Oct. 22, 1935. E. D. BARRINGER 2,018,115

WEATHER STRIP CONSTRUCTION

Filed Jan. 27, 1934 2 Sheets-Sheet 1

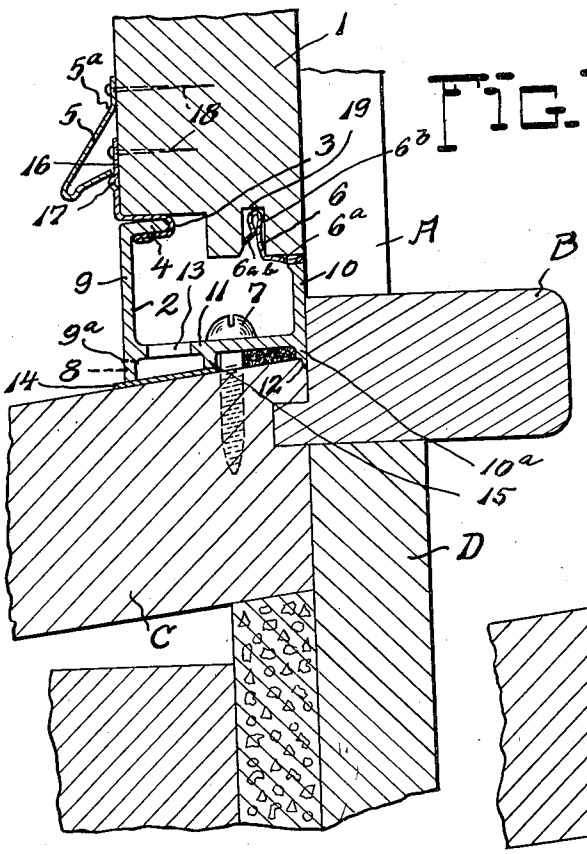


Fig. 1.

Fig 2.

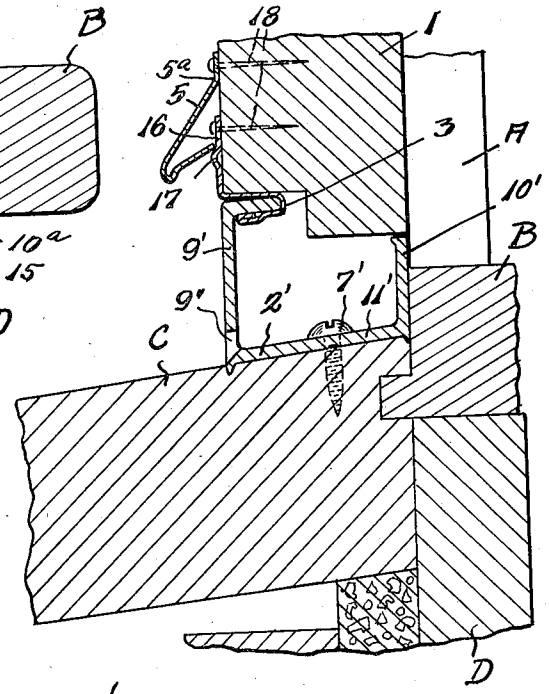
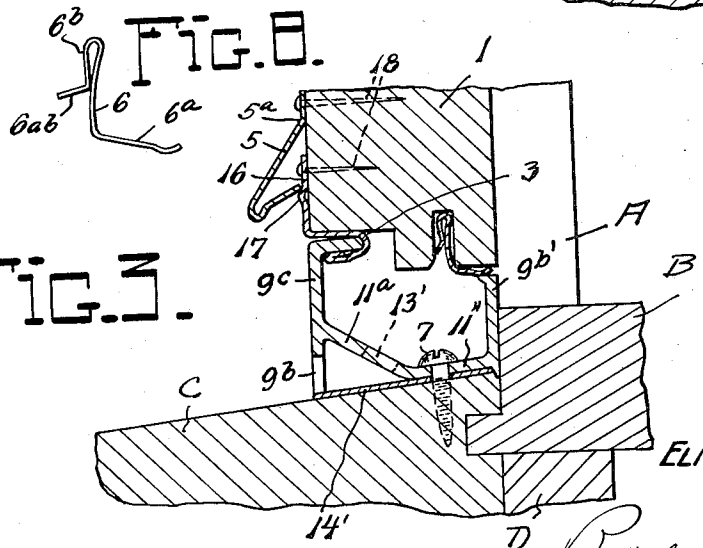


Fig. 3.



