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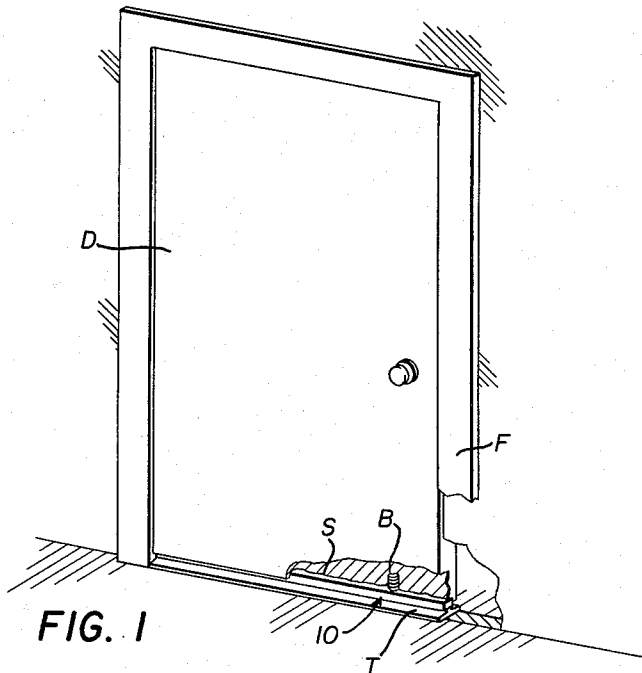
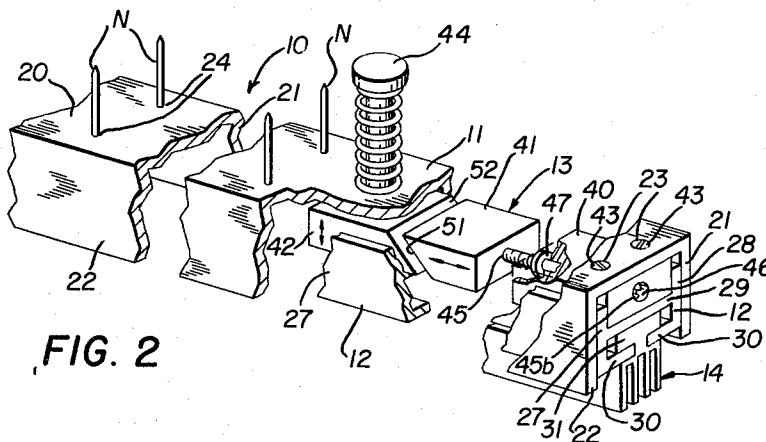
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ADJUSTABLE WEATHERSTRIPPING FOR THRESHOLDS

