Feb. 19, 1935. E. D. BARRINGER 1,991,357

WEATHER STRIP FOR SWINGING METAL WINDOWS

Filed March 14, 1934 2 Sheets-Sheet 1

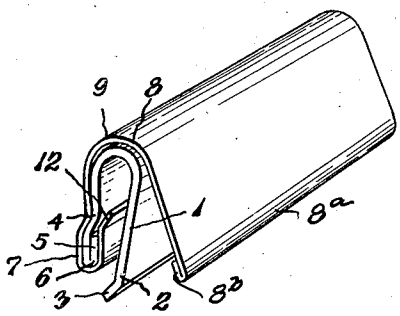


FIG. 1.

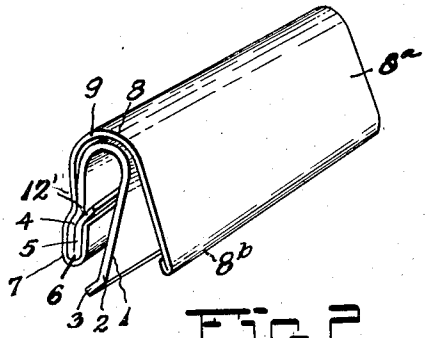


FIG. 2.

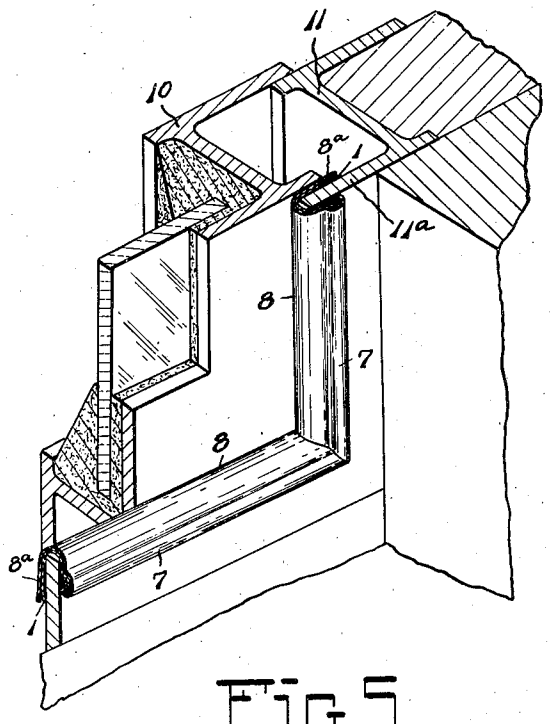


FIG. 5.

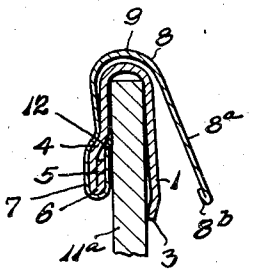


FIG. 3.

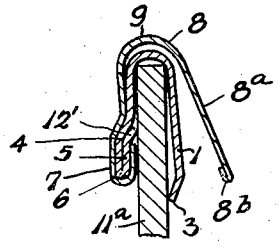


FIG. 4.

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FIG. 6.

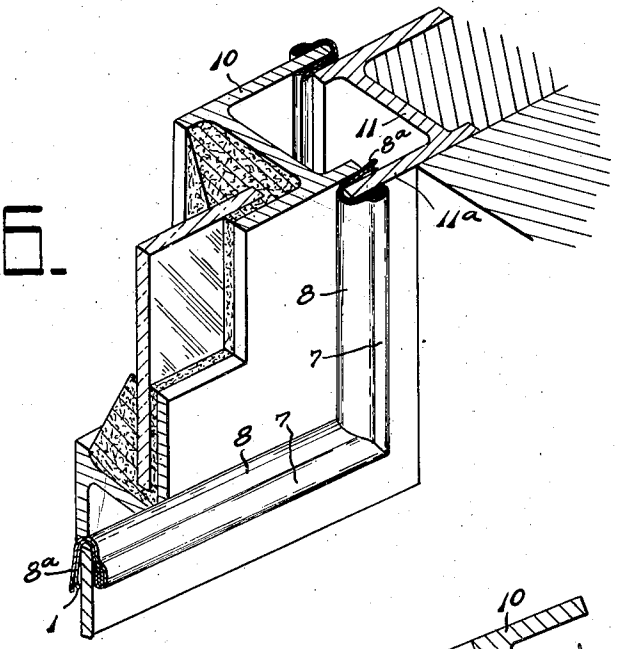


FIG. 7.