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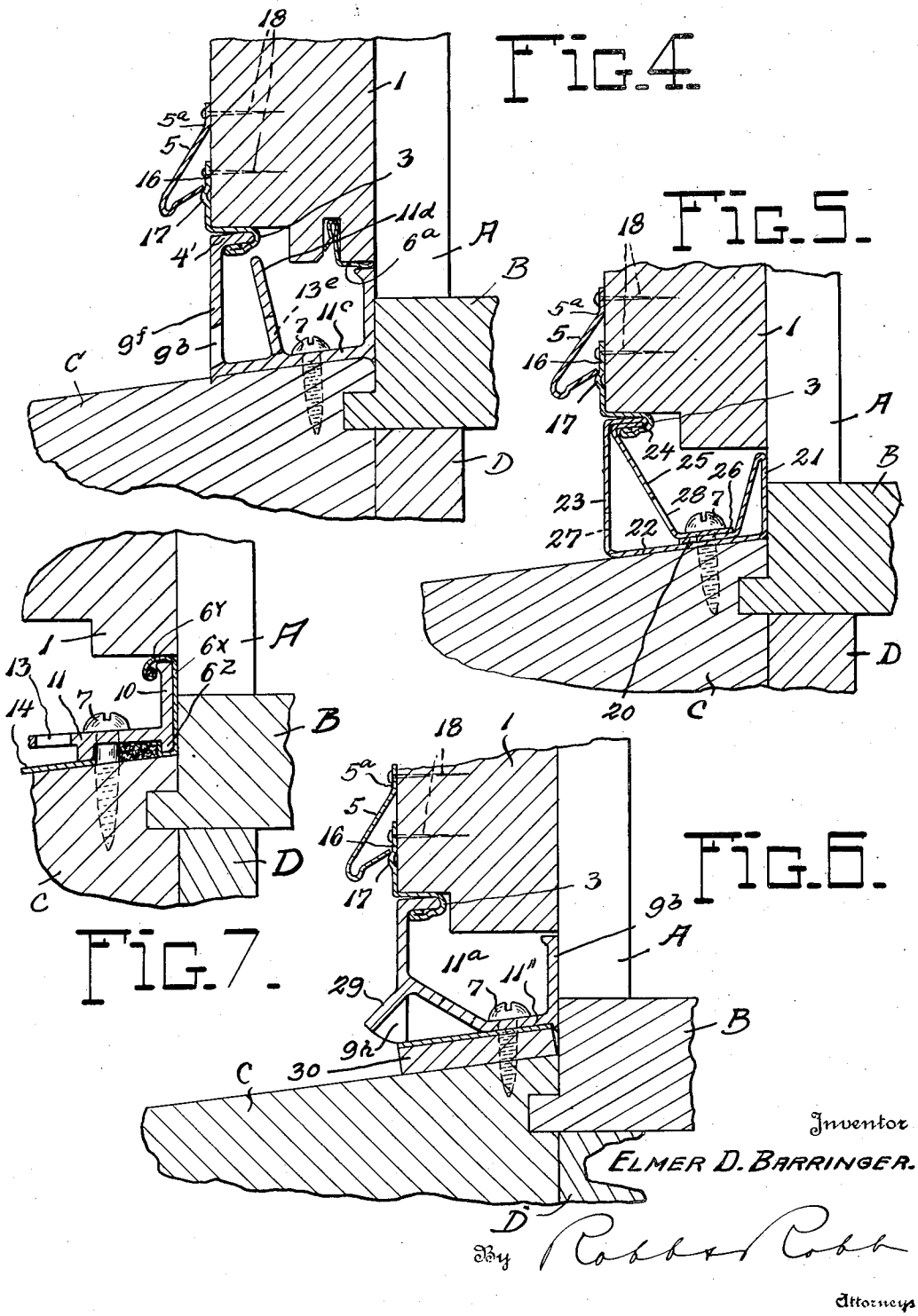
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Filed Jan. 27, 1934 2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,018,115

