March 18, 1952 C. H. FRY 2,589,364

SELF-TIGHTENING WEATHERSTRIP

Filed June 4, 1947 2 SHEETS—SHEET 1

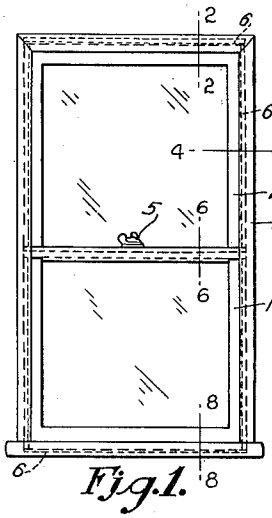


Fig. 1.

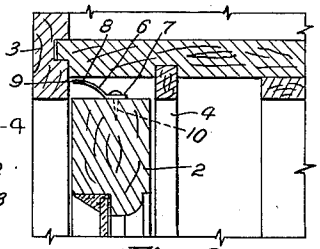


Fig. 2.

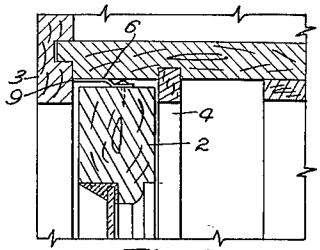


Fig. 3.

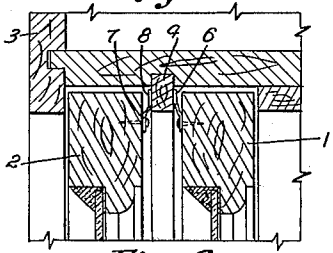


Fig. 4.

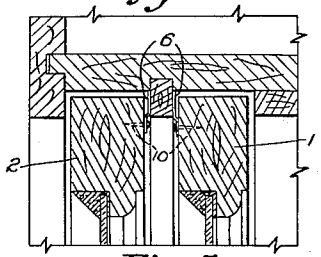


Fig. 5.

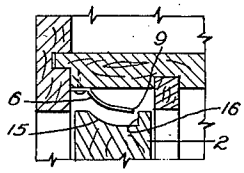


Fig. 21.

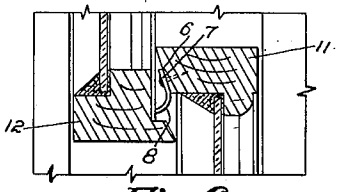


Fig. 6.

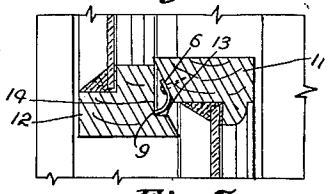


Fig. 7.

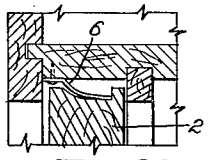


Fig. 22.

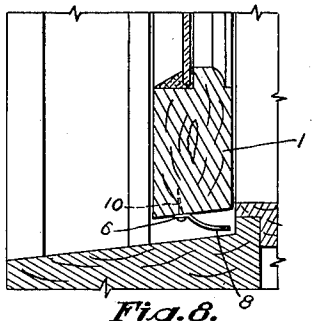


Fig. 8.

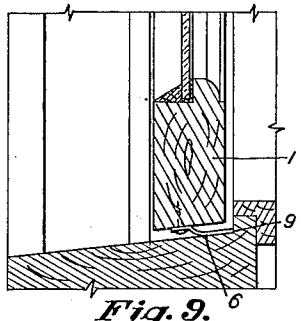


Fig. 9.

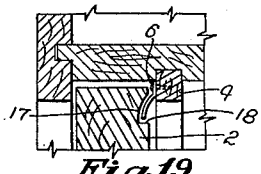


Fig. 19.

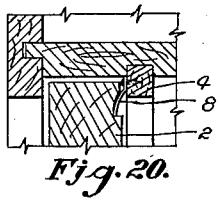


Fig. 20.