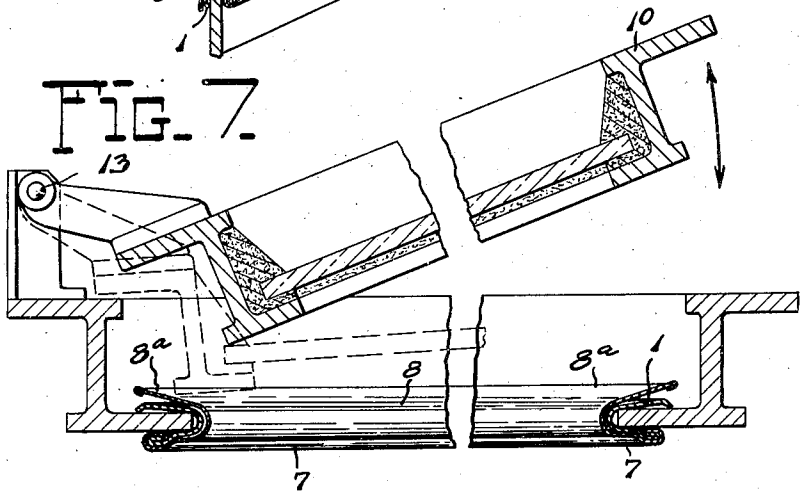
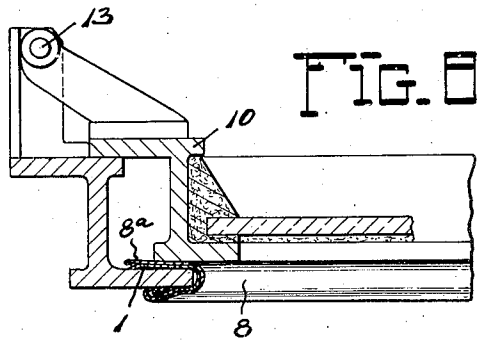


FIG. 8.



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WEATHER STRIP FOR SWINGING METAL WINDOWS

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Application March 14, 1934, Serial No. 715,520

17 Claims. (Cl. 189—65)

The present invention has to do with improvements in that type of weatherstrips which are designed primarily for use in connection with metal windows, including the casement type, such as may be hung on vertical pivots or hinge means, the center pivot type, top hung type or the bottom hinge type. Metal windows present a special problem in regard to the application of weatherstrips thereto, particularly referring to the method of securing same in position on the frame of the window.

It has been proposed heretofore to secure weatherstrips to metal windows by rivets or special fastenings, but this method is highly disadvantageous, usually requiring the drilling or forming of holes to receive the fastening. Again, it has been proposed to employ constructions of weatherstrips applied to metal windows by self-clamping action of portions of the strips, so to speak, thus eliminating the need for special fastening means separate from the strip unit.

My invention involves improvements in the latter type of clamping construction of strip above mentioned. So far as I am aware, the clamping type of weatherstrip which utilizes a clamping element as a part of the strip unit adapted to engage with an edge of the frame of the window, involves practical difficulties of adoption because the clamping element has heretofore been ineffectual to permanently hold the strip in place upon the window frame. Therefore one of the important objects of my invention has been to design a weatherstrip construction having an especially efficient clamping member or element for the purpose above referred to, one which will enable the quick application of the strip to the window frame, involving a biting edge or lip which is engaged with the frame so as to give a gripping effect in a direction opposite to that in which the strip is moved in order to apply it to the frame, the biting or gripping member of the clamping means additionally acting so as to prevent any liability of accidental displacement of the strip once positioned on the frame. In matter of fact my construction of the gripping member of the clamping part of my strip is so effective that once it is placed in position on the frame it is very difficult to remove the strip without the use of a special tool or tool action for such purpose.