Filed Aug. 8, 1955

2 Sheets-Sheet 1



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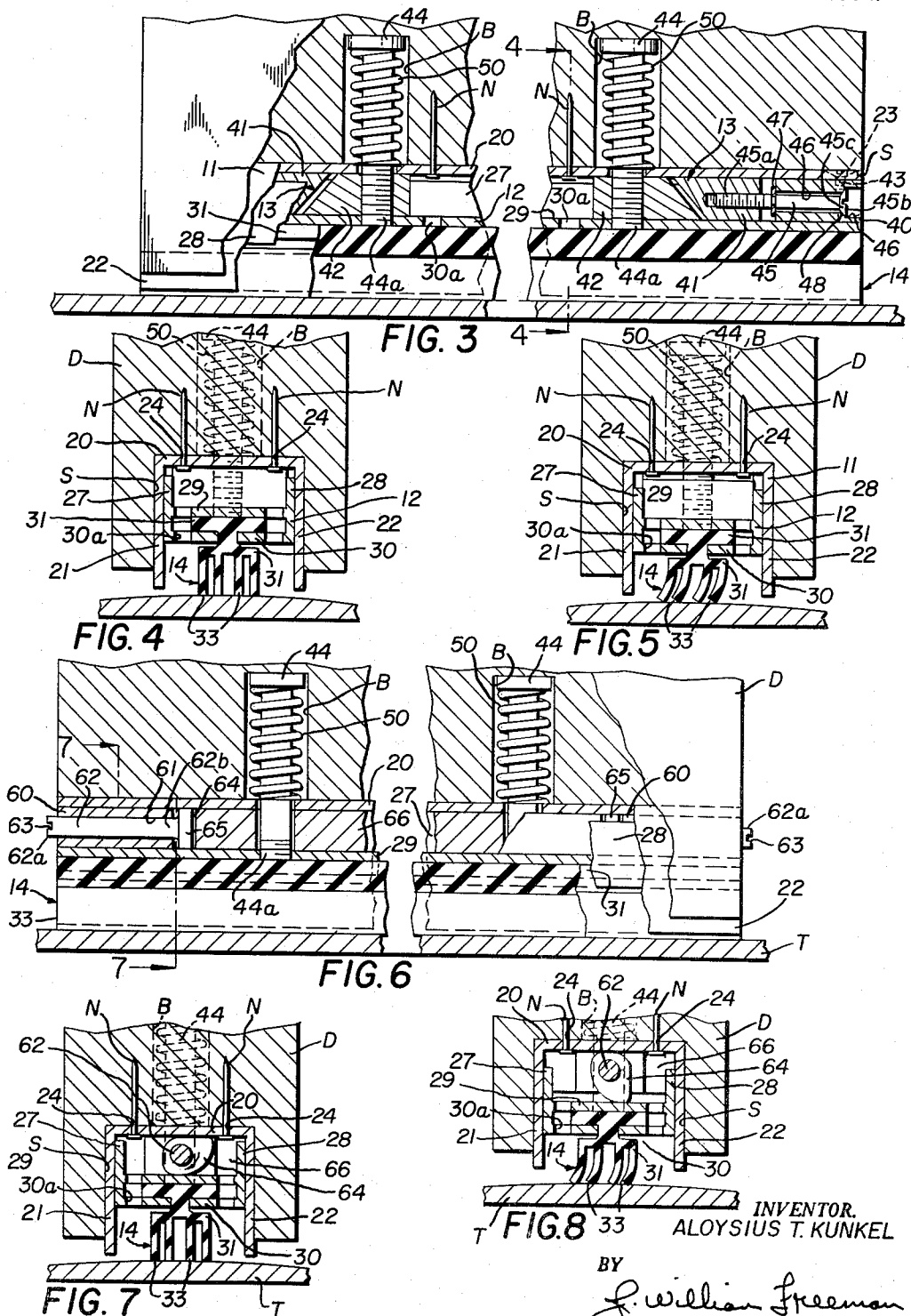
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1

2

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ADJUSTABLE WEATHERSTRIPPING FOR THRESHOLDS

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This invention relates to weatherstripping apparatus, and in particular, relates to improvements in weatherstripping units that are designed to seal the horizontal clearance space that exists between the lowermost section of a swingable closure member and the threshold or frame member that is positioned adjacent thereto.

In the construction of swingable closure members, it is a well known fact that the dimension of a door, for example, is never exactly the same as the dimension of the frame within which the same is swingably mounted, in view of the fact that clearance must be provided between these members for various reasons. Because such clearance areas are vulnerable to the passage of air, weatherstripping of various types is positioned in such clearance areas, in an attempt to minimize the heat loss occurring at these points.

Representative of such clearance is the vertical spacing that is provided between the bottom portion of a door and the adjacent threshold. This vertical clearance is provided for the purpose of eliminating among other things, "binding" between the threshold and the door that is swingably mounted with respect thereto.

With particular respect to the sealing or weatherstripping of the threshold area of a swinging door, for example, the known prior art discloses several forms of weatherstripping varying in complexity from the simple "wiper" type of weatherstripping that merely makes frictional contact with the threshold, to certain complex types that depend, for their effectiveness, on an intricate interlock between the door and the threshold to effectuate the purported seal therebetween.

Two salient disadvantages presently characterize the known type of weatherstripping for thresholds that are above discussed.

First, because the present type of weatherstripping can be positioned only in certain minimum clearance areas between the threshold and the door, it is necessary to "fit" this weatherstripping between the door and the threshold with a certain degree of accuracy, with the result that such installation can normally only be made by skilled artists specializing in such type of work. Additionally, because the threshold member is normally metal, present practice dictates that the alteration of door size be accomplished by sawing or planing the door until the required "fit" or clearance with respect to the threshold is obtained. Such a procedure can be employed on doors or closure members that are made of wood, although in actuality, the same is disadvantageous because of the labor cost that is involved in such "fitting" operations that are above described.

However, when metal or aluminum doors are being installed such as "fitting" operation is not possible at all, in view of the fact that the metal frame members of the door cannot be sawed or planed by the ordinary tools possessed and used by journeymen of the trade. Accordingly, at the present time installers of such metal doors normally leave as small a clearance as possible between the door and the threshold area, and omit the installation of weatherstripping in this area. Such a procedure is disadvantageous because of the obvious heat loss that occurs in this area.

