

May 5, 1942.

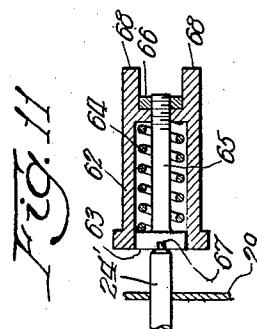
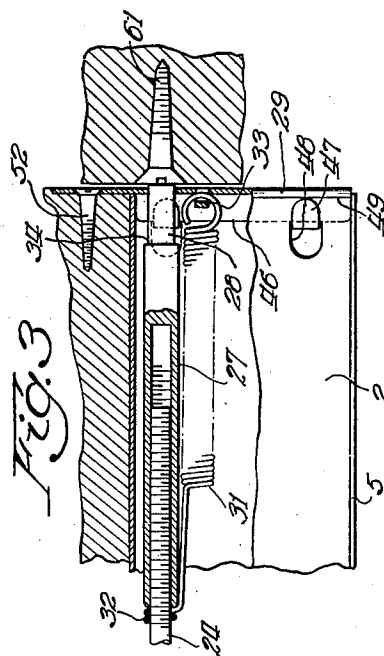
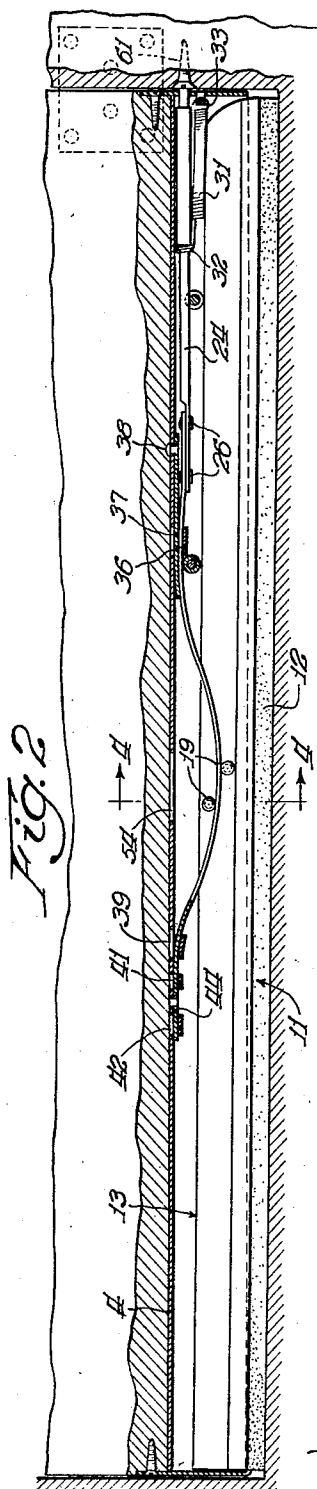
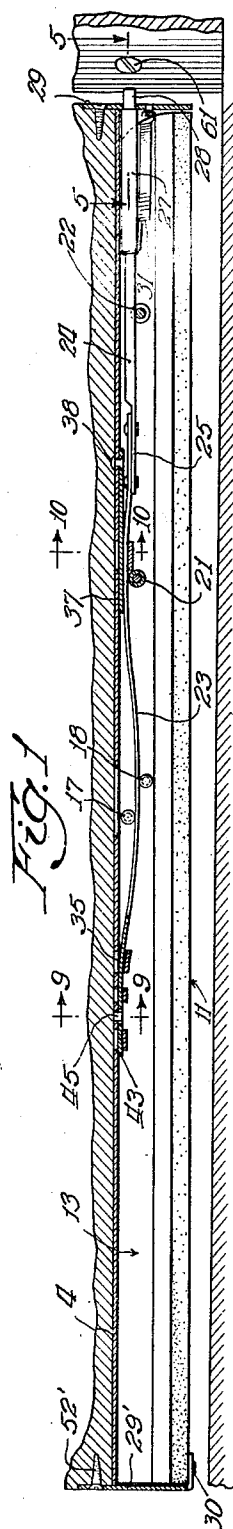
W. E. BALOUSEK

2,282,019

AUTOMATIC DOOR BOTTOM

Filed Aug. 7, 1939

2 Sheets-Sheet 1



Inventor:
William E. Balousek

By: *Stille & Stille*

Atty.

