottom forming web portion 71 and upstanding side flange portions 72 and 73 which have their bottom edges connected by the web 71 and which are bowed slightly towards each other and the web 71 so as to snugly engage the outer and inner faces 74 and 75 at the bottom of the door 62 when installed thereon as shown in FIG. 10. A number of coil spring members 76 are seated in spaced relation in the channel member 68, each of which is of generally pyramid shape in relaxed condition, as shown in FIG. 9. In the relaxed or non-compressed condition the spiral springs extend somewhat above the top edges of the channel side walls 72 and 73. Each of the coil springs 76 has an associated fastener member 77 which in the form shown is a hex headed wood screw so that raising and lowering of the weatherstrip assembly on the door can be accomplished, by using a small ratchet wrench, without removing the door from the hinges. A rectangular block of medium density closed cell foam plastic 78 is seated on the top face of the web section 71 at each end of the channel member 68 which is of substantial thickness or height when seated in the channel member, as shown in FIGS. 7 and 9, with a lengthwise dimension somewhat less than the inside cross dimension of the channel member and having substantial width. These members serve to close the ends of the channel when the assembly is installed on the door and adjusted to the proper height or position where it will provide the best contact with the top face 63 of the sill 64 as illustrated in FIG. 10.

In this form of the device, as illustrated, a series of laterally spaced, depending strip members 80 depend in the form of spaced fingers or flaps on the bottom web 71 of the channel member 68. The finger forming flexible strip members 80 are made to depend from the bottom face of the web section 71 a sufficient distance to sweep across the top face 63 of the sill 64, with the front and rear strip members 81 and 82 forming continuations or bottom extensions of the flange members 72 and 73. The front or outside strip finger 81 has a vertical dimension which is greater than the remainder of the finger forming strips 80 and 82 in the same fashion as 45 and 46 in the form of the assembly shown in FIG. 6. The spacing of the finger forming strip members 80 is arranged so as to provide a center recess 83 of a size sufficient to accommodate the heads 84 of the fastening screws 77.

The compressible spring members 76 together with the fasteners 77 and the compressible foam block or pad members 78 serve the same purposes as the foam strip 26 and fasteners 33 of the assembly shown in FIGS. 2 and 4, and the application of the assembly 60 to the door bottom is the same as described with respect to the assembly 15. This form of the device, when

installed and properly adjusted, serves to provide an efficient continuous seal between the end of the door and the sill as shown in FIG. **10** as well as between the end of the door and the rabbeted door frame **85** (FIG. **8**) in which the door is supported by means of hinges **86** and which may be of conventional construction with the usual spring sealing strips **87.**

I claim:

1. Weather sealing means for the bottom of a door comprising a channel member of reinforced plastic material of generally U-shaped cross section which is of sufficient length to enable it to be mounted so as to extend along the entire bottom edge of the door with upstanding side flanges which are flared inwardly at the top edges so as to snugly engage the bottom margins of the exterior and interior door faces, an elongate strip member of resilient, compressible material disposed in said channel member between the bottom edge of the door and the bottom of the channel member which has a width less than the distance between said side flanges, adjustable fastening means for securing the channel member in adjusted position on the bottom edge of the door with said strip member adapted to be compressed in the space between the bottom edge of the door and the bottom of the channel member so as to substantially fill said space while permitting limited adjustment of said channel member on the door edge, and resilient, compressible strip means extending in depending relation along the bottom face of said channel member and between the side edges of the door so as to contact in wiping engagement with the sill surface which confronts the bottom face of said channel member when the door is moved to a closed position thereby to form a weather seal.

2. Weather sealing means for the bottom of a door comprising a channel member of relatively rigid plastic material having a generally U-shaped cross section and a length sufficient to extend between the side edges of the door, which channel member is adapted to be mounted on the bottom of the door with upstanding side flanges which are adapted to engage the margins of the oppositely disposed door faces, an elongate strip member of resilient, compressible material positioned in said channel member, which compressible strip member is of a normal width less than the corresponding dimension of the channel member and is compressible so as to expand laterally and fill the space between the bottom edge of the door and the channel member, adjustable fastening means for securing the channel member in position on the bottom edge of the door with said resilient strip member adapted to be compressed thereby permitting limited adjustment of the vertical position of said channel member on said door edge, and resilient, compressible depending strip means extending along the bottom face of said channel member so as to contact in wiping engagement with the sill surface which is disposed opposite the bottom edge of the door when the door is moved to a closed position thereby to form a weatherseal between the bottom edge of the door and the sill surface.

3. Weather sealing means for the bottom of a door comprising a channel member of relatively rigid plastic material having a generally U-shaped cross section and a length sufficient to extend between the side edges of the door, which channel member is adapted to be mounted on the bottom of the door, said channel member having upstanding side flanges which are spaced so as to engage the bottom margins of the oppositely disposed door faces when positioned on the door, an elongate strip member of resilient, compressible material positioned in said channel member, adjustable fastening means for securing the channel member in position on the bottom edge of the door with said resilient strip member interposed between the bottom edge face of the door and the inner face of the bottom of the channel member and adapted to be compressed so as to fill the space between the bottom edge of the door and the bottom of the channel member thereby permitting limited adjustment of the vertical position of said channel member on said door edge, and resilient, compressible depending strip means extending along the outer bottom face of said channel member so as to contact in wiping engagement with the sill surface which is disposed opposite the bottom edge of the door when the door is moved to a closed position thereby to form a weatherseal between the bottom edge of the door and the sill surface.