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SELF-TIGHTENING WEATHERSTRIP

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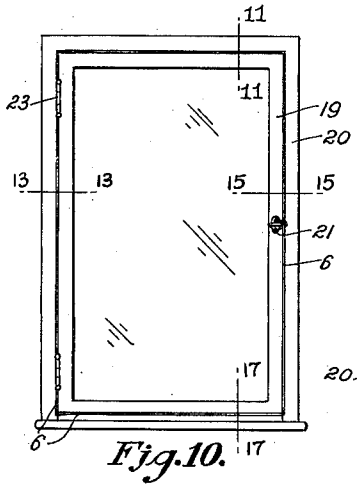


Fig.10.

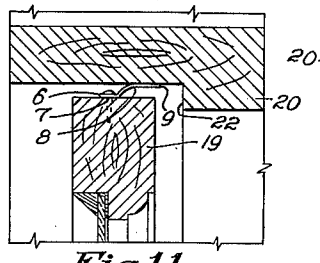


Fig.11.

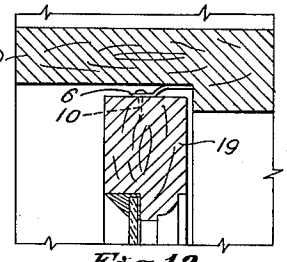


Fig.12.

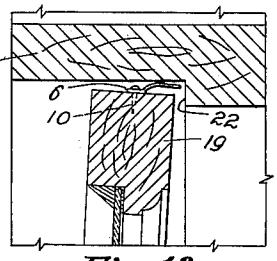


Fig.13.

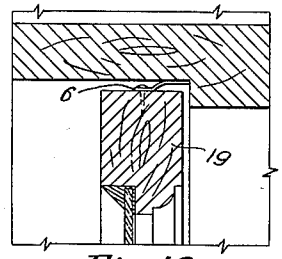


Fig.14.

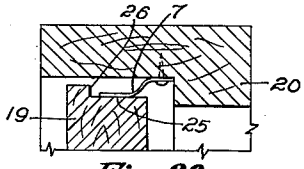


Fig.23.

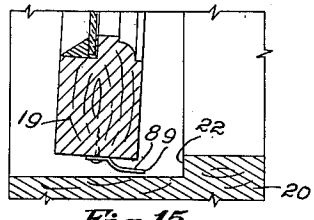


Fig.15.

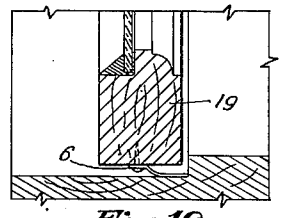


Fig.16.

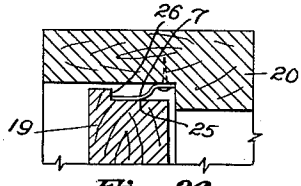


Fig.24.

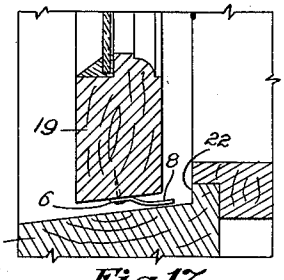


Fig.17.

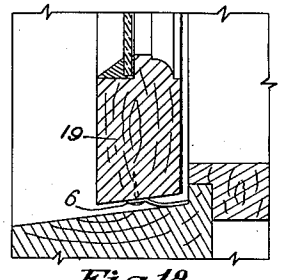


Fig.18.

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UNITED STATES PATENT OFFICE

2,589,364

SELF-TIGHTENING WEATHERSTRIP

Cyril Howard Fry, Windsor, Ontario, Canada

Application June 4, 1947, Serial No. 752,487
In Canada July 10, 1946

1 Claim. (Cl. 20—69)

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This invention relates to sealing means for closure members such as weatherstrips for windows, doors and the like.

Metal weatherstrips heretofore in general use usually either fit too tightly to permit free movement of the window or loosen in use, especially on shrinkage of the wood sash or frame, thus becoming ineffective. While these disadvantages are met in part by certain present day weatherstrips, the most satisfactory of these are so elaborate as to be excessively expensive in manufacture and installation.

An object of the present is to provide, in combination with a window or other closure medium, a metal or like weatherstrip of simple and inexpensive construction and installation, which is particularly effective in use, which maintains its effectiveness for substantially the life of the installation, and which permits substantially free, normal movement of the closure medium.