WEATHER STRIP CONSTRUCTION

Elmer D. Barringer, Cleveland, Ohio

Application January 27, 1934, Serial No. 708,681

11 Claims. (Cl. 20—69)

My aim in reference to my present invention has been to provide certain practical improvements upon the construction of weatherstrip equipment for French or casement windows of the type disclosed by my Letters Patent No. 1,789,923 issued January 20th, 1931, which invention utilizes a channel or trough member adapted normally to be positioned below the lower edge of the inswinging casement window as a part of the weatherstrip equipment for sealing such portion of the window in relation to the sill, so as to prevent air, water, or foreign matter, passing beneath the window, between it and the frame parts.

My previous Letters Patent deals effectively with the problem of providing a weather flange or member on the channel device or trough that provides for draining of water that may reach the upper surface of the channel or trough by being blown between the interlocking hook of the window sash and the cooperating interlocking lip of the channel device, at the same time preventing entry of wind, rain, etc., through the drain openings which are known as "weep" holes.

I have found as a result of my manufacture and the actual use of my said previously patented invention, and in the use of other inventions designed for sealing the lower edges of casement windows that under some conditions, when it is raining exceedingly hard and the wind is blowing at a terrific rate, the wind pressure may become so great at the water side or flange of the channel member as to prevent the water from draining through the weep holes to the outside of the sill. I have found by study and testing my channel member type of weather equipment that the prevention of the draining of the water from the channel or trough under the condition above first mentioned, is due to the fact that my channel has been heretofore constructed fairly shallow, the depth from the top water line to the bottom of the channel being about one-half inch or slightly less. With this type of channel it is usually necessary to cut off the sash equal to the height of the inside edge of the channel. To make this channel higher would necessitate cutting so much off the sash that it would seriously weaken it. In order to remedy the above difficulty arising at certain times in the use of my previous invention, I have redesigned the channel so as to approximately double the depth from the top water line to the bottom of the member, the purpose of this construction being to obtain the new result of enabling the water to attain a greater depth in the channel than heretofore, without weakening the sash, whereby to build up sufficient pressure to tend to force the water out of the weep holes against the great wind resistance created under storm conditions, when the wind pressure on the weather side or flange of the channel member would otherwise prevent the escape of the water and at times cause the water to overflow the channel member inner flange, and reach the inside of the window.

The increase in the depth of my channel member while maintaining its width affords an increase of the volumetric capacity of the channel as regards the amount of water it may receive or contain under the emergency conditions incident to its use when it is raining extraordinarily hard and the wind is blowing at a terrific rate against the weather side or flange of the channel. With the additional volumetric capacity of the channel thus created as described, I find that if there is any retarding of the flow of the water through the weep holes, my new design of channel as presented hereinafter, will enable the water to build up in depth in the channel and I have provided a deep enough construction of this member so that there will be no liability of overflowing of the water inside the casement window under the most adverse conditions of service of the device.

Still another objective achieved by my present invention is the reduction in the difficulty and labor of installing my channel weatherstrip beneath the casement window. In my previous construction, the channel member was placed on the sub-sill carried by the main outer sill of the window frame and the lower edge of the casement window was required to be cut away by the weatherstripper in the installation operation to such an extent as to make the job time-taking and somewhat expensive. According to my invention, however, where the window frame is of that type equipped with a sub-sill, the workman installing my invention may readily pry off the wooden sub-sill and throw it away and substitute my channel of special increased depth for the sub-sill to occupy the position previously occupied by the latter.

Under these conditions, it is unnecessary for the workman attending to the installation to remove any considerable portion of the lower edge of the casement window as heretofore required. In fact, practical experience and use of my invention indicates that all that is necessary is to obtain a nice fit of the window against the upper portions of the channel member for the proper interlocking of the hook on the lower edge of the

window with the cooperating flange of the channel member and this may be accomplished by removal of a sixteenth of an inch or an eighth of an inch of the lower edge of the window and ofttimes even this amount of the wood does not have to be removed.

