Nov. 20, 1951 W. T. MOTEN 2,575,459

WEATHER STRIP STRUCTURE FOR DOORS

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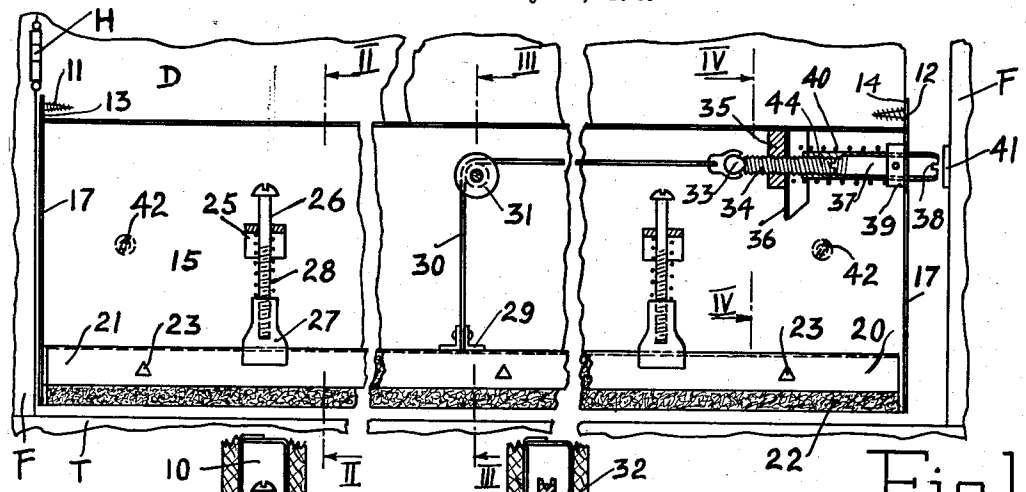

Fig. 1

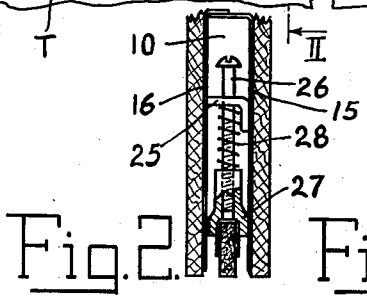

Fig. 2

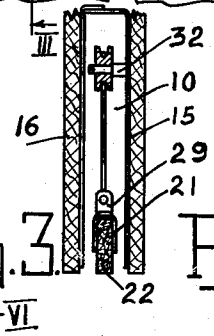

Fig. 3

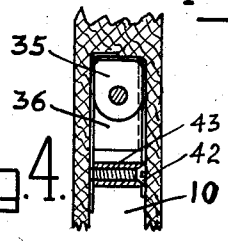

Fig. 4

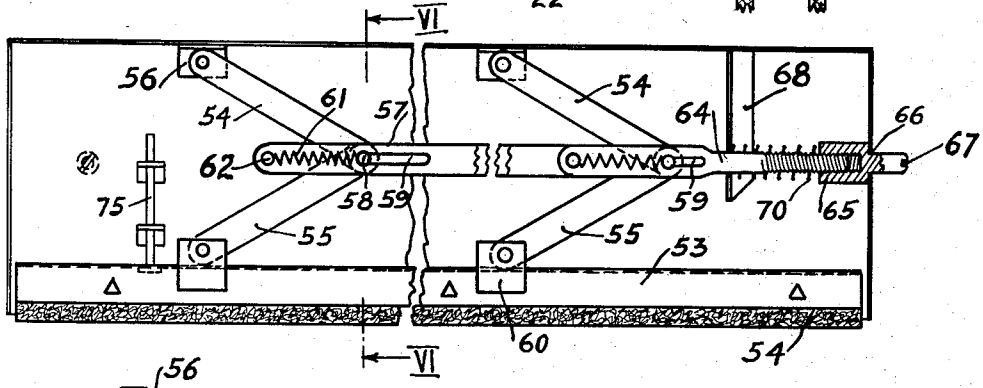

Fig. 5

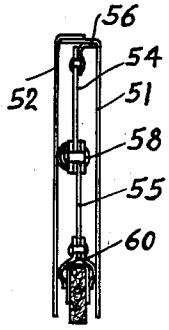

Fig. 6

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WEATHER STRIP STRUCTURE FOR DOORS

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2 Claims. (Class 20—68)

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This invention relates to a weather strip structure for attachment to the bottom of a hinged door.

One object of my invention is to provide a weather strip structure for the bottom of a hinged door which will permit the door so equipped to be hung so that it may be swung freely over floor coverings and when the door is closed will provide a tight seal between the lower edge of the door and the structure either floor or threshold, directly therebeneath.