The invention contemplates the provision of a weatherstrip wherein the effective weatherstripping contact between the strip and the frame or sash of the closure assembly occurs only when approaching complete closure or on complete closure of the closure member and wherein such contact area is provided by an edge, rather than a side, surface of the weatherstrip itself.

The invention will be described with reference to the accompanying drawings, in which:

Figure 1 is an elevation of a double-hung window assembly weatherstripped in accordance with the invention,

Figure 2 is an enlarged section on line 2—2 of Figure 1, showing the top sash in slightly opened position,

Figure 3 is a section similar to Figure 2 but showing the top sash in closed position,

Figure 4 is an enlarged section on line 4—4 of Figure 1, showing the sash in unlocked position,

Figure 5 is a section similar to Figure 4, but showing the sash in locked position,

Figure 6 is an enlarged section on line 6—6 of Figure 1, showing the sash in slightly open position,

Figure 7 is a section similar to Figure 6, but showing the sash in fully closed position,

Figure 8 is an enlarged section on line 8—8 of Figure 1, showing the lower sash in slightly opened position,

Figure 9 is a section similar to Figure 8 but showing the lower sash in fully closed position.

Figure 10 is an elevation of a casement window or door assembly weatherstripped in accordance with the invention,

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Figure 11 is an enlarged section on line 11—11 of Figure 10, showing the closure member in slightly open position,

Figure 12 is a section similar to Figure 11, but showing the member in closed position,

Figure 13 is a section on line 13—13 of Figure 10, showing the member in slightly opened position,

Figure 14 is a section similar to Figure 13, but showing the member in closed position,

Figure 15 is a section on line 15—15 of Figure 10, showing the member in partially opened position,

Figure 16 is a section similar to Figure 15, but showing the member in closed position,

Figure 17 is a section on line 17—17 of Figure 10, showing the member in slightly opened position,

Figure 18 is a section similar to Figure 17, but showing the member in closed position.

Figures 19, 20, 21, and 22 are sectional views of slightly modified forms of the invention as applied to double-hung windows, and

Figures 23 and 24 are sectional views of a modified form, applied to casement windows.

Referring to Figures 1 to 9, the usual double-hung window assembly shown comprises lower sash 1, upper sash 2, frame 3, center stop 4, and sash lock 5.

The weatherstrip, in accordance with the invention, comprises a strip 6 of spring metal having a flat portion 7, for attachment to the frame or sash, and a curved spring portion 8. As shown in Figures 2, 4 and 8, the strip 6 is attached by nails, screws or the like 10, to the upper and lower sashes on each of the three frame-engaging edges thereof in such position that the curved portion 8 normally extends outwardly from the edge surface of the sash and forwardly or rearwardly, as the case may be, towards the contiguous front or rear surface of the sash, the free edge 9 of the strip lying in the same, or approximately the same, plane as that of such contiguous sash surface. As shown in Figure 6, the strip 6 is attached to the meeting rail 11 of the lower sash with the curved portion 8 extending downwardly beyond the rail.

When the sashes approach full closure or are fully closed, and the sash lock 5 actuated to lock the sashes in place, the weatherstrips 6 assume the positions shown in Figures 3, 5, 7 and 9. As the upper sash is forced upwardly towards the frame and the curved portion 8 of the strip on the upper edge of the sash is compressed between the sash and the frame, the free edge 9

of the strip is projected rearwardly of the sash and, as the closing movement approaches and reaches its final stage, into engagement with the opposite frame surface and such free edge "bites" into the frame and at the same time thrusts the top of the sash in towards the center stop to ensure a substantially absolute and positive seal between the strip and frame, as shown in Figure 3. Similarly, as the lower sash is forced downwardly towards the frame, the free edge 9 of the strip on the lower edge of the sash is projected forwardly into biting engagement with the opposite frame surface and at the same time thrusts the bottom of the sash in towards the center stop, as shown in Figure 9.