Owing to the foregoing advantage, it is obvious that a considerable saving in the installation expense of my new channel device is obtainable irrespective of the advantages incident to the operation of the drain action of the channel and its water retaining capacity as previously pointed out. The present improvements contemplate additionally novel constructions of the base portion of the channel in order to afford the baffling function set forth in my previous patent, whereby the bottom member of the trough is so formed with its drain openings that they are offset or staggered in relation to the weep holes in the weather side or flange of the channel, preventing the entry of water or air into the trough of the channel.

My invention also contemplates the provision of a novel contact weatherstrip to be carried by the inner portion of the lower edge of the casement window for sealing cooperation with the inner flange of the channel means so that for all practical purposes in the carrying out of my invention, I secure a channel with weatherstrip devices carried by the window at its lower edge and cooperative with both the outer or water side flange of the channel as well as the inner flange, the action of the parts so constructed, creates virtually a double seal effect of material practical advantage, under actual conditions of service of my device.

Still another feature of my invention resides in the provision of a special form of weatherstrip hook, which is used for interlocking cooperation with the weather flange or side of my channel member, and which is designed with a special form of rib to provide a guide or indicator to facilitate the proper positioning on the casement window of the customary rain drip member.

My invention involves certain other detailed features of improved construction, the form and use of which will be more fully understood, upon reference to the accompanying drawings, in which:

Figure 1 is a sectional view of a window frame and the lower portion of a casement window in closed position relative thereto, illustrating my improved channel, hook and sealing means intermediate the lower edge of the window and the sill beneath the same.

Figure 2 is a view similar to Figure 1 embodying a modification of the invention, the inner weatherstrip of the window omitted.

Figure 3 is a view similar to Figure 1, embodying still another modification in which the bottom of the channel is specially inclined in relation to the base upon which it is mounted, whereby the formation of a depending intermediate flange, on the under side of the channel is done away with.

Figures 4, 5 and 6 embody views similar to Figure 1 and illustrate other modifications of the invention.

Figure 7 is a fragmentary view of a structure similar to that of Figure 1, but illustrating a different form of inner sealing strip cooperating with the inner flange of the channel.

Figure 8 is a detail view of the inner sealing strip in its form previous to being crowded in the recess in which it automatically locks or engages.

Embodiment of invention in Figure 1.— Referring to the construction of Figure 1, A designates the inside of the window casing, B the stool, C the main sill and D the apron of the casing. This construction of window casing is one which, so far as I am aware, is quite commonly in use. The casement window or sash thereof is designated 1 and the weatherstrip means intermediate the lower edge of this window sash 1 and the main sill C comprises the following members: channel member 2; the hook 3, so-called in the art, cooperating with the horizontal flange 4 of the weather side or flange of the channel member 2; the rain drip 5 of known construction; the inner bronze member of weatherstrip 6; and the attaching screws 7.

Now in general conformation, the construction of the channel 2 is very similar to that of my Patent No. 1,789,923 excepting that I have greatly deepened the channel structure to provide a water container, so to speak, of such increased depth that the pressure of the water therein should it accumulate under certain adverse conditions of use, previously mentioned, will create a pressure sufficient to cause said water to issue from the channel member through the weep holes 8 shown in Figure 1 in dotted lines and designated 14 in my previous Letters Patent mentioned. Said channel member comprises not only the horizontal flange but the weather flange or side 9 about even with the outside surface of the window sash 1, the inner flange or side 10, and the bottom member 11. The flanges 9 and 10 project below the bottom 11 so as to form a place or chamber beneath the channel or trough-like member 2, the extensions of the flanges 9 and 10 being designated 9*a* and 10*a* respectively. The portion 10*a* is preferably formed with a biting edge such as designated 12 in Figure 1 to embed itself in the upper surface of the sill though this edge is not absolutely necessary because when the screws 7 are tightened down the part 10*a* will become slightly embedded in the sill under the ordinary conditions of fastening the channel member 2 in place.

