

Sept. 8, 1953

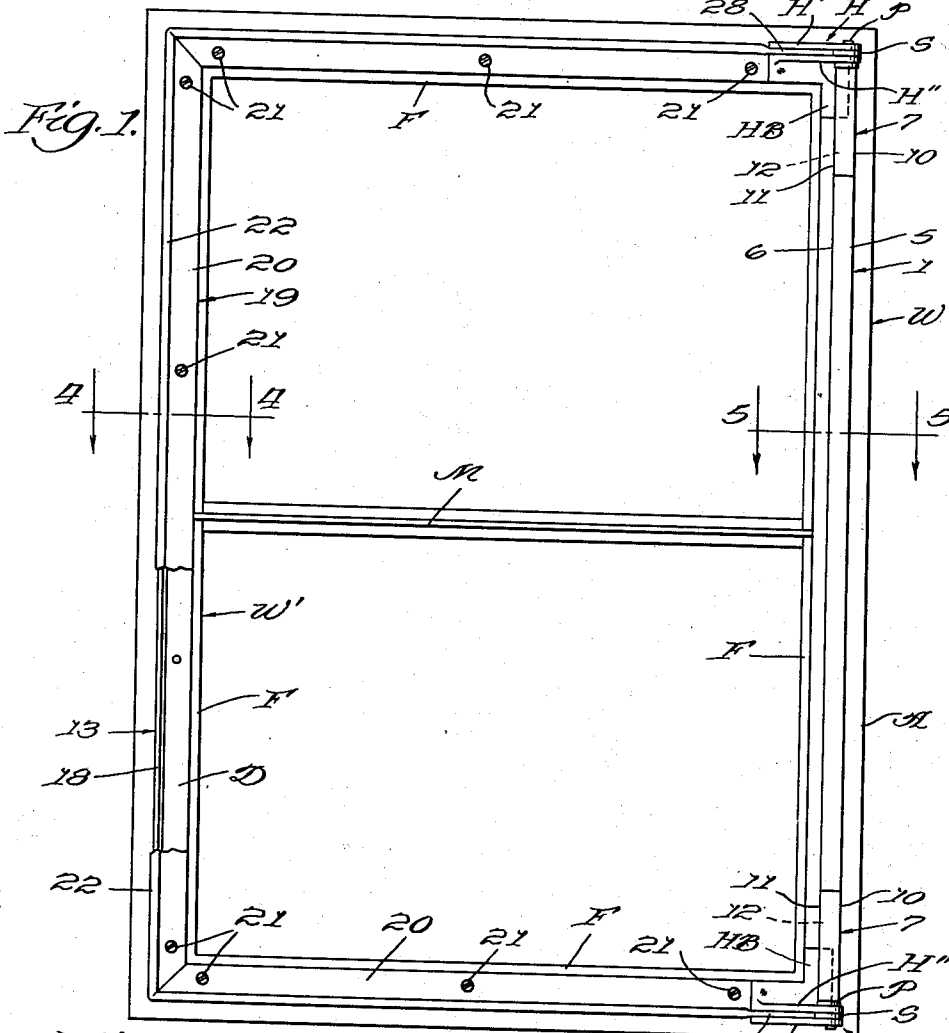
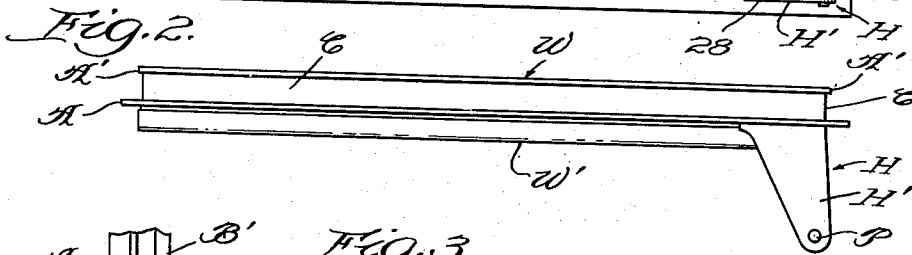
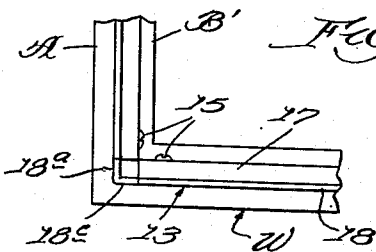
T. O. CRAIG, JR., ET AL

