DOOR BOTTOM WEATHER SEALING STRUCTURE

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Filed: Jan. 14, 1974

Appl. No.: 433,400

U.S. Cl. 49/308, 49/310, 49/470, 49/488
Int. Cl. E06b 7/20
Field of Search 49/308, 307, 306, 303, 49/309, 310, 311, 312, 313, 314, 488, 470

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ABSTRACT

An automatic door bottom weather sealing structure disposed in a channel formed in the bottom of a door comprising a pair of interfitting channel members being transversely extensible and retractable in which the improvement consists of a flexible accordion gasket forming an air pocket with the bottom of the lower of said channel members to provide a flexible bottom sealing member and the side walls of said gasket member overlying the side walls of said channel members forming a sealed extensible enclosure for the moving parts of said door bottom sealing structure.

7 Claims, 7 Drawing Figures
DOOR BOTTOM WEATHER SEALING STRUCTURE

BACKGROUND AND SUMMARY OF THE INVENTION

Extensible door bottom sealing structures are known in the art and are generally operated by a rod engaging a door jamb to extend the floor engaging drop bar as a sealing member. Such a structure is generally fitted into a slot or channel formed in a door bottom with the moving parts thereof being generally unprotected against the entry and accumulation of dust and dirt.

It is desirable to have a door bottom sealing structure to be disposed within a channel at the bottom of the door in which a plate member is first secured being arranged and constructed to slidingly receive thereon the door sealing structure and to have said structure sealed against the entry and accumulation of dust and dirt and to provide a wide positive yielding engagement with the underlying sill or floor surface serving both as an effective air and sound barrier.

It is an object of this invention therefore to provide a door bottom sealing structure having a mounting plate member in connection therewith, said plate member being disposed and secured in a channel formed in the bottom of a door with said sealing structure being slidingly carried by said plate member within said channel for convenient installation.

It is another object of this invention to have a flexible sealing member forming an air pocket at the bottom of said sealing structure and having side wall portions overlying said sealing structure forming an effective sealed enclosure for the same.

More generally stated, it is an object of this invention to provide a door bottom sealing structure in connection with a channel formed in the bottom of a door, a mounting plate member secured within said channel, said plate member having a pair of depending guide rails at each side thereof, a channel member having flanged portions received in said guide rails, a second channel member receiving therein said first-mentioned channel member, said first-mentioned channel member having extensible means therein and having said second-mentioned channel member operably secured thereto, a rod operable by engagement with a door jamb actuating said extensible means to extend said second-mentioned channel member for floor engagement and a gasket underlying said second-mentioned channel member to form an air pocket at the bottom thereof as a sealing member and overlying the side walls of said channel members to form a sealed enclosure for the same.

These and other objects and advantages of the invention will be set forth in the following description made in connection with the accompanying drawings in which like reference characters refer to similar parts throughout the several views and in which:

FIG. 1 is a broken view in elevation showing the portion of a door structure;
FIG. 2 is a broken view on an enlarged scale in vertical section taken on line 2—2 of FIG. 1 as indicated; FIG. 3 is a view similar to FIG. 2 showing a different operating position; FIG. 4 is a broken view in perspective on an enlarged scale showing details of structure;
FIG. 5 is a view on a somewhat reduced scale in vertical longitudinal section taken on line 5—5 of FIG. 2 as indicated;
FIG. 6 is a view similar to FIG. 5 taken on line 6—6 of FIG. 3 as indicated; and
FIG. 7 is a broken view in vertical section showing a detail of structure on an enlarged scale.

DESCRIPTION OF A PREFERRED EMBODIMENT

Referring to the drawings, a door 10 is indicated as representative of doors in common use such as metal doors which generally have the outer walls thereof secured in spaced relation such as by U-channel members on the order of the inverted U-channel member 12 adjacent the bottom portion of said door as shown and the same may be secured in position as by welding. Said door is shown having adjacent its hinged side a jamb 14 and disposed thereunder is a floor surface or a sill 15.