Referring to Figure 5, as the sash lock compresses the upper and lower sash together in the usual manner, the strips 6 on the inside surfaces of the two sashes are compressed between the sashes and the center stop 4, which action, in association with the thrusting action referred to above, thrusts the upper and lower sashes along their entire length towards the center stop and projects the free edges 9 of the strips laterally into biting engagement with the opposed frame surfaces.

As the meeting rail 11 of the lower sash approaches the meeting rail 12 of the upper sash, strip 6 engages the horizontally deposed surface 13 of the rail 12 and, during the final stage of the closing movement, the free edge 9 bites into the vertically disposed surface 14 of the rail 12, as shown in Figure 7.

It will be observed that, in the system described, the weatherstrips do not interfere with the free opening and closing movement of the sashes since only a slight pressure is exerted by the strips 6 on the center stop 4 and very little frictional resistance results. The weatherstripping action occurs only in the final stages of closing movement when, on actuation of the sash fastener, the weatherstrips so thrust and counterthrust between the sashes and frame that the window becomes weathertight and substantially airtight at top, bottom, sides and meeting rails.

The weatherstrips may be mounted on the frame instead of on the sash, for instance, in the manner shown in Figures 19 to 24. In Figure 21, the edge of the sash is notched at 15 to receive the curved portion of the strip 6 and to provide a vertically disposed surface 16 for engagement with the thrusting free end 9 of the strip, as shown in Figure 22. In Figure 19, the forward or rearward face of the sash is notched at 17 to receive the curved portion of the strip 6 and to provide a horizontally disposed surface 18 for engagement with the thrusting free end 9 of the strip, as shown in Figure 20.

Referring to Figures 10 to 16, the casement window assembly includes the sash 19, hinged at 23 to frame 20, and the usual sash lock 21. The flat portion 7 of the weatherstrip 6 is fixed to the upper, lower and side edges of the sash, as shown, with the curved portion 8 extending forwardly, the free end 9 thereof lying in a plane beyond that of the contiguous forward surface of the sash. As the window approaches closed position, the free ends 9 of the strips engage the opposed faces 22 of the frame and, in the fully closed position shown in Figures 12, 14 and 16, bite into such faces 22 to provide tight sealing

engagement. As before, there is the thrusting sealing action of the weatherstrip which, being a flexible spring, acts, as a result of the closing action on the free ends of the same, to thrust the sash downwardly, upwardly and outwardly against the bottom, top, and sides, respectively, of the frame.

As shown in Figures 23 and 24, the weatherstrip is applied to the frame instead of to the sash. In this form, the sash edges are recessed at 25 to receive the curved portion 7 of the strip and to provide a shoulder 26 against which the free end 9 bears when the window is closed, as shown in Figure 24.

It will be understood that the weatherstripping arrangement described may be applied to any closure medium where sealing engagement is required.

The weather strip described is self-adjusting and self-tightening in response to the pressure exerted by the standard sash fastener, and any expansion or contraction of the wood sash or frame is automatically taken up or allowed for without destroying the effectiveness of the device.

The thrusting action described provides an elastic flexible mounting of the sash, which increases the sealing action and results in freedom of adjustment to overcome irregularities of frame and sash.

While the strip has been described as formed of metal, it will be understood that it may be made of any other suitable material, such as plastics or the like.

I claim:

In window construction, the combination with a window frame and a sash therefor, said sash and frame each having complementary edge and side surfaces, said sash being slidable in the frame to place said edge surfaces in juxtaposition to close the window and to place said edge surfaces in spaced relation to open the window, of means for sealing the joint between said surfaces in the closed position of the window comprising a thin metal strip coextensive with said edge surface of the sash and having one lateral edge portion engaging and fixed to said sash edge surface, the remaining and major portion of said strip being outwardly offset from and thereby lying in spaced relation to said sash edge surface and having a free edge, said free edge lying in the plane substantially coincident with the plane of the adjacent side surface of the sash, said offset portion of the strip being engaged by the edge surface of the frame on closing movement of the sash to compress the offset portion between said edge surfaces and to project said free edge in a direction away from said fixed edge portion, said side surfaces of the frame being engaged by said projected free edge substantially throughout its length.

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