2,651,392

WEATHER STRIP FOR METAL CASEMENT WINDOWS

Filed Dec. 11, 1950

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 4.

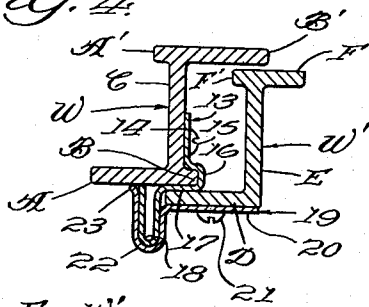


Fig. 5.

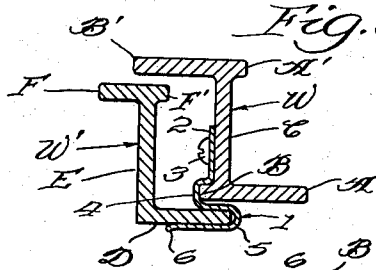


Fig. 6.

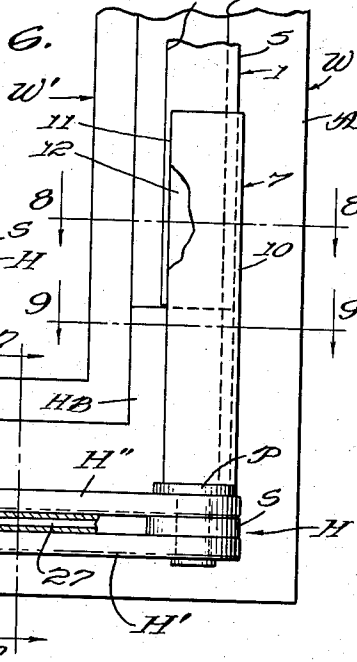


Fig. 7.

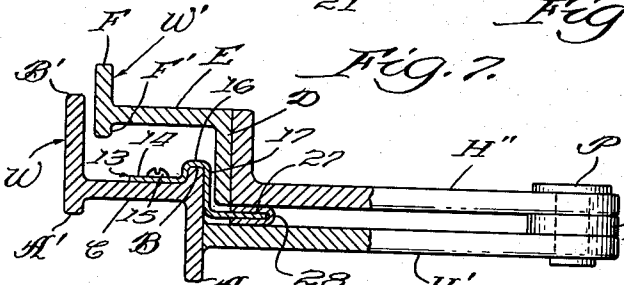


Fig. 8.

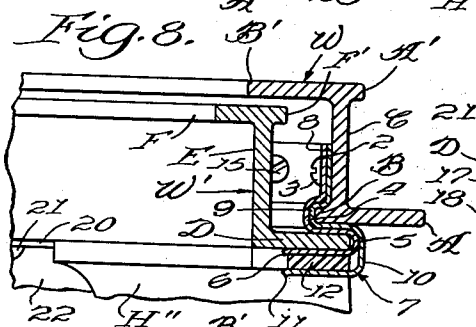


Fig. 9.