Another feature of my invention of primary importance involves the formation of the weather closing member of my strip in a peculiar manner as to its arrangement respecting the clamping portion, so that the said weather closing member is not only resilient in its action to perform its weatherstrip function, but is disposed on the frame in such a manner that there is no liability of improper engagement of the movable window therewith such as will give rise to mutilation or distortion or improper bending of said weather closing member incident to the closing movement of the window relatively to the frame. I have perceived that one of the difficulties in the use of said known types of metal window weatherstrips has been the tendency of the window movement to cause such an abutment of the window with the strip as to bend or distort the same from its normal shape and prevent proper weatherstrip action of the weather closing portion of the strip member, and I have designed my strip to avoid the above difficulty.

Still another feature of my invention involves the formation of my weatherstrip of composite construction, said construction taking two forms preferably, though possibly other forms may be used equally to embody same. In one form the gripping member or biting lip of my clamping element is made a part of the clamping member of the two-part construction, wherein a clamping member and a weather closing member make up the composite device. In the second form just above referred to the said gripping member or biting lip is made a part of the weather closing member of the strip instead of a part of the clamping member, as previously mentioned.

My invention involves other detailed features of construction appertaining to the relative mounting and mode of attachment of the clamping and weather closing members of the strip such as will be more fully evident upon reference to the following description in conjunction with the annexed drawings, in which:

Figure 1 is a perspective view of a preferred form of weatherstrip embodying my invention.

Figure 2 is a similar view to Figure 1, showing a modification of the invention.

Figure 3 illustrates by a cross sectional view the mode of mounting of the weatherstrip construction of Figure 1 upon the edge of the flange portion of the Z-bar of a metal window frame.

Figure 4 is a view similar to Figure 3 but showing the form of Figure 2 applied to the window frame.

Figure 5 is a fragmentary perspective view showing the manner of application of the weatherstrip of Figure 1 to a window frame and the way in which the window closes against the window closing member of the weatherstrip so

as to compress the same against the clamping member.

Figure 6 is a view similar to Figure 5 but illustrating how my weatherstrip may be applied to the inner portion of the Z-bar of a window frame and to the outer flange of the Z-bar of the window, should it be desired to have double protection against the weather at both the inner and outer sides of the frame and window members.

Figure 7 is a horizontal sectional view illustrating a window frame and a swinging type casement window pivoted thereto, full lines illustrating the open position of the parts and dotted lines showing how the window swings inwardly and out upon the weather closing window of the weatherstrip so as to merely compress or bear thereagainst under resilient pressure action of said closing member, without liability of distortion or mutilation of the weatherstrip unit in any way.

Figure 8 is a fragmentary view like Figure 7, except showing the window in full closed position and the manner in which the parts of the composite strip are disposed under such conditions.

I refer first to Figure 1 of the drawings showing one of my preferred forms of weatherstrip as comprising the clamping member 1 of somewhat U or horseshoe shape in cross section, one of the sides of said clamping member projecting slightly beyond the other as shown at 2 and being bent at a slight angle to provide a resilient window frame engaging flange 3, or if the weatherstrip of my invention is applied to a window, the flange acts as a window engaging flange. The other side of the clamping member 1 is bent outwardly as shown at 4 and then rebent upon itself as shown at 5 to provide a fold or folded edge, so to speak. The folded edge, generally designated as 6, affords an anchorage, so to speak, for the attachment portion 7 of the weather closing member 8. The attachment portion 7 consists largely of a U-fold bent about the fold 6 of the clamping member 1 and pressed into clamped immovable engagement with said folded portion 6. The U portion 7 is bent so as to fit into the angle portion 4 of the body of the clamping member 1, from which point the U portion extends around the general U-shaped body of the clamping member 1 as shown at 9, being spaced away from said body of the clamping member 1 as shown clearly in the drawings, thereby to provide a freely movably resilient wing 8*a* that constitutes the main weather closing member or portion of my strip. Preferably the free edge of the weather closing member or wing 8*a* is folded as at 8*b* to give reinforcement or strength to such edge in an obvious manner. Normally the member 8*a* diverges in its disposition, in reference to the adjacent side of the clamping member 1 so that there will be considerable space between them when the weatherstrip is not performing its weatherstrip function; that is, when the window designated 10 is in an open position in relation to the frame designated 11, see Figure 5 and other figures of the drawings.