The second disadvantage of the known prior art relates

to the inability of the same to clean itself of normal foreign objects that accrue on the top surface of the threshold per se, during normal use. Such objects include rain water, sleet, snow, dirt and grit. This lack of self-cleaning ability in such structure arises because conventional weatherstripping requires that the wiper or other contact element that is secured to the closure member be positioned adjacent the internal surface of the door, so as to make a purported sealing contact with that raised portion of the threshold that is adjacent the inner surface of the door being sealed. The fact that an artificially created friction contact accounts for whatever sealing is obtained, dictates that this pressure of contact be great; and accordingly, such wiper contacts could not be provided adjacent the outer portion of the closure member because of the obvious fact that the door could not be closed, in view of the interference that would exist with respect to the threshold member.

To the present time, the known prior art has attempted to alleviate this difficulty by providing "drain-backs" that attempt to centrally collect such foreign objects and then wash the same to a point exterior of the door by the use of liquids that are entrapped during a storm, for example. Such drain-back systems have been found to defeat themselves, however, in view of the fact that the dirt accruing invariably clogs the entry ports to the collecting chamber, with the result that the liquid cannot enter the chamber to effectuate the desired washing action.

In addition to the foregoing limitations of such drain-back systems, it is apparent that the same are expensive in construction because of the intricate design thereof, with the result that the cost of the same to the ultimate purchaser is excessive.

Another limitation of the known prior art type of weatherstripping for threshold areas, relates to the fact that a single sealing contact is normally relied on at the present time, to prevent air passage in this clearance area existing between the door and the threshold, it being heretofore impractical to provide a second sealing barrier adjacent the outside face of the door, because of the unsolved interference problems occurring in the limited vertical space that is capable of being utilized to effectuate weatherstripping of a proper degree.

In co-pending application Serial No. 502,321, filed April 19, 1955, now Patent No. 2,880,477, issued April 7, 1959 there has been disclosed an improved type of weatherstripping unit for the threshold door of a metallic swingable closure member.

The adjustment mechanism of this co-pending application contemplates the loosening and positioning, together with the resetting in a locked position, of the sealing members carried on the closure member. Thus, it is not possible in the type of weatherstripping unit disclosed in the co-pending application above referred to, to adjust to a very fine degree, it being necessary in each case to loosen, position and subsequently re-tighten the sealing unit per se of the weatherstripping unit.

Accordingly, it becomes the principal object of this invention to provide an improved type of weatherstripping unit for the threshold area of a metallic door member that is capable of fine adjustment with the use of simple hand tools and without the necessity for removing the door for the purposes of such adjustment.

It is another object of this invention to provide an adjustable weatherstripping unit of the character above described, characterized by the fact that the same can be positioned over a wide range of clearance distances that exist between the door per se, and the threshold adjacent thereto.

It is a still further object of this invention to provide

an adjustable weatherstripping unit for sealing off the vertical clearance existing between a swingable metal door and a threshold therefor, that is characterized by the presence of a plurality of sealing points, each of which operates to create, in effect, a sealing that resists the passage of wind and foreign objects to the clearance that exists between the metal door and the threshold.

It is a still further object of this invention to provide an adjustable weatherstripping unit for use at the threshold area of a metallic door, that is characterized by the presence of an improved sealing means for contact with the threshold per se.

It is a still further object of this invention to provide a new and improved type of door frame that includes as a component element thereof, a built-in threshold member that does not need to be adjusted upon installation.

These and other objects of the invention will become more apparent upon a reading of the following brief specification, considered and interpreted in the light of the accompanying drawings.

Of the drawings:

FIGURE 1 is a perspective view, partly broken away and in section and illustrating the improved sealing means illustrated on a swingable metallic door, positioned in a preformed metal frame.

FIGURE 2 is a perspective view illustrating in break-away the component parts of the weatherstripping unit per se.

FIGURE 3 is a front elevation, partly broken away and in section and illustrating the improved weatherstripping unit.

FIGURE 4 is a view taken on the lines 4—4 of FIGURE 3, and showing the sealing means of the improved weatherstripping in the normal position.

FIGURE 5 is a view similar to FIGURE 4, but showing the sealing means in the extended position.

FIGURE 6 is a side elevation, partly broken away and in section and illustrating a modified form of the invention.

FIGURE 7 is a view taken on the lines 7—7 of FIGURE 6, and showing the sealing means in the retracted position.