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2 Sheets-Sheet 2

Fig. 4

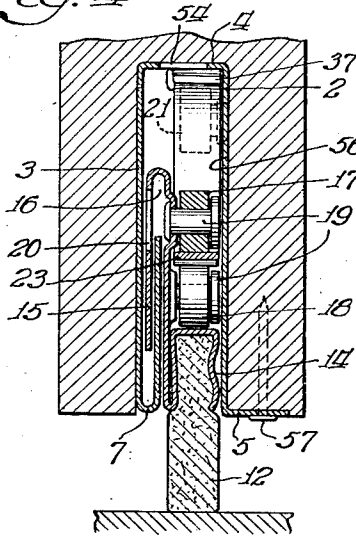


Fig. 5

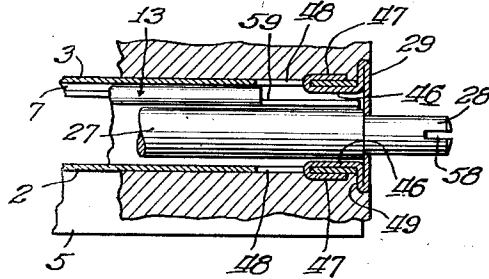


Fig. 6

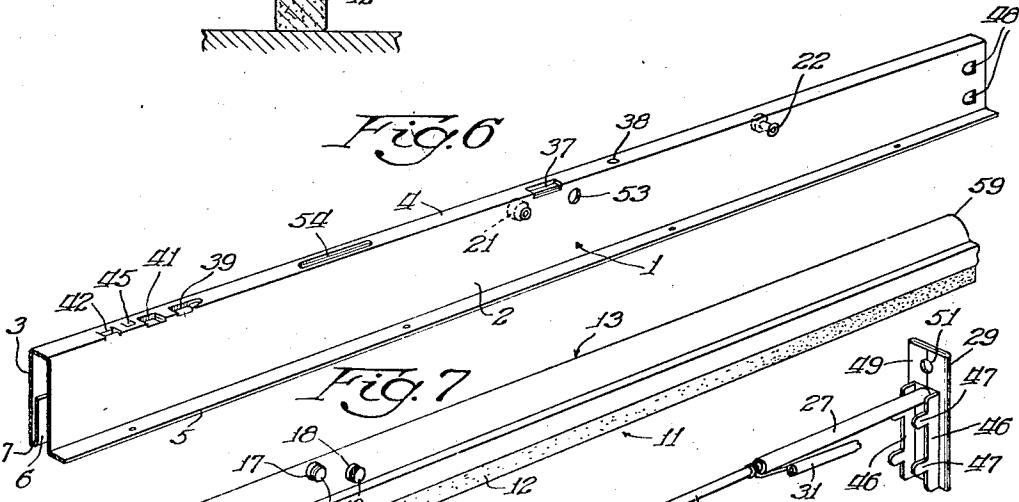


Fig. 7

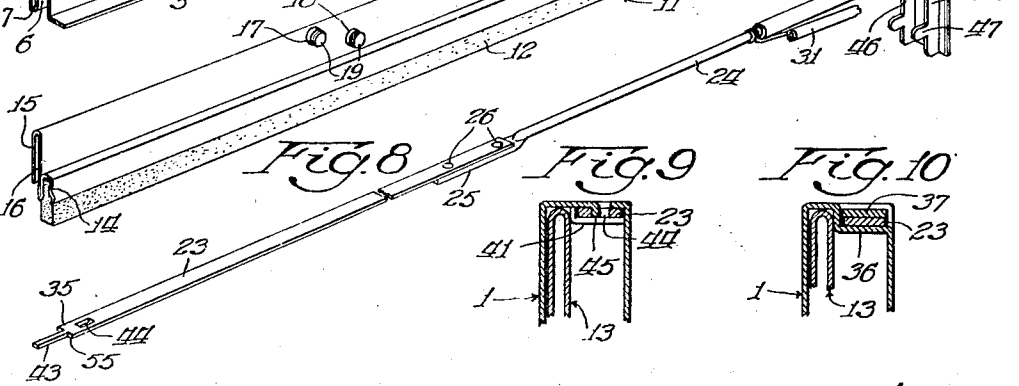
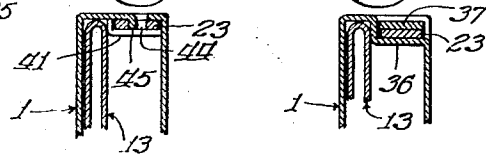