It is a further object to provide a weather strip which will be raised or lowered by the opening or closing of a door to which it is attached.

A still further object is to provide a simple, inexpensive bottom sealing structure which may be incorporated in the door structure or fastened to the bottom of the door.

The structure includes an elongated sealing element which may extend substantially the width of the door, with means for moving the sealing element into close engagement with and draught excluding relationship with the floor or threshold when the door is closed and means for retracting or lifting the sealing element to a draught neutral position or retracted position when the door is opened. In the latter position the bottom of the sealing element or weather strip is substantially flush with the bottom of the door.

In the drawings, where I have shown certain presently preferred embodiments of my invention:

Figure 1 is a vertical section medial of the thickness of the door, showing various parts of the sealing structure when the door is ajar;

Figure 2 is a view in section along the line II—II of Figure 1;

Figure 3 is a view in section along the line III—III of Figure 1;

Figure 4 is a view along the line IV—IV of Figure 1;

Figure 5 is a vertical section medial of the thickness of the door, showing various parts of another sealing structure when the door is ajar, embodying a variation of my invention; and

Figure 6 is a view in section along the line VI—VI of Figure 5.

The structure shown in Figures 1 through 4 is illustrated as attached to a door D of any conventional type hinged at H to a door frame F. The bottom edge of the door is spaced from the floor or threshold T.

The sealing structure is received in a recess 10 which extends medially, longitudinally, and upwardly from the bottom of the door and from

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edge to edge of the door. It is fastened to the upright door edges by screws 11 and 12 which extend through lugs 13 and 14 respectively, which form extensions of the side frame of the sealing structure.

The sealing or weather strip structure is formed from elongated sheet metal members, namely a base plate 15 and a cooperating cover plate 16, both of which have turned over top edges which overlap one another to form an enclosure. The base plate 15 has inwardly turned end portions 17 which have the lug portions 13 and 14 welded thereto or formed integrally therewith as desired. The depth of the structure is determined by the width of the top edge of base plate 15, which is of the same width as the width of end portions 17. Thus the plates in effect form a box which is opened at the lower edge, which lower edge is substantially on a level with or just above the bottom edge of the door in which it may be mounted.

Suspended adjacent the bottom of the box is a weather strip 20, which is comprised of a sheet metal inverted channel 21 in which is clamped a compressible strip 22, which is anchored by inturned lugs 23. The sealing strip 20 extends for substantially the length of the inside of the box downwardly beyond the bottom edge of the channel 21. The compressible strip or sealing member may be formed of felt, rubber or other suitable material. The weather strip is movable, as will be described from a draught excluding or projected or sealing position to a draught neutral or retracted position.

Mounted on the base plate 15 are two spaced apart outstanding lugs 25 through each of which slidably passes a screw 26, which is received in a threaded clamp 27 secured to the weather strip channel 21. A helical spring 28 is disposed between the clamp and the lug to urge the weather strip 20 in a downward direction. The force of the springs 28 exerted on the weather strip 20 and urging it toward the bottom of the door can be adjusted by turning the screw 26.

Approximately midway of the strip 20, there is fastened by means of clamp 29, a flexible cable 30 which passes over sheave 31 rotatably mounted on the back plate 15, by pin 32. The cable extends horizontally to and is fastened to one end of a ball and socket joint 33. The other end of the joint is fastened to a threaded rod 34, which is threaded through a stop nut 35, which is slidable, but not rotatable relative to the back plate 15, thence slides through stop bracket 36 secured to the back plate and then is threaded into

sleeve or plunger 37. Sleeve 37 slidably passes through an edge 17 of the back plate 15, extends beyond the plate and terminates in a slotted head 38. Secured on the sleeve 37 is a stop ring 39, and betwen the stop ring and the bracket 36, a helical spring 40 in compression, is interposed. By adjusting the sleeve 37 on the threaded shaft 34 the tension on spring 40 may be varied and thus the force tending to lift the weather strip and urge the sleeve 37 to the right as viewed in Figure 1. This adjustment also controls the distance that the sleeve member 37 protrudes beyond the latch side of the door.

When the door is almost closed the end of sleeve 37 contacts a striker plate 41 secured to the door frame, forces the sleeve 37 inwardly, and allows the cable 30 to slacken and thus permits the springs 28 to force the weather strip 20 downwardly into close contact with the floor or theshold, as the case may be. When the door begins to swing open, the sleeve 37 begins to move outwardly (to the right as seen in Figure 1) as soon as it slides beyond contact with striker plate 41 by the action of spring 40. The cable 30 lifts the weather strip back to its position where the bottom edge is flush, or substantially so, with the bottom of the door. It is evident that the spring 40 must have sufficient strength to lift the strip against the action of the springs 28.