FIGURE 8 is a view similar to FIGURE 7, but showing the sealing means in the extended position.

Referring now to the drawings, and in particular, to FIGURE 1 thereof, the improved weatherstripping unit, generally designated by the numeral 10, is shown secured to a door D so as to effectuate a sealing action with a threshold T that is provided as one integral part of a metallic frame F.

As best shown in FIGURE 2 of the drawings, the weatherstripping unit 10 is shown as being defined by a securing channel 11 that receives interiorly thereof a supporting channel 12; the arrangement being such that adjustment means 13 moves the channel 12 relatively of channel 11 so as to effectuate adjustment of sealing means 14 in a manner to be described.

Considering first the structure of the securing channel 11, it will be seen from the drawings that the same is of elongated U-shaped configuration so as to define a base 20 and perpendicularly extending side flanges 21 and 22, with the entire channel 11 being received within the rectangular cutout slot S provided in the lowermost surface of the door D (see FIGURE 4). In addition to the aforementioned component parts, the base portion 20 is provided with a series of apertures 23, 23, two of which are provided at each axial end thereof for the purpose of attaching the adjustment means with respect thereto, as will be presently described. Also, additional apertures 24, 24 are provided (see FIGURE 2) for the purpose of securing the channel member 11 to the door as will be described.

Turning now to the detailed construction of the supporting channel 12, it will be seen that the same is of elongated H-shaped configuration, wherein a pair of vertically extending side flanges 27, 28 are interconnected by

horizontal flange member 29; the arrangement being such that the leg members 27 and 28, respectively abut against the flange members 21 and 22 in sliding contact therewith; while the horizontal member 29 coacts with the adjustment means 13, as will be presently described. In addition, the lowermost portion of the leg members 27, 28 are shown provided with return flanges 30, 30 that define, with members 27, 28 and 29 an elongated T-shaped recess for reception therein of the sealing means 14.

In addition to the aforementioned component parts, the supporting channel 12 is shown as being apertured as at 30a (see FIGURE 4) for the purpose of receiving therethrough a screw or nail N that will pass through apertures 24, as will be presently described.

To this end the sealing means 14 are shown as including a T-shaped head 31 that is receivable in the just mentioned recess of channel 12. The actual sealing edges of the sealing means 14 are shown defined by a plurality of resilient fingers 32, 32 that depend from the main body portion 33 of sealing means 14 so as to contact the threshold T and effectuate a sealing and wiping contact therewith.

Considering next the structure of the adjustment means 13, it will be seen that the same utilizes a fixed block 40 and movable blocks 41, 42 to effectuate raising and lowering of the previously described sealing means 14; the arrangement being such that block 40 is fixed with respect to channel 11 by bolts 43, 43 passed through apertures 23, 23 thereof, while block 42 is secured with respect to channel 11 through spring loaded bolt 44 which has the threaded end 44a thereof received in horizontal member 29 of channel 11, it being apparent that screws (not shown) could also be utilized to secure bolt 42 with respect to the horizontal member 29 of channel 11. In this manner, horizontal movement of block 41 will vertically raise or lower the position of channel 11 so as to accordingly adjust the sealing means 14 that are carried by channel 12 as has been previously described.

To the end of effectuating such horizontal movement of block 41, the same (block 41) is shown secured with respect to fixed block 40, through the medium of screw or shaft 45 that has the end 45a thereof threaded interiorly of block 41, while the head end 45b thereof is received in internal aperture 46 of block 40, with collar 47 being employed to obviate axial shifting of screw 45 with respect to block 40. Similarly, the actual head portion 45c of screw 45 is shown presented interiorly of block 40 by being seated against recessed shoulder 48, and in this manner the length of the unit 10 may be trimmed without effecting the adjustment means 13 thereof.

For the purpose of permitting vertical movement of block 42 upon horizontal movement of block 41 as shown by the directional arrows of FIGURE 2, the blocks 41, 42 are shown provided with inclined faces 51 and 52 respectively. With this arrangement of component parts, a wedging action will be obtained and accordingly, as the surface 51 of block 41 is moved horizontally to the left of FIGURE 3 into contact with face 52 by turning screw 45, the block 42 will be lowered, with spring 50 being compressed so as to urge the block 42 upwardly so that the same (block 42) will be raised upon "backing off" of screw 45.