Fig. 8

Fig. 9

Fig. 10



Witness:
V. Siganders

Inventor:
William E. Balousek
By: *Steel Steel* Attys

UNITED STATES PATENT OFFICE

2,282,019

AUTOMATIC DOOR BOTTOM

William E. Balousek, Hinsdale, Ill., assignor to
W. J. Dennis & Company, Chicago, Ill., a corporation of Illinois

Application August 7, 1939, Serial No. 288,823

5 Claims. (Cl. 20—63)

The invention relates generally to weather strips, and more particularly to weather strips for use on the bottom of doors or other similar closures.

The invention has among its objects the construction of such a weather strip which is simple in construction, efficient in operation and relatively inexpensive to manufacture.

Another very important object of the invention is the production of a weather strip which is so constructed that leakage of air is substantially eliminated, at the same time providing a device which will work easily and smoothly with a minimum of friction.

Another object of the invention is the construction of such a device in which the sealing element may be described as floating, it being free to move longitudinally, thus allowing it to readily adjust itself to compensate for irregularities in the floor surface.

A further object of the invention is to the production of a device of the kind described employing novel means for securing the actuating member to the device and in other various details of construction as will be hereinafter described.

Many other objects and advantages of the construction herein shown and described will be obvious to those skilled in the art from the disclosure herein given.

To this end, my invention consists in the novel construction, arrangement and combination of parts herein shown and described and more particularly pointed out in the claims.

In the drawings wherein like reference characters indicate like or corresponding parts:

Fig. 1 is a longitudinal sectional view through the housing of the device, showing the door in open position, the sealing element being shown in elevation;

Fig. 2 is a similar view showing the door in closed position;

Fig. 3 is a longitudinal sectional view taken through the device at the end thereof adjacent the hinged edge of the door;

Fig. 4 is a sectional view taken substantially on the line 4—4 of Fig. 2;

Fig. 5 is a sectional view taken substantially on the line 5—5 of Fig. 1, showing the actuating rod in elevation;

Fig. 6 is a perspective view of a portion of the housing, showing the construction thereof;

Fig. 7 is a similar perspective view of a portion of the sealing member;

Fig. 8 is a similar view of the actuating mechanism and end plate;

Fig. 9 is a sectional view taken substantially on the line 9—9 of Fig. 1;

Fig. 10 is a similar view taken substantially on the line 10—10 of Fig. 1; and

Fig. 11 is a sectional view somewhat similar to Fig. 3 of a modified form of the construction.

I am aware that there have been numerous types of weather strips adapted to be placed on the bottom edge of a door but the great fault in these devices has been the relatively great amount of leakage of air around the sealing element. Various means have been employed to eliminate this condition, but these have had the disadvantage of increasing the frictional resistance of the sealing element in the housing.

In the present device, the sealing element is free to move into and out of engagement with the floor as the door is opened or closed, but due to its interlocking construction as will hereinafter be described, passage of air around the sealing element is substantially eliminated.

Referring to the drawings, particularly Figs. 6, 7 and 8, it will be noted that the form illustrated comprises a housing 1 having side walls 2 and 3, respectively connected by a top portion 4 to form a structure having a substantially inverted U-shaped cross section. The side wall 2 terminates in an outwardly extending flange 5, while extending from the lower edge of the side wall 3 is an inwardly extending partition or wall 6, the latter being spaced from the side wall 3 to form a narrow channel 7 therebetween. The sealing element designated generally by the numeral 11 consists of a strip of felt 12 or other suitable material which is carried by the member 13, the strip 12 being clamped by the U-shaped portion 14 of the member 13, while the upper portion of the member is bent back upon itself to provide the wall 15 to form a narrow channel 16 similar to the channel 7.