The strip operating structure, as described, is assembled on the back plate 15, after which the cover plate 16 is applied and secured to the back plate by screws 42, the ends of which are received in internally threaded spacers 43 which also ensure proper spacing apart of the back plate and cover plate. The weather strip 20 may be adjusted vertically by means of the screw rod 34 which has a slotted head 44 by means of which the position of rod 34 relative to nut 35 may be varied. Access to slot 44 is through the hollow sleeve 37.

The structure illustrated in Figures 5 and 6 is formed with a back plate 51 and a cover plate 52 similar to the plates 15 and 16 heretofore described. A weather strip 53 which includes a compressible strip 54 is positioned between the bottom portions of the plates and extends therealong. The strip 53 is moved up and down by the action of a pair of toggle joints including levers 54 and 55. Each lever 54 is hingedly connected at its upper end to a bracket 56 secured to back plate 51 and at the other end to a generally rectangularly shaped shaft 57 by a pin 58 which is slidably received in the lengthwise slot 59 in shaft 57. Likewise each lever 55 is connected to shaft 57 and hinged at one end to a lug 60 secured to the weather strip 53. A helical spring 61 in tension is fastened at one end to pin 58 and at the other end to a pin 62 fixed to shaft 57 as shown in Figure 5.

The right end portion 64 of shaft 57 is circular and threaded to be received in a sleeve 65 which in turn has a reduced portion 66 of circular cross section which passes through one inturned end of the back plate and has a slot 67 in the extreme end. The circular section portion of the shaft 57 slidably passes through a bracket or lug 68 fastened to the back plate. Between the bracket 68 and the inner end of sleeve 65, a helical spring 70 is disposed in compression. The spring 70 is strong enough to keep the mechanism in the position shown in Figure 5 when the sleeve 65 is out of contact with the striker plate. The degree of compression of the spring 70 may be controlled by adjusting the position of the sleeve 65 relative to the threaded end of shaft 57. The vertical position of the strip 53 may be controlled by the movement of sleeve 65 on shaft 57.

When the sleeve 65 is forced to the left upon closing of the door, the sleeve is moved by contact of the outer end thereof with the usual striker plate (not shown) on a door frame in which the door including the structure is hung, and the weather strip is forced down by the toggles. In the event the threshold beneath the door is not even, or an obstacle is thereon, the spring and slot arrangement whereby the toggle joints are connected to the shaft 57 permits the weather strip to accommodate itself to the differences in height between the portions of the threshold and also prevents injury to the mechanism in case of an obstruction which would prevent lowering of the weather strip.

To ensure that the weather strip 53 will move substantially vertically, I prefer to arrange a guide rod 75 (Figure 5) which is attached to weather strip 53 and is slidable vertically through appropriate openings in guide lugs 76 and 77, attached to the back plate 51.

In the drawings the weather strip is shown in the position which it occupies in the housing when the door is sufficiently ajar so that the striker or thrust rod is not in contact with the striker plate. When the door is closed sufficiently, the thrust rod is forced inwardly (to the left) and this causes the weather strip to be quickly forced down to seal the space between the bottom of the door and the threshold or floor.

While I have described the presently preferred embodiment of my invention, it is to be understood that changes may be made in the structure illustrated without departing from the scope of the following claims.

I claim:

1. In a device for sealing the space between the bottom of a door which may be swung from an open to a closed position, a weather strip mounted on the door bottom for movement from a retracted position to a sealing position, a fixed lug on the device, an expansible spring between the lug and the weather strip to urge the strip toward the sealing position, a cable attached at one end to the weather strip, a threaded rod attached to the other end of the cable and receivable in a slidable nut, a fixed bracket on the device through which the rod is passed, said nut being engageable with said bracket to limit movement of the rod in one direction, a sleeve member the interior of which is threadably engageable with the rod and which projects through the edge of the door, a stop ring on the sleeve member, a compressible spring disposed between the bracket and the stop ring, and which is of such strength as to overcome the downward thrust of the expansible spring.

2. In a device for sealing the space between the bottom of a door which may be swung from an open to a closed position, a weather strip mounted on the door bottom for movement from a retracted position to a sealing position, an expansible spring biasing the strip for movement to the sealing position, a threaded rod having an adjusting nut in threaded engagement therewith, operating mechanism for moving said strip against the bias of said spring and having a first connection with said strip and a second connection to said threaded rod, a fixed bracket on the device through which the rod is passed, said nut being engageable with said bracket to limit movement of the rod in one direction, a sleeve mem-

ber the interior of which is threadably engageable with the rod and which projects through the edge of the door, a stop ring on the sleeve member, a compressible spring disposed between the bracket and the stop ring, and which is of such strength as to overcome the downward thrust of the expansible spring.

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