In use or operation of the improved device for effectuating weatherstripping, it will first be assumed that the door D has had the appropriate slot S (see FIGURE 4) provided thereon for the purpose of receiving the securing channel 11 therein; and additionally, that the appropriate bores B, B have been drilled vertically into the slot S for the purpose of accommodating the bolt 44 and spring 50. It will be further assumed that the component parts of the weatherstripping unit have been assembled into a complete unit.

With the door prepared as just indicated, it is merely necessary that the securing channel 11 of unit 10 be se-

5

cured with respect to the slot S by passing the head and body portion of a nail N through the apertures 30a, 30a of flange 29, so that the head portion of the nail thereof may be received against base portion 20, while the body portion of the nail N may project into the wood of the door D to thus secure the channel 11 with respect thereto.

With the unit 10 thus secured to door D, the unit 10 is ready for use, and it is merely necessary, in the event that the fingers 32, 32 are to be raised or lowered, to apply rotational force to the screw 45. This turning force to the screw 45 will operate to move the block 41 to the left of FIGURE 3, for example; at which time the inclined surface 51 thereof will strike the inclined surface 52 of block 42 and cause the same to be lowered, with the result that the supporting channel 12, as well as the fingers 32, 32 carried thereby, will be correspondingly lowered. In the event it is desired to raise the fingers 32, 32 out of their point of contact with the threshold T, it is merely necessary that rotational force be applied in the opposite direction to the head 45c of screw 45; at which time the fingers 32, 32 will be raised as a result of the spring 50 moving the bolt 44 and channel 12 upwardly, while the block 41 moves to the right of FIGURE 3.

It is believed apparent that additional adjustment of this improved type of weatherstripping unit may be facilitated at any time by merely inserting a screw driver, for example, within the usual slot of the head 45c of screw 45 and merely turning the same to raise or lower the fingers 32, 32 as has just been described.

In the modified form of the invention illustrated in FIGURES 6, 7 and 8 of the drawings, there is illustrated a modified form of the invention that differs primarily from the previously described form of the invention in the form and type of adjustment means employed. Thus where indicated, like numerals indicate like parts.

Accordingly, the sealing unit 10 is shown received within slot S of door D as before, and includes a U-shaped securing channel 12 that has turned flanges 30, 30 for receiving therein the T-head 31 of sealing means 14. In this manner, the fingers 32, 32 may be raised or lowered with respect to threshold T by operation of the adjustment means 14.

As best shown in FIGURES 6, 7 and 8 of the drawings, each adjustment means 14 provided adjacent opposed ends of unit 10 includes a bearing block 60 internally apertured as at 61 to receive a shaft 62; the arrangement being such that end 62a thereof includes a turning slot 63, while the opposite end 62b thereof defines a cam member 64 that is provided with a cam surface 65. While the block 60 is secured to securing channel 11, a second block 66 is secured to channel 12 through the medium of bolt 44 which projects upwardly through channel 11 for seating in bore B with spring 50 constantly urging channel 12 and the component parts thereof to the position of FIGURE 6.

In use or operation of this modified form of the invention, it will first be assumed that door D has been provided with slot S and bores B and further, that the unit 10 has had the various component parts thereof assembled. At this time, nails N, N may be passed in entirety through apertures 30a, 30a, and the ends thereof additionally passed through apertures 24, 24 to effectuate attachment of unit 10 to door D. With the unit thus positioned, a screw driver (not shown) may have the end thereof placed in slot 63 and upon turning of the same, the cam surface 65 will move from the position of FIGURE 7 towards the position of FIGURE 8, and during such movement will, by virtue of its contact with channel 12, cause the same (channel 12) to move downwardly, with the result that fingers 32, 32 will also be lowered accordingly. Opposite rotational movement of shaft 62 will result in raising of fingers 32, 32 with spring 50 aiding in the return of the component parts to the

6

position of FIGURE 7. As before, it is apparent that the end 62a of shaft 62 could be recessed in block 60 so as to permit trimming of the length of unit 10, as previously described.

It is believed apparent that in the event the unit 10 was to be used for metal doors that were incapable of being bored with bores B, B to receive spring 50, that a leaf spring arrangement could be employed in either form of the invention above described with the leaf spring secured, for example, to securing channel 11 so as to constantly urge supporting channel 12 away from channel 11.

It will be seen from the foregoing that there has been provided a new and novel type of weatherstripping unit that is characterized by the ease with which the same can be finely adjusted to fit within a wide range of clearances. In disclosing the invention, certain parts have been specifically described as to configuration and composition for the sake of clarity. It is to be understood, however, that the basic concept herein disclosed is limited only by the scope of the hereinafter presented claims.