The U portion 7 of the weather closing member 8 at the edge adjacent to the fold 6 of the clamping member 1 is bent at an angle and toward the opposite spaced side of the clamping member 1 to provide the biting lip or gripping member 12 which acts in a peculiar manner to perform an important function for the purposes of the invention. Thus, as is seen in Figure 3, when the weatherstrip of my construction above set forth is applied to a flange or edge of one of the Z-bars of a window frame as shown in Figure 5, the said flange or edge being designated 11*a*, the gripping member or biting lip 12 is disposed so as to incline in a direction opposite that of the direction of movement of the clamping member 1 when emplacing the strip upon the edge or flange portion 11*a* of the window frame. I have found this to be a highly desirable construction because the said gripping member 12 thus acts as an effective biting element to resist any tendency for my weatherstrip to be displaced from the window frame. Under practical conditions in fact by reason of the resiliency of the gripping member 12 and its peculiar angular disposition as set forth, it so bites into the metal of the window frame, or, if applied to the window, to the metal of the window itself, as to resist fully any attempt to remove the strip. There is therefore no likelihood of accidental displacement of the strip because even to remove it practically requires the application of a tool between the window frame or part which is engaged by the gripping member 12 so as to discontinue or release its gripping action. However, since once the weatherstrip is applied to the frame or window itself, it is not necessary to ever remove it under ordinary conditions, it is obvious that the very strength and efficiency of the gripping action of the part 12 is highly desired.

Now as to the specific construction of the device of Figures 1 and 2, it is notable that I may employ for the formation of the clamping member 1 a heavier gauge bronze or metal strip than utilized in the making of the weather closing member 8. Obviously it is desirable in order to obtain an effective clamping action of the member 1 that the same have a fairly strong resilient clamping effect and this is obtained by the use of the heavier gauge material than necessary to be employed for the construction of member 8 which performs its weather closing function incident to mere resilient contact, which contact is distributed over a fairly large area of surface in establishing the weatherstrip seal, so to speak.

Figure 5 illustrates clearly the manner of mounting of the metal window frame 11 in a building structure and the relative disposition of the metal sash 10 when closed in reference to the frame 11, the action of the sash at the inner flange of its Z-bar frame being to bear against the weather closing member 8*a* with sealing contact, and the pressure of this part of the window sash being such as to cause the member 8*a* to move into an approximately parallel position with respect to the outer side of the clamping member 1. Attention is further called to the peculiarity of construction in respect to the curvature of the member 8 around the clamping member 1 in such a way as to practically enfold the clamping member therein, but also in such a way that except at the point where the member 8 is anchored to the inner side of the clamping member, said member 8 with its wing 8*a* is spaced slightly from the member 1 at all points. The object of this construction is to avail of the full resiliency of the weather closing member 8 with its wing 8*a*, same being of relatively light gauge metal, so that there will be no difficulty in closing the window sash 10, the force required to move the sash into closed position being relatively small since practically little or no resistance is set up by the employment of the contacting weather closing member 8 carried by the clamping member 1.

Reference is now made to Figure 2 wherein

as before suggested, the gripping member or biting lip 12' is produced by extending the free edge portion of the fold 6 of the clamping member 1, the angular disposition of the gripping member 12 in this form of my invention being substantially the same as the disposition of the member 12 in the Figure 1 type. In other words, the only substantial difference between the two modifications of my invention as herein set forth lies in the fact that in the Figure 1 type the gripping member 12 is produced by extending an edge portion of the weather closing member, whereas in the Figure 2 type the gripping member 12', equivalent to the member 12, is produced by extending an edge of the strip of material from which the clamping member 1 is made.