As shown in Fig. 4, the device is assembled with the walls 6 and 15 positioned in the channels 16 and 7, respectively, the two members being interlocked with one another so that the only way that they may be separated is by drawing the one longitudinally from the other. It will be noted that air leaking through the device would have to pass along the open face of the partition wall 6 of the housing around the edge thereof, down between the inner face of the wall 15 up between the outer face of the wall 15 between the same and the inner face of the side wall 3 and down between the side wall 2 and the adjacent face of the U-shaped portion 14 of the member 13. It will be apparent that at all times

there will be one or more contacting surfaces between the walls 2, 3, 6, 14 and 15 and as the leakage path is comparatively long, little if any air will pass through the device. Obviously, the sealing element 11 is free to move in the housing. As shown in Figs. 1, 2, 6 and 7, the member 13 is provided with a pair of rollers 17 and 18 carried by suitable studs 19 riveted to the member 13 directly above the U-shaped portion 14, the wall 15 having apertures 20 positioned directly opposite the rivets 19 so that both sides of the rivet are accessible during mounting. A similar roller 21 is carried from the inner wall of the housing 1 as is a guide stud 22, the side wall 3 of the housing also being provided with oppositely disposed apertures, similar to the apertures 20 and serving the same purpose.

As shown in Fig. 8, a flat spring or tape 23 is provided, the latter having one end thereof secured to a rod 24, the end of the latter being flattened as shown at 25 to receive the end of the spring which is secured thereto by rivets 26 or other suitable means. The rod 24 is threaded in an adjusting member 27, the end 28 of which extends through the end bracket 29. A coil spring 31 is secured at one end to the bracket 29 and at the other to the rod 24. As shown in Fig. 3, the latter end of the spring is coiled around the rod at 32, the opposite end passing through the eye 33 formed from the end bracket 29. The end 28 of the member 27 is of smaller diameter than the remainder of the member forming a shoulder 34, the latter adapted to seat on the inner face of the end bracket 29 to limit the outward movement of the member. The end bracket 29 is secured to the housing adjacent the end thereof at the hinged edge of the door, the rod 24 extending between the guide stud 22 and the top portion 4, the spring tape 23 passing over the roller 21 and between the rollers 17 and 18 on the member 13, with the free end 35 of the spring secured to the housing.

As shown in Figs. 6 and 10, the housing is provided with an inwardly extending portion 36. This is formed by laterally cutting the housing and bending the same inwardly between a pair of cuts. The spring tape 23 as shown in Fig. 10, passes through the guide eye formed by the portion 36 and the housing. Extending between the spring 23 and the top portion 4 of the housing and also passing over the portion 36 is a bronze strip 37. The latter is secured to the top portion 4 by means of a rivet 38 and acts as a bearing surface for the spring 23, particularly one of the rivets 26. The top portion 4 is also provided with the portions 39, 41 and 42 similar to the portion 36 and formed in a similar manner to provide guides for the spring 23. The portion 42 is smaller in width than the portions 36, 39 or 41 and forms a smaller eye adapted to receive the narrow tongue 43 at the end 35 of the spring. Adjacent the tongue 43 in the end of the spring is a small hole 44, the latter being adapted to receive a lug 45 punched from the top 4 of the housing, or other suitable means for locking the end of the spring in operative position.

The end bracket 29, as shown, is constructed from sheet metal or other suitable material and is provided with two inwardly extending flanges 46 from which extend tongues 47. After the bracket is inserted in the housing 1, the tongues 47 are bent outwardly through apertures 48 in both side walls 2 and 3, after which the tongues are bent back towards the bracket whereby the walls of the housing are securely clamped be-

tween the tongues 47 and the flanges 46. The upper portion 49 of the bracket is provided with a hole 51 for insertion of a mounting screw 52. This bracket serves several purposes—first it maintains the housing at the proper width, aligns the adjustment rod 27 and holds the end of the spring 31. It also forms a simple means for further securing the housing to the door.