Accordingly, other modifications of the invention may be resorted to without departing from the spirit thereof or the scope of the appended claims.

This application is a continuation in part of co-pending application Serial No. 502,321, filed April 19, 1955, now Patent No. 2,880,477, issued April 7, 1959.

What is claimed is:

1. A weatherstripping unit of the character described, comprising; an elongated securing member, defined by a base and at least one guide flange projecting therefrom; a second elongated supporting member, defined by a base and having at least one leg flange positioned in sliding contact with said guide flange of said first mentioned securing member; an elongated sealing strip carried by the base portion of said second mentioned supporting member; and means operable between said base portions of said first and second mentioned members to urge said members apart under tension; said means including a block, fixed to said securing member; a second block, shiftable longitudinally of said first block and having an inclined face defining one longitudinal end thereof; and a third block, fixed to said supporting member and having an inclined face defining one longitudinal end thereof; said inclined faces of said second and third blocks being abutted, whereby longitudinal movement of said second block will result in vertical movement of said third block.

2. The device of claim 1 further characterized by the fact that said third block is tensionally urged towards said securing channel.

3. A weatherstripping unit for attachment to movable closure members of the character described, comprising; an elongate securing member fixed to said closure member and having longitudinal ends; an elongate supporting member having longitudinal ends that are longitudinally aligned with said longitudinal ends of said securing member and being shiftable carried by said closure member so as to be movable towards and from said closure member; a sealing strip carried by said supporting member and being movable therewith; a shaft rotatably carried by said securing member and extending longitudinally thereof with one end of said shaft being disposed adjacent one longitudinal end of said securing member; means for urging said supporting and securing members towards each other under tension; and means carried by the inboard end of said shaft for spreading said support and securing members apart upon rotation of said shaft the longitudinal ends of said securing and said supporting members remaining longitudinally aligned during said spreading.

4. A weatherstripping unit of the character described comprising; an elongated securing member defined by a base and at least one guide flange projecting therefrom and having longitudinal ends; an elongated supporting member defined by a base and having at least one leg

7

flange positioned in sliding contact with said guide flange of said securing member said supporting member having longitudinal ends that are longitudinally aligned with said longitudinal ends of said securing member; an elongated sealing strip carried by the base portion of said supporting member; tension means normally urging said securing and supporting members towards each other; and means operable between said base portions of said supporting and securing members to urge the same apart under tension by overcoming the force of said tension means the longitudinal ends of said securing and said supporting members remaining longitudinally aligned during said spreading.

5. A weatherstripping unit for attachment to movable closure members of the character described, comprising; an elongate securing member having opposed longitudinal ends, with said securing member being fixed to one edge of said closure member; an elongate supporting member having opposed longitudinal ends that are longitudinally aligned with the longitudinal ends of said securing member; an elongate sealing strip carried by said supporting member; tension means for tensionally urging said securing and supporting members towards each other; and means for selectively overcoming said tension means and moving said securing and said supporting members apart under tension; said last mentioned means including a shaft rotatably journaled to said securing member and extending longitudinally thereof; a cam surface defined by said supporting member; and cam means carried by said shaft and acting upon said cam surface upon rotation of said shaft; said longitudinal ends of said securing and said supporting members remaining longitudinally aligned during the moving apart of said securing and supporting members.

6. The device of claim 5 further characterized by the fact that said cam means include a rotatable cam member having an inclined cam face engageable with said cam surface of said supporting member.

7. The device of claim 5 further characterized by the fact that said cam means include a pair of relatively shift-

8

able block members contacting each other through complementally inclined surfaces thereof, whereby horizontal movement of one said block will result in vertical movement of said remaining block.

8. A weather stripping unit of the character described, comprising; an elongated securing member defined by a base and at least one guide flange projecting therefrom and having opposed longitudinal ends; an elongated supporting member having opposed longitudinal ends and being defined by a base and having at least one leg flange positioned in sliding contact with said guide flange of said securing member; an elongated sealing strip carried by the base portion of said supporting member; and means operable between said base portions of said securing and supporting members to urge said members apart under tension; said means including a shaft, disposed between said base portions and being rotatably carried by said securing member; and a cam wheel secured about its axis to one end of said shaft and having an inclined cam face contacting said base portions, whereby the same may be moved apart upon rotation of said shaft; said opposed longitudinal ends of said securing and said supporting members remaining longitudinally aligned during movement apart of said supporting and securing members.

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