The channel member 12 is shown forming a channel 17 adjacent the bottom of said door with said channel being of sufficient height to accommodate the door bottom sealing structure 25 hereinafter to be described. Said channel is shown closed at the outer or free end of the door as at 17a and open at the inner end of said door as at 17b.

Inserted within said channel 17 and secured by screws 18 to the web of said channel member 12 is a supporting mounting plate member 19. Said plate member extends the full length of said channel 17 and comprises a top wall 20 having depending facing right angled flanges 22 and 23 at each side thereof forming a pair of facing guide rails.

Removably carried by said plate member 19 is said door bottom sealing structure 25.

Said sealing structure comprises what is here shown as a substantially H-shaped channel member 27 having upper outer oppositely extending horizontal flanges 29 and 31 having outer portions thereof disposed in and supported by said guide rails 22 and 23. Each of said flanges has an intermediate depending horizontally disposed T-slotted rail portion indicated respectively as 32 and 33.

Adapted to have interengagement with said channel member 27 is a U-shaped channel member 40 receiving said channel member 27 therein. Said channel member 40 has side walls 41 and 42 and a bottom wall 43. At the lower outer sides of said side walls 41 and 42 in oppositely facing relation are T-slotted rails 45 and 46.

It will be understood that said channel members 27 and 40 are readily formed as extrusions.

Referring now to the channel member 27, the door sealing operating mechanism will be described. This structure is well-known in the art and only a brief description will be given. A U-shaped bracket 50 is riveted to the web 28 as illustrated and has extending therethrough a rod 51 threaded at its inner end at 52 and extending forwardly having a forward threaded portion 53 onto which is threaded a jamb engaging operating rod 54 having a slotted head 55 and being tapped to be threaded onto the threaded portion 53 of said rod 51. Carried on said rod 51 between said rod 54 and the bracket 50 is a coil spring 56.

A plate spring 58 has a right angled end portion 59 fastened to be secured by nuts 60 to said inner threaded end portion 52 of said rod 51. Said plate spring slides under an elongated plate-like keeper 62.
riveted to said web 28 and said plate spring is secured at its free end to said web 28 by a rivet 63.

When the rod 54 engages the jamb 14 upon the door 10 being closed, said rod causes the portion 58a of said spring 58 to bulge outwardly as shown in FIG. 6 which will cause the transverse extension or dropping action of the channel member 40.

Said plate spring 58 operatively connects said channel member 40 and said channel member 27 by having a pin or rivet 69 pass through side walls of said channel 40 and adjacent its bottom wall 43 and overlie a central portion of said plate spring as shown in FIGS. 5 and 6. The side walls 34 and 35 of said channel member 27 are notched as at 35a to permit the passage of said rivet 69 through said side walls.

With reference to FIGS. 2-4, the essential novelty of the invention herein is present in the structure and application of the gasket member 74 to the channel members 27 and 40.

Said gasket member will be formed of a suitable flexible plastic material having an accordion-like action as will be described.

Said gasket member will comprise a bottom wall 75 having upwardly and inwardly curved wall portions 76 and 77 terminating in T-flanges 78 and 79 disposed into said slotted rails 45 and 46.

Upper side wall portions 81 and 82 of said gasket member extend upwardly of said portions 76 and 77 outwardly of said flanges 78 and 79 and terminate in T-flange portions 84 and 85 disposed into said T-rails 32 and 33.

Said upper side wall portions 81 and 82 are of sufficient length to permit said channel member 40 to drop or extend out of the channel 17 freely onto floor or sill engagement. When said channel members 27 and 40 are in retracted position, said gasket has its upper side walls gathered in accordion fashion and said side walls preferably will also be gathered to some extent with said sealing apparatus in extended position. In actual practice the depth of the channel 17 will be on the order of 1/4 inches and the drop from the bottom of the door to the underlying floor surface or seal may be on the order of one-half inch.