The device illustrated in Figs. 6, 7 and 8 is assembled as follows:

The sealing element 11 consisting of the felt strip 12 and member 13 is inserted longitudinally into the housing 1, the portion 15 being inserted between the partition wall 6 and the side wall 3 of the housing, as shown in Fig. 4. The actuating assembly shown in Fig. 8 is then inserted in the housing, the spring tape 23 and rod 24 passing between the guide stud 22 and the top portion 4 of the housing. The spring 23 is then inserted between the bronze strip 37 and the portion 36 of the housing as shown in Fig. 10. To facilitate this last step, a work hole 53 is provided in the side wall 2 adjacent the portion 36 through which by means of a suitable tool, the end 35 of the spring 23 may be guided into proper position. The spring then is inserted between the rollers 17 and 18, the spring passing over the roller 18 and under the roller 17. Another work hole 54 is provided in the top portion 4 of the housing directly above the rollers 17 and 18. The end 35 of the spring is then drawn through the apertures or eyes formed by the portions 39 and 41, with the tongue 43 resting upon the portion 42 as shown in Figs. 1 and 2. It will be noted that when the tongue 43 is inserted into its furthestmost position, the shoulder 55 will engage the housing adjacent the portion 42. When the end of the spring has reached the above position, the lug 45 is bent downwardly through the hole 44 in the end of the spring, thereby securely locking the end of the spring to the housing. The device is secured to a door or other closure by inserting the same in a channel 56 formed in the bottom edge of the door and is held in place by means of nails 57 or other suitable means passing through the flange 5 into the door. The end bracket 29 is set in the side edge of the door and secured thereto by the screw 52, the bracket being inset so that the outer face thereof is flush with the edge of the door. A plain end plate 29' may be secured to the opposite edge of the door by a screw 52' to conceal the end of the channel 56. The lower end of this plate may be bent inwardly along the bottom edge of the door and nailed thereto as shown at 30 in Fig. 1. The adjusting member 27 is then rotated by means of a screwdriver or the like inserted in the slot 58 until the total length of the spring 23, rod 24 and the member 27 is that required to give the most satisfactory results. Obviously, by shortening or lengthening these members, the downward movement of the sealing element 11 may be readily controlled. It might be added that the end of the member 13 adjacent the end bracket 29 may be cut away as shown at 59 in Figs. 5 and 7, the partition wall 6 also being shortened a corresponding distance so that the ears 47 on the end bracket may be readily secured to the side 3 of the housing.

In the construction illustrated in Fig. 11, the adjustment member 27 is eliminated as is the spring 31. The end of the rod 24 is extended through the bracket 29, as shown at 24', and is engageable with the door jamb. Instead of the screw 61, an adjustable stop somewhat sim-

ilar to that described in my Patent Number 2,022,930 is utilized. This comprises a cup-like casing or housing 62 in which pressure member or stop 63 is slidably carried, a compression spring 64 urging the stop 63 outwardly, the latter being provided with a screw threaded shank 65 and a nut 66 for preventing the stop from coming out of the housing. By turning the stop 63 with a screwdriver or other suitable tool placed in the slot 67 adjustment relative the end of the rod 24 can be made, the nut being prevented from turning by suitable shoulders 68 formed on the housing or other means, said shoulders preventing rotation of the nut, but allowing it to slide between them. The spring 64 is relatively stiff so that engagement of the end of the rod with the head of the screw will operate the weather strip. However, when the weather strip has been firmly engaged with the floor surface, the spring will give and move inwardly with the end of the rod 24, if such action should take place.

In operation the device will normally assume the position shown in Fig. 1, the door being in open position, with the sealing element 11 drawn within the housing out of contact with the floor surface. It will remain in this position until the door has been closed sufficiently to allow the end 23 of the member 27 to engage the face of the door jamb. The latter is preferably provided with a screw 61, the head of which is positioned to engage the end 28 of the member 27 and thereby prevent marring of the door jamb by the same. Instead of the screw 61 a large tack or otherwise suitably formed element may be employed. When the end 23 engages the screw 61, it will move the member 27 inwardly until it will finally reach the position shown in Fig. 2. As the end 35 of the spring 23 is secured to the housing, the spring will buckle as shown in Fig. 2 and will exert pressure on the roller 13, thereby forcing the sealing element 11 down into engagement with the floor surface. Upon opening of the door, the spring will again assume the position shown in Fig. 1 and by means of its engagement with the roller 17, will carry the sealing element 11 up into the housing. It will be noted that the sealing element 11 is not connected to the spring 23, but is merely actuated by the same by engagement thereof with either the roller 17 or the roller 18. As the element is not connected to the spring, it might be termed floating in the housing and free to readily adjust itself to compensate for irregularities in the floor surface. Likewise, as the pressure of the spring is exerted downwardly at only one point, namely, upon the roller 18, the pressure will be uniformly distributed throughout the length of the sealing element. It will be noted that neither the rod nor the adjacent end of the spring comes into contact with the upper portion 4 of the housing, all frictional contact taking place on the bronze strip 37. As the inner end of the spring 31 is looped about the rod 24 and engages the end of the member 27, the adjustment between the same will be readily maintained and the member 27 will be prevented from rotating relative the rod except when manually adjusted. As previously mentioned, due to the interlocking construction of the sealing element and the housing, air leakage through the housing will be reduced to a minimum, there always being frictional contact between two or more of the adjacent surfaces of the side wall 3, partition wall 6 and