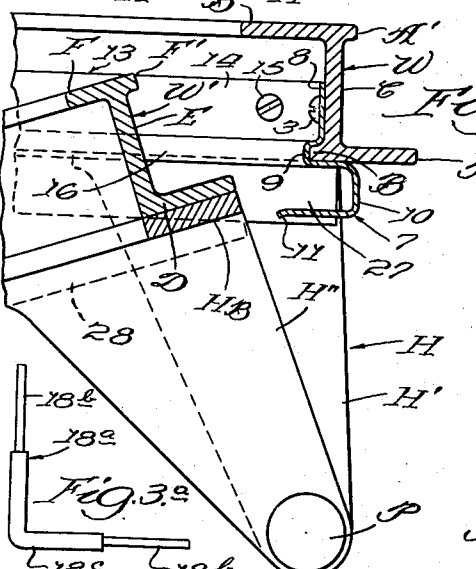
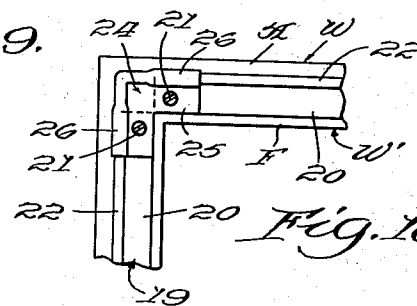


Fig. 10.



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UNITED STATES PATENT OFFICE

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WEATHER STRIP FOR METAL CASEMENT WINDOWS

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6 Claims. (Cl. 189-65)

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This invention relates to casement windows and particularly to an improved form of weatherstrip for use with metal casement windows.

Heretofore many attempts have been made to provide a suitable weatherstrip for metal casement windows and such attempts have usually resulted in a weatherstrip which must be applied to the window frame before the window and frame assembly is installed in a building. Additionally, most if not all of such attempts employ yielding metal strips having a resilient edge which engages the window and which on contact with a raised point on the surface engaged, is raised away from the surface over a considerable portion of its length with resultant failure in its intended function. Metal casement type windows are commonly applied on buildings having a stucco exterior and the outer face of the frame component is covered by the stucco, making it thereafter impossible to apply a weatherstrip element to the outer face of the frame, and it is for this reason that prior art devices contemplate the installation of weatherstrip to the window and frame before it is installed in a building. So far as is known, all prior art attempts to provide a metal weatherstrip for metal casement windows have been deficient in one or both respects discussed above.

With the foregoing considerations in mind, it is an object of the present invention to provide a weatherstrip construction for metal casement windows which comprises mating components carried by the frame and sash elements which are so constructed and arranged as not to be dependent on a smooth straight surface on either the frame or the sash to achieve an efficient seal.

Another object of the invention is to provide a metal weatherstrip construction for metal casement windows which is so constructed and arranged as to be susceptible of application on windows installed in a building.

A further object of the invention is to provide a metal weatherstrip for metal casement windows in which one of the sealing components comprises a U-shaped element which yieldingly receives another element to effect a double sealing action.

Still another object of the invention is to provide a metal weatherstrip for metal casement windows embodying the above advantages and which is so designed as to be capable of being supplied in long lengths for application on the job or which can be furnished in sets for application to windows of specific standard sizes.

A still further object of the invention is to pro-

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vide a metal weatherstrip for metal casement windows which is simple in design, does not require special skill to install, and which is reliable in use.

With the foregoing objects in view, together with such other objects and advantages as may subsequently appear, the invention resides in the parts and in the construction, combination, and arrangement of parts, described, by way of example, in the following specification of one mode of execution of the invention; reference being had to the accompanying drawings which form a part of said specification and in which drawings:

Fig. 1 is a front elevation of a metal casement window to which the invention has been applied, a portion of the sash component being broken away to disclose concealed parts.

Fig. 2 is a top plan view of Fig. 1,

Fig. 3 is a front elevation of a corner of the frame component of the window showing the application of one component of the weatherstrip thereto and the formation of a corner joint therein.

Fig. 3a is a front elevation of a splice element for the corner joint shown in Fig. 3,

Figs. 4 and 5 are enlarged transverse sectional views taken, respectively, on the lines 4-4 and 5-5 of Fig. 1,

Fig. 6 is an enlarged fragmentary front elevation of one of the hinge corners of the window shown in Fig. 1,

Figs. 7, 8 and 9 are transverse sectional views taken, respectively, on the lines 7-7, 8-8, and 9-9 of Fig. 6, and

Fig. 10 is a fragmentary front elevation of a modified form of corner joint for the weatherstrip.