Figures 6 to 8 illustrate quite clearly various mountings of my weatherstrip upon metal sash and/or frame structures. In Figure 6 the frame 11 carries the weatherstrip in substantially the same manner as in Figure 5, but in this arrangement now being described the sash 10 likewise carries my weatherstrip on the outer flange of the Z-bar.

Figure 7 illustrates the mode of application of my weatherstrip means to a common type of metal window and sash structure known as the outwardly swinging casement window type. In this construction the casement window 10 is pivoted to swing out on the axis provided by pintle means 13. It is clear by reference to the full and dotted lines that as the casement window or sash 10 swings to its closed position, the hinge side of the sash moves into self-sliding contact with the outwardly diverging resilient wing 8*a* and there is no liability of mutilation, improper distortion, or bending out of shape of the part 8*a* incident to the closing of the window. Such disadvantageous result would be liable to take place if the resilient weather closing member 8*a* were disposed so as to project in the opposite direction to that in which it is illustrated as being disposed at the left in Figure 7. In Figure 8 the window sash 10 of Figure 7 is in full closed position, illustrating how the wing 8*a* of the weather closing member 8 moves toward or against the adjacent side of the clamping member 1, affording the desired resilient contact between the parts 8*a* and the sash 10, the weatherstrip under these conditions effectively closing the space between the sash and its frame found necessary to be occupied by some weather closing means.

Figures 3 and 4 depict in an excellent manner the way in which the gripping members 12 and 12' engage with biting effect the metal flange portion of the window sash, or window frame as the case may be, upon which the weatherstrip means of the invention is disposed. By reason of the action of the parts 12 and 12' there is no likelihood of accidental movement or displacement of the weatherstrip after it has once been put in position for use. The emplacement of the weatherstrip is effected by forcing the clamping member 1 over the flange in an obvious way, pushing the clamping member as far onto the flange as the depth of the loop or U structure of the clamping member will permit.

Save in respect to the parts 12 and 12' since the remaining parts of the weatherstrip device are substantially alike, the reference characters applicable to the two modifications of the invention illustrated are the same, and the parts are therefore correspondingly designated by similar reference characters, with the single exception noted.

It is notable that in the assemblage of the clamping member 1 and the weather closing member 8 the weather closing member enfolds or encircles, so to speak, the clamping member 1 which is arranged between the sides of the weather closing member, and one edge of the weather closing member is inter-engaged with the fold portion 6 of the clamping member 1 by being folded thereabout and mechanically impinged therewith in a tight manner so that the parts 8 and 1 are thus united without liability of coming apart. This uniting action may be performed by any suitable type of machine adapted after a manner to swage the fold 7 of the weather closing member around the fold 6 of the clamping member. In this same operation of uniting the parts 1 and 8 the angle 4 may be formed, which angle denotes the upper terminus of the anchored together portions of the folds 6 and 7. When the weatherstrip means is once applied the part 3 of the clamping member 1 is located almost opposite the fold portion 6 of said member, so that separation of the sides of the clamping member is necessary in applying same to the portion of the window frame or sash which is to carry it. This separation compels the clamping action of the clamping member 1 relatively to the part with which it engages, holding the weatherstrip in place for use. The gauge of metal used for making the member 1 affords substantial strength while the lighter gauge of metal used for making the member 8 affords substantial resilient contact which is all that is necessary to obtain the weather closing function of the member 8.

As seen best in the several figures of the drawings, it is notable that the gripping members 12 and 12' are so formed that in the clamping engagement of the clamping member 1 the side of the clamping member from which the gripping member projects affords a bearing pressure area just about at the point of the angle 4 which is approximate to the gripping member at the outer surface thereof. By reason of this structure the inherent spring clamping action of the clamping member 1 enables it to act upon the clamping member with resilient engaging force to enhance the gripping effect of the gripping member in a manner obvious from the foregoing in conjunction with the drawings.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States, is—

1. A weatherstrip construction of the class described, primarily designed to be engaged with a flange of the Z-bar of a metal window frame or sash, the same comprising a clamping member having spaced sides to receive therebetween the flange portion of the part on which the weatherstrip is to be mounted, a gripping member carried by the clamping member to engage a side of said flange part in placing the clamping member on said flange part, said gripping member extending in a direction opposite that of the movement required in placing the clamping member in position on the flange part, and a weather closing member carried by the clamping member, said weather closing member including a yieldable sealing wing substantially spaced normally from but having yieldable movement towards and from one side of the clamping member.