the walls of the member 13. The interlocking construction also forms guiding means for the sealing element insuring vertical movement of the element and preventing lateral movement thereof in the housing. Likewise, I have provided a door check in which the sealing element is substantially floating in its housing so that it will readily align itself and efficiently seal the door. While the device illustrated is shown as being mounted in a channel in the lower edge of the door or other closure member, obviously the device would be readily adapted for mounting on the face of the door adjacent the lower edge thereof.

Having thus described my invention, it is obvious that various immaterial modifications may be made in the same without departing from the spirit of my invention; hence I do not wish to be understood as limiting myself to the exact form, construction, arrangement and combination of parts herein shown and described or uses mentioned.

What I claim as new and desire to secure by Letters Patent is:

1. In a weather strip, the combination of an inverted U-shaped housing, and an end plate positioned adjacent an end of said housing, the latter having a plurality of apertures therein, said plate having flanges extending therefrom positioned adjacent the side walls of said housing, said flanges being spaced from the edges of said plate to form shoulders thereon engageable with the supporting member on which the strip is mounted and a tongue carried by each flange extending through the apertures in said housing and parallel with said side walls to secure said plate thereto.

2. In a weather strip, the combination of a supporting member, a sealing element carried by said member, and a tape operatively engageable with said element and at one end with actuating means therefor, said tape having a tongue adjacent the opposite end thereof to form a shoulder, said tongue passing through a projecting portion of said member with said shoulder butting thereagainst, said tape having an aperture therein adjacent the end thereof, and means carried by said member positioned in said aperture to lock said tape to said member.

3. In a weather strip, the combination of a housing, a sealing element carried by said housing, and a tape operatively engageable with said element and at one end with actuating means therefor, said tape having a tongue adjacent its free end to form a shoulder, the end of said tape passing through inwardly extending portions of the housing with said shoulder butting against one of said inwardly extending portions, said tape having an aperture therein intermediate said inwardly extending portions and a portion of said housing positioned in said aperture to lock said tape to said housing.

4. In a weather strip, the combination of a housing of inverted substantially U-shaped cross-section comprising a top portion and side walls extending downwardly therefrom, one of said side walls terminating in an outwardly extending flange, the other side wall terminating in an inwardly extending portion and a partition wall extending upwardly from said last mentioned portion, and spaced from said second side wall to form a relatively narrow channel therebetween, a sealing element positioned in said housing having downwardly extending walls positioned on opposite sides of said partition wall

with one of said walls in said channel, said element engageable with the surface to be sealed, and actuating means carried by the housing and operatively connected with the wall of said element positioned exteriorly said channel for moving said sealing element into and out of operative engagement with said surface.

5. In a weather strip, the combination of a housing comprising a top portion and side walls extending downwardly therefrom, one of said side walls terminating in an outwardly extending flange, the other side wall terminating in an inwardly extending portion and a partition wall extending upwardly from said last mentioned

portion and spaced from said second side wall to form a relatively narrow channel therebetween, a member carried in said housing having downwardly extending walls positioned on opposite sides of said partition wall, with one of said walls in said channel, the other wall terminating in an inverted U-shaped portion, a strip of suitable material carried in said U-shaped portion and engageable with the surface to be sealed, and actuating means carried by the housing for moving said member to operatively engage or disengage said strip with the surface to be sealed.

WILLIAM E. BALOUSEK.