Referring to the drawings, the invention is shown applied to a steel casement window comprising a frame component W and a sash component W' hinged thereto along one side of the frame component by a pair of hinges H, H each comprising a stationary member H' mounted on the frame component, a moving element H'' mounted on the sash component and a spacing washer S; the members being pivotally connected by a pin P disposed outwardly from one side edge of the frame component as best shown in Figs. 2, 7 and 9. The usual opening means (generally a crank operated worm and wheel segment) and hand operated latch means have been omitted from the drawings as not necessary to the disclosure of the invention. Both the frame and sash components are formed of bar stock of modified Z-bar cross section; the frame

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component having an outwardly extending wide front flange A and a short inwardly extending front flange B connected to a wide inwardly extending rear flange B', and short outwardly extending flange A' by a web portion C, while the sash component comprises a wide outwardly extending front flange D connected by a web E to a wide inwardly extending flange F and narrow outwardly extending flange F' (see Figs. 4, 5 and 7). The sash component is of such size that when closed the flange portions thereof will lie closely adjacent to the corresponding flange portions of the frame component with the webs C and E thereof spaced apart as also shown in Figs. 4, 5 and 7. The outer face of the flange F forms a seat for the window glass and the glassed area may be divided into pane areas by one or more mullions M as shown in Fig. 1; the glass being secured therein by any of the usual means employed for that purpose. Since the presence or absence of the glass is not necessary to an understanding of the invention, it has been omitted from the drawings.

The weatherstrip along the hinge side of the window assembly comprises a strip of resilient metal 1 having a flat flange portion 2 adapted to lie on the inner face of the web C and to be secured thereto by a series of screws 3 threaded into the web C. Along one edge, the strip 1 is formed into a shallow return bend 4 which surrounds the flange B and thence extends part way across the flange A and is formed into a return bend 5 having an outwardly turned lip portion 6; the return bend being adapted to yieldingly receive the flange D of the sash component as the window is closed as shown in Fig. 5. The strip 1 extends between the adjacent ends of the hinge supporting blocks HB which are formed as integral parts of the hinge elements H' and extend along the face of the flange for short distances downwardly from the upper hinge and upwardly from the lower hinge. In the region of the hinge blocks, due to the increased thickness of the edge that must be received in the weatherstrip, auxiliary strips 7 are provided each of which (see Figs. 8 and 9) comprises a flange portion 8 secured to the inner face of the web C and extending from the corners of the sash component to underlie the ends of the strip 1 as shown in Figs. 6, 8 and 9. The strips 7 are each provided with return bends 9 similar to the bends 4 which extend around the edge of the flange B and thence are formed into return bends 10 with out-turned lip portions 11; the return bends 10 being sufficiently wide to yieldingly receive the flange D and the superimposed hinge blocks HB (see Fig. 9) and beyond the ends of the hinge blocks, the spaces between the overlapping portions of the strips 1 and 7 are filled by blocks 12 of plastic material cemented or otherwise secured in place as shown in Fig. 8.

The construction of the weatherstrip extending around the top and bottom and the opening side of the window is of the cross section shown in Fig. 4 except where modified to accommodate the hinges as shown in Fig. 7. This comprises a stationary element 13 formed of strips of thin resilient metal which extend along the three sides of the frame component, each having a flange portion 14 secured to the inner face of the web W by a series of screws 15 and having a shallow return bend 16 extending around the flange B. The element thence continues across the front face of the flange A to about the mid point thereof as at 17 and is bent forwardly away from the flange

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and thence back toward the flange with resultant formation of a return bend 18 with the free edge of the strip disposed closely adjacent to the front face of the flange A.

The element 13 may be manufactured in long strips which are then cut to length as illustrated in Fig. 3; the continuation of the bead formed by the return bend 18 being formed by an L-shaped corner forming splice element 18a (see Fig. 3a) having end portions 18b which enter the adjacent return bend and a mid portion 18c which is of the same cross sectional dimension as the exterior of the return bend 18.