4. Sealing means for the bottom of a door as set forth in claim **3** wherein the compressible strip means extending along the bottom face of the channel member is in the form of a pair of tube members of flexible material and rectangular cross section which are filled with a foam plastic material and which are spaced to provide a fastener receiving area between the same and which have side walls forming an integral continuation of the side flanges of said channel member.

5. Sealing means for the bottom of a door as set forth in claim **3** wherein said compressible strip means extending along the bottom face of the channel member has a side wall portion forming an integral downward extension of a side flange of said channel member and wherein said side wall portion has a flexible sweep forming bottom marginal portion which extends a short distance below the bottom face of said compressible strip means.

6. Sealing means for the bottom of a door as set forth in claim **3** wherein said channel member is of a length corresponding to the dimension of the door at the bottom and between the side edges and said compressible strip members extend a short distance beyond the ends of said channel member.

7. Sealing means for the bottom of a door as set forth in claim **3** wherein said compressible strip means extending along the bottommost face of the channel member has a side wall portion which is in the form of an integral downward extension of a side flange of said channel member and a flexible sweep forming bottom marginal portion which extends at least to the bottom edge of the remaining portions of said compressible strip means.

8. Sealing means for the bottom of a door as set forth in claim **3** wherein the compressible strip member which is disposed in said channel member is a medium density closed cell foam plastic material.

9. Sealing means for the bottom of a door as set forth in claim **3** wherein the compressible strip means extending along the bottom face of the channel member is in the form of a tubular member filled with a medium density plastic foam.

10. Sealing means for the bottom of a door as set forth in claim **9** wherein said compressible strip means has exterior faces which form a continuation of the side flanges of said channel member.

11. Sealing means for the bottom of a door as set forth in claim 3 wherein said depending strip means extending along the bottom face of said channel member comprises a plurality of narrow strip members of flexible material which are spaced across the width of the bottom edge of the door and extend along the same in generally parallel depending relation from the bottom face of said channel member.

12. Sealing means for the bottom of a door as set forth in claim 11 wherein one of the outside strip members constitutes an integral extension of the associated side flange and extends a short distance below the bottommost edges of the remaining strip members.

13. Weather sealing means for the bottom of a door comprising a channel member of reinforced plastic material of generally U-shaped cross section which is of sufficient length to extend along the entire bottom edge of the door, said channel member having upstanding side flanges which are turned inwardly so as to snugly engage the bottom margins of the exterior and interior door faces when mounted on the bottom of the door, a resilient, compressible means seated in said channel member so as to be disposed, when the channel member is mounted on the door, between the bottom edge face of the door and the inside bottom face of the channel member, fastening means for securing the channel member in adjusted position on the bottom edge of the door with said resilient and compressible means adapted to be compressed in the space between the bottom edge of the door and the bottom of the channel member so as to fill the space whereby said space is closed while limited adjustment of said channel member on the door edge is permitted, and resilient, compressible strip means extending in depending relation along the bottom face of said channel member and between the side edges of the door so as to contact in wiping engagement the sill surface which confronts the bottom face of said channel member when the door is moved to a closed position thereby to effect a weather seal.

14. Sealing means for the bottom of a door as set forth in claim 13 wherein said resilient and compressible means, which is seated in said channel member, comprises coil spring members which are spaced along said channel member and which are adapted to be compressed by said fastening means and to urge said channel member toward the top face of the door sill structure.

15. Sealing means for the bottom of a door as set forth in claim 13 wherein said resilient and compressible means which is seated in said channel member comprises relatively short sections of foam plastic strip material which are seated in the ends of the channel member so as to close the space between the bottom edge of the door and the bottom of the channel member at the ends of the channel member.

16. Sealing means for the bottom of a door as set forth in claim 13 wherein said resilient and compressible means which is seated in said channel member comprises spaced coil springs disposed between the ends of said channel member and compressible blocks of a foam plastic material of relatively short length at the ends of the space which will seal off the ends of the space between the bottom edge of the door and the bottom of the channel member.

17. Weather sealing means for the bottom of a door as set forth in claim 13 wherein said means for securing the channel member in adjusted position on the bottom edge of the door comprises screw members with the heads thereof seated in downwardly opening, upwardly extending recesses in the compressible strip means which is disposed in depending relation and extends the length of the bottom face of said channel member.

18. Weather sealing means for the bottom of a door as set forth in claim 13 wherein the compressible strip means which depends along the bottom face of the channel member includes a plurality of narrow, flexible strip members which extend along the length of the bottom edge of the door and which are spaced transversely of the same.

19. Weather sealing means for the bottom of a door as set forth in claim 18 wherein an outside strip member is in the form of an integral extension of the associated side flange of said channel member and extends a short distance below the bottommost edges of the remaining strip members.

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