2. A weatherstrip construction of the class described, primarily designed to be engaged with

a flange of the Z-bar of a metal window frame or sash, the same comprising a clamping member having spaced sides to receive therebetween the flange portion of the part on which the weatherstrip is to be mounted, a gripping member carried by the clamping member to engage a side of said flange part in placing the clamping member on said flange part, said gripping member extending in a direction opposite that of the movement required in placing the clamping member in position on the flange part, and a weather closing member carried by the clamping member and including a yieldable sealing wing normally spaced laterally at its extremity from the extremity of one side of said clamping member but having yieldable movement towards and from one side of the clamping member, the said gripping member constituting an extension of one of the said clamping and weather closing members.

3. As a new article of manufacture, a weatherstrip comprising a substantially U-shaped clamping member adapted to receive in the U thereof the flange or similar portion of a window or sash frame, a gripping member carried by said U-shaped clamping member and projecting laterally from the inner face of one of the sides of said U-shaped body of the clamping member at a point intermediate the closed end of the U-shaped portion and the open end thereof, together with a weather closing member carried by said clamping member and substantially encircling the same and including a sealing wing laterally offset in substantially spaced relation to one side of the clamping member.

4. As a new article of manufacture, a weatherstrip primarily designed for metal window frames and sash constructions for self-clamping action when applied to the latter to avoid the use of separate fastenings, the same comprising a substantially U-shaped clamping member to receive between the sides thereof the part on which the weatherstrip is mounted, a gripping member carried by one side of the clamping member on the inner face thereof and projecting therefrom in a direction opposite that of the open portion of the clamping member, combined with a weather closing member of substantially U-shape having one of the sides thereof anchored to a side of the clamping member, thence extending around the clamping member to substantially enfold the latter, and having its other side resiliently spaced from the side of the clamping member opposite to that to which the clamping member is anchored.

5. As a new article of manufacture, a weatherstrip comprising a substantially U-shaped clamping member to embrace a part to which the weatherstrip may be applied, and gripping and weather closing means associated with the clamping member including a piece of metal folded around one edge of a side of the clamping member and extended laterally from said side at an inclination to the side in the direction of the closed portion of the clamping member to provide a biting lip, and a weather closing wing resiliently disposed in spaced relation to a side of the clamping member.

6. As a new article of manufacture, a composite weatherstrip for metal windows or the like, the same comprising a substantially U-shaped clamping member between the sides of which a portion of a metal window or frame may be received, a substantially U-shaped weather closing member between the sides of which the clamping member is disposed, means whereby the weather closing member is anchored to the clamping member at one side of the latter, and clamping means extending laterally from one side of the clamping member at its inner face for engaging with biting action into the window or sash part received between the sides of the clamping member.

7. As a new article of manufacture, a weather strip of the class described, comprising composite parts including a clamping member of substantially U-form adapted to receive the flange portion of a metal window or sash, a weather closing member of substantially U-form between the sides of which the clamping member is disposed, the weather closing member having a fold at one side thereof engaging and anchoring the same to the adjacent edge of the adjacent side of the clamping member, the opposite side of the weather closing member being spaced from the opposite side of the clamping member and resiliently movable relatively thereto, and a gripping part carried by the side of the clamping member and projecting from said side toward the opposite side.

8. As a new article of manufacture, a weatherstrip of the class described, comprising composite parts including a clamping member of substantially U-form adapted to receive the flange portion of a metal window or sash, a weather closing member of substantially U-form between the sides of which the clamping member is disposed, the weather closing member having a fold at one side thereof engaging and anchoring the same to the adjacent edge of the adjacent side of the clamping member, the opposite side of the weather closing member being spaced from the opposite side of the clamping member and resiliently movable relative thereto, and a gripping part carried by the side of the clamping member and projecting from said side toward the opposite side in a direction inclining toward the closed portion of the clamping member, the body of the weather closing member extending around the body of the clamping member in substantially spaced relation except at the point of anchorage of these two parts together.