The moving element 19 which cooperates with the stationary element 13 comprises a strip of thin resilient metal having a flange portion 20 lying on and secured to the front face of the flange D of the sash component by a series of screws 21. Beyond the free end of the flange D the strip is bent outwardly and thence inwardly to form a return bend 22 terminating in an out-turned lip 23; the return bend being adapted to yieldingly embrace the return bend 18 when the window is closed and thus provide an efficient seal which is not dependent on the surface of the window elements for its effectiveness. The strips forming the moving element may be furnished in long lengths and notched to permit the formation of corners as shown in Fig. 1 or the strips may be cut to form miter corners as in the case of the stationary element. Alternatively, the moving element strips may be cut with square ends as shown in Fig. 10 and the corner formed by a corner splice element 24 formed of a metal stamping having a flange portion 25 which extends around the corner and overlies the ends of the strips forming the moving element 19 and having a return bend portion 26 which is enlarged at its ends to receive the ends of the return bend portions 22 and thence reduced in size to the same size as the return bends 22 and thus forming a continuous channel along the top, bottom and opening side of the window to engage the return bend portion 18 of the stationary element as the window is moved to closed position as shown in Fig. 4.

The space between the adjacent faces of the hinge elements H' and H'' formed by the spacing washers S in most windows is insufficient to receive the full thickness of the nested return bends 18 and 22 and the portions of the strips 13 and 19 lying therebetween are modified in the manner best shown in Figs. 6 and 7 in such cases. Where such reduction in thickness is required, the outer leg of the return bend 18 of the strip 13 is cut away in the region of the hinge elements H' and H'' leaving a single leaf portion 27 and in all cases, the flange 26 of the strip 19 is cut away to permit the return bend 22 thereof to extend between the hinge members to the points of juncture with the strips 7 at the corners. The return bends 22 which engage the leaf portion 27 are pinched together slightly as shown at 28 in Figs. 1, 6 and 7 to engage the leaf 27 and to be received in the narrow space between the adjacent faces of the hinge members; this adaptation being usually done on the job by merely pinching the two sides of the return bend together for the required distance with a pair of pliers or by hammering.

Thus there has been created a weatherstrip construction for metal casement windows which is formed from resilient metal strips which are of such shape that they may be economically manufactured in long lengths by rolling to form.

The applied weatherstrip forms a double seal around the window and is not dependent on smooth window surfaces to effect the sealing action. Additionally the installation is simple and does not require highly skilled workers for that purpose. Further, it may be applied to windows in completed stucco exterior buildings, since only a small portion of the outer face of the frame component is required to be exposed and the attachment of the stationary element of the weatherstrip to the frame component is on the inner face of the web portion of that component. It is also to be noted that the free end of the return bend portion of the stationary component 13 is disposed in close proximity to or in contact with the front face of the frame component so that it may effectively support the return bend portion thereof as it is enveloped by the yielding grip of the return bend portion of the moving element 19 incident to closing the window.

While we have illustrated and described one embodiment of our invention in the foregoing specification and drawings it is not to be implied therefrom that the invention is limited by such disclosure and it will be understood that our invention embraces all such modifications in the parts, and in the construction, combination, and arrangement of parts as shall come within the purview of the appended claims.

We claim:

1. A weatherstrip construction for a metal casement window including in combination a rectangular frame component and a sash component hingedly attached thereto and movable from open to closed positions relative to the frame component; said weatherstrip construction comprising a first resilient sheet metal element including a mounting flange portion fixed to an internal surface of the frame component and a longitudinally co-extensive return bend portion extending along the outer face of the top and bottom sides and the side remote from the hinge; said return bend being disposed wholly outwardly beyond the plane of the outer surface of the frame component, and, a second resilient sheet metal element including a mounting flange portion fixed to and extending along the outer surface of the corresponding sides of the sash component and a longitudinally co-extensive return bend portion disposed to yieldingly engage and fit over the return bend portion of said first strip incident to closing of the window.