The bottom wall 75 of said gasket in forming a pocket about the bottom wall 43 of said channel member 40 in effect forms a resilient inflated sealing member which makes an air-tight seal with the underlying floor surface or sill and is sufficiently resilient to have a tight sealing contact with the entire underlying surface and very readily accommodates any irregularity present in such underlying surface. The upper side walls of said gasket form a sealed enclosure about the side walls of said channel members 27 and 40 in having an air-tight engagement by being received within the T-rails 45 and 46 at their bottom portions and by being received within the T-rails 32 and 33 with their upper T-flanged portions. The mounting plate 19 has an effective sealing engagement with the U-channel member 12 which in turn is integral with the door structure.

Thus with the bottom sealing structure 25 in door sealing operating position, there is prevented the passage of air through or about said sealing structure and further, the gasket with its respective pockets of air as described forms a very effective sound barrier.

In a conventional type of door sealing structure where the door sealing apparatus is merely mounted within a slotted or channel formed within the bottom of a door, it has been found that there is sufficient leakage about the door sealing member in and through the slot in which it is disposed to permit the passage of significant quantities of air and also to permit the passage of significant sound. The applicant's structure as herein described forms a substantial improvement with respect to providing a more effective air seal and an effective sound barrier.

Although the sealing structure 25 carried by the mounting plate 19 is here shown as being secured within a channel at the bottom of a door, the same may be surface mounted at the bottom of a door.

It will of course be understood that various changes may be made in form, details, arrangement and proportions of the parts without departing from the scope of the invention herein which, generally stated, consists in an apparatus capable of carrying out the objects above set forth, in the parts and combinations of parts disclosed and defined in the appended claims.

What is claimed is:

1. A door bottom weather sealing structure in connection with a door, having in combination:
   - door mounting means,
   - a first channel member carried by said door mounting means,
   - a second channel member interfitting with said first channel member,
   - means operatively connecting said first and second channel members for an extension and retraction of the same relative to one another,
   - a flexible accordion-like gasket overlying the side walls of said channel members,
   - a lower portion of said gasket enclosing the bottom of said second channel member,
   - an upper portion of said gasket having sealing engagement with said first mentioned channel member,
   - said gasket being extensible and retractable responsive to extension and retraction of said channel members relative to one another.

2. A door bottom weather sealing structure in connection with a door having in combination:
   - a door mounting plate member,
   - a first channel member disposed onto said mounting plate member,
   - a second channel member interfitting with said first channel member,
   - means operatively connecting said first and second channel members for an extension and retraction of the same relative to one another,
   - a flexible accordion-like gasket,
   - a lower portion of said gasket enclosing the bottom of said second-mentioned channel member having sealing engagement with either side thereof,
   - side walls of said gasket extending upwardly from said lower portion thereof and overlying the side walls of said first and second channel members, said upwardsly extending side walls having terminal portions,
   - means providing sealed engagement for said terminal portions with the upper portion of said first-mentioned channel member, and
   - said side walls of said gasket being extensible and retractable responsive to extension and retraction of said channel members relative to one another.

3. The structure set forth in claim 2, wherein
said mounting plate member has a pair of opposed
depending guide rails, and
said first channel member has flanges slideable onto
said guide rails.
4. The structure set forth in claim 2, wherein
said second channel member has a pair of outwardly
facing T-slotted rails, and
said lower portion of said gasket forms flanges dis-
posable into said T-slotted rails.
5. The structure set forth in claim 2, wherein
said first channel member has a pair of opposed outer
slotted rails, and
said terminal portions of said side walls of said gasket
comprise flanges disposed into said slotted rails.
6. The structure set forth in claim 2, wherein
said side walls of said gasket are gathered in accor-
dion-like form.
7. The structure set forth in claim 2, including
a door bottom having an open bottom channel
therein, and
said mounting plate member being recessed in said
channel.