9. As a new article of manufacture, a weatherstrip of the class described comprising a substantially U-shaped clamping member having at one of its sides a folded edge portion, a substantially U-shaped weather closing member having at one side a folded edge portion folded into tight impinging engagement with the folded edge portion of the clamping member and thence extending around the clamping member in substantially spaced relation thereto, the side of the weather closing member opposite the side inter-engaged with the clamping member being spaced from the clamping member and providing a freely movable resilient wing for weather closing contact action, there being a gripping member projecting from the side of the clamping member interengaged with the weather closing member and located intermediate the open and closed portions of the clamping member provided by the U-formation of the latter.

10. A weatherstrip construction of the class described, comprising a clamping member having spaced sides to receive therebetween a portion of the part on which the weatherstrip is to be mounted, and a weather closing member comprising spaced sides between which the clamping member is arranged, said weather closing member including a weather closing wing resiliently

movable toward and from the adjacent side of the clamping member.

11. A weatherstrip construction of the class described, comprising a clamping member having spaced sides to receive therebetween a portion of the part on which the weather-strip is to be mounted, and a weather closing member comprising spaced sides between which the clamping member is arranged, said weather closing member including a weather closing wing resiliently movable toward and from the adjacent side of the clamping member, the said clamping member having spring clamping action and being made of metal of a heavier gauge than that from which the weather closing member is made.

12. As a new article of manufacture, a weather-strip primarily designed for metal windows and frames, the same comprising complemental inner and outer members of approximately U-form, one disposed within the other, one of said members forming a clamping member to directly engage the window or other part upon which it is to be mounted, and the other member comprising a weather closing member having a part resiliently movable relative to and normally spaced from an adjacent side of the first mentioned member, one of said complemental members having an edge portion folded about the edge portion of the other member to establish an anchorage connection between the members.

13. As an article of manufacture, a weatherstrip for metal windows and frames, comprising complemental inner and outer members, each member of approximately U-form in cross section, and one member being received in the other, the last mentioned member constituting a clamping part and the member which receives it constituting a weather closing part, the said members being formed so as to provide an anchorage connection between them at one edge, and the outer member which receives the clamping part being normally spaced from the clamping part throughout the area thereof excepting at a point adjacent to the anchorage connection.

14. As a new article of manufacture, a weatherstrip comprising a clamping member of U-form in cross section, a weather closing member of approximately U-form in cross section in which the clamping member is received, said parts being anchored together at adjacent edge portions of adjacent sides thereof, and a gripping member projecting from the clamping member at one side thereof and extending toward the opposite side thereof and having a bearing portion upon the side of the clamping member upon which it extends, said bearing portion engaging said side when the clamping member is in position upon a part to which it may be secured.

15. A weatherstrip of the class described, comprising superimposed substantially U-shaped folds of resilient material, one fold lying within the other, the outer fold being normally spaced from the inner fold except for a relatively small portion thereof adjacent the outer extremity of one side where the respective sides of the folds are normally in substantial contacting engagement, the opposite side of the outer fold diverging outwardly from the adjacent side of the inner fold and constituting a yieldable weather closing wing when the strip is mounted on a sash or frame flange with the flange grippingly received within the inner fold.

16. A weatherstrip of the class described, comprising superimposed substantially U-shaped folds of resilient material, one fold lying within the other, one side of the outer fold diverging outwardly from the adjacent side of the inner fold and constituting a yieldable weather closing wing when the strip is mounted on a sash or frame flange with the flange grippingly received within the inner fold.

17. A weatherstrip of the class described, comprising complemental inner and outer members, each member of approximately U-form in cross section, and one member being received in the other, the last mentioned member constituting a clamping part and the member which receives it constituting a weather closing part, the said members being so formed as to provide an anchorage connection between them at one edge, the outer member which receives the clamping part being normally spaced from the clamping part throughout the area thereof excepting at a point adjacent to the anchorage connection, and one of said members having adjacent said anchorage connection a gripping member projecting laterally and towards the closed ends of the U's.

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