2. A weatherstrip construction for a metal casement window including in combination a rectangular frame component having an outer flange portion and a web portion disposed normally to the flange portion and extending toward the interior of the building and a sash component hingedly mounted at one side of the frame component and movable from open to closed positions relative thereto; said weatherstrip construction comprising a first resilient sheet metal element having a flange portion attached to the exposed surface of the web portion of the frame component and extending along all sides of said frame component except the side thereof to which the sash component is hinged and having a return bend portion substantially co-extensive with said flange disposed wholly outwardly of the plane of the outer surface of the frame component, and a second resilient sheet metal element fixed to the outer surface of and extending along the correspond-

ing sides of the sash component and having a return bend portion disposed wholly outwardly of the outer surface of the sash component and effective to yieldingly engage and fit over the return bend portion of said first strip incident to closing of the window.

3. A weatherstrip construction for a metal casement window including in combination a rectangular frame component having an outer flange portion disposed parallel to a plane containing the frame component and a rearwardly extending web portion adjacent the inner perimeter of the flange and a sash component hingedly mounted along one side of the frame component and having an outer flange portion extending parallel to the flange portion of the frame component; said weatherstrip construction comprising a first resilient sheet metal element including a mounting flange portion fixed to the exposed web surface of the frame component and a return bend portion disposed wholly outwardly from the outer flange portion thereof along all sides of the frame component except the hinged side thereof, a second resilient sheet metal element including a mounting flange portion attached to the outer surface of the flange portion of the sash component and a return bend portion positioned to overlie and yieldingly grip the return bend portion of said first element when the window is moved to closed position.

4. A weatherstrip construction for a metal casement window including in combination a rectangular frame component having an outer flange portion disposed parallel to a plane containing the frame component and a rearwardly extending web portion adjacent the inner perimeter of the flange and a sash component hingedly mounted along one side of the frame component and having an outer flange portion extending parallel to the flange portion of the frame component; said weatherstrip construction comprising a first resilient sheet metal element fixed to the frame component and having a return bend portion disposed wholly outwardly from the outer flange portion of the frame component along all sides of the frame component except the hinged side thereof, and a second resilient sheet metal element having a flange portion attached to the flange portion of the sash component and having a return bend portion positioned to overlie and yieldingly grip the return bend portion of said first element when the window is moved from open to closed position.

5. A weatherstrip construction for a metal casement window including in combination a rectangular frame component and a rectangular sash component hingedly mounted on the frame component and movable from open to closed positions with respect to the frame component; said weatherstrip construction comprising a first sealing means comprising a series of resilient metal strips attached to the frame component and extending one each along each of the sides thereof except the hinged side thereof; each of said strips including an integrally formed return bend portion coextensive therewith disposed wholly outwardly of the frame component, and a second sealing means comprising a series of resilient metal strips mounted one each on the component strips of said corresponding sides of the sash component parallel to the first sealing means and including return bend portions coextensive with the return bend portions of said first sealing means adapted to receive and yieldingly engage the outwardly projecting portions of said first

sealing means when the window is moved from open to closed position.

6. A weatherstrip construction for a metal casement window including in combination a rectangular frame component and a rectangular sash component hingedly mounted on the frame component and movable from open to closed positions with respect to the frame component; said weatherstrip construction comprising a first sealing means comprising a series of resilient metal strips attached to the frame component and extending one each along each of the sides thereof except the hinged side thereof; each of said strips including an integrally formed return bend portion coextensive therewith disposed wholly outwardly of the frame component, and a second sealing means comprising a series of resilient metal strips mounted one each on the corresponding sides of the sash component and disposed parallel to the component strips of said first sealing means and including a return bend portion coextensive with said first sealing means

positioned to receive and yieldingly engage the outwardly projecting portion of said first sealing means when the window is moved from open to closed position.

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JOSEPH MICHAEL LEWIS.

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