The weep holes 8 may be round, or they may be elongated, as shown in my previous patent, and they are located at intervals in the weather side or flange 9 of the channel member 2. Provided near the outer portion of the bottom 11 of the channel member 2 are vertical weep holes 13 and these are specially located, as taught by the prior art, by being staggered or off-set in relation to the weep holes 8 so as to prevent wind, water or other foreign matter from passing to the upper surface of the channel 2 through the weep holes 8. In other words, the bottom portion 11 of the channel member forms a baffle at all points opposite the weep holes 8, being solid at such points and this arrangement is necessary and advantageous in order to obtain the baffling function of the part 11. As usual in constructions like my invention, I provide a zinc plate 14 beneath the outer drain portion of the channel 2 upon which plate the parts 9*a* and the middle bottom rib 15 rest. The hook 3 comprises the usual attaching section 16 fastened to the outer side of the window sash and is formed with a guide projection or rib 17 pressed therefrom. The purpose of this rib is to act as an indicator or guide for properly installing the rain drip 5 in a true and proper relation to the channel weather side or flange 9. In other words, once the hook 3 has been secured in place by the fastenings 18,

the weatherstripper installing my invention will be able to exactly position the rain drip 5 for its proper place of attachment by simply causing the lower laterally extending flange 5a of the rain drip to overlap and engage the upper side or portion of the rib or projection 17.

It is to be understood that my channel means above described, with the associated parts, may be installed by removing what is called the sub-sill that usually sits and is secured to the main sill C at the angle at which this sill joins the stool B. As seen in Figure 1, my channel member is occupying the space where the sub-sill ordinarily is disposed, and because of the previous removal of the sub-sill, this channel member 2 just above fits properly beneath the window 1 requiring little or no removal of the wood at the lower edge of the window in the practical installation. This statement, of course, applies when the strip 6 is not used, as is shown by the construction in Figure 2.

The said sealing flange 6a will be seen to abut resiliently or with spring-like contact with the upper edge of the inner flange 10 of channel member 2. The sealing strip 6 is of rather unique form, and mounting, being provided with an engaging or clamping flange 6b, said flange projecting laterally from the body of the strip 6 at about an acute angle in reference to the vertical disposition of said body, and is resilient. The clamping flange has an offstanding holding or engaging extension 6ab. The body of the strip 6 is bowed slightly, and its flange part 6b is so disposed that normally when the strip 6 is not on the window, it is spaced somewhat a greater distance from the body of the strip 6 than as shown in Figure 1. Thus it is that when the parts 6 and 6b are forced into the recess 19, the engaging extension 6ab of the flange 6b or engaging wing as it might be called, presses in on the bowed body 6 placing it under a compressive force. The free edge of the part 6ab under such force acts as a sort of biting edge to engage and embed itself in the wood of the window at the outer wall of the recess 19. In this manner, I secure an automatically engaging device for the strip 6 for holding it in place, doing away largely with the necessity of employing fastenings of any kind at intervals throughout the length of the said strip.

Embodiment of invention in Figure 2.—Those parts of my construction as seen in Figure 2, which are independent of the channel member 2', are designated the same as are their designations in Figure 1. In Figure 2 it will be seen that channel 2', which is to perform largely the function of the channel 2 of Figure 1, has the bottom 11' resting directly on the sill C and secured thereto by the screw fastenings 7'. In this construction, I do not employ baffling instrumentalities derived by the combination of the parts 8 and 11 as in Figure 2, the weep holes 9'' of the weather side or flange 9', being provided. However, in this construction, I have retained the important novel feature previously presented, involving the relatively deep formation of the channel member 2' so that water raining thereinto, and collecting therein, may reach such depth as to create a pressure forcing out of the weep holes 9''. Likewise, the depth of the channel is sufficient to give it its receptacle function of that large or maximum capacity required for it to hold all possible water that might enter the channel around the hook 3, between the swinging edge of the sash and the frame, or between meeting edges of two mating sash, under severe flooding rain and high wind conditions, without liability of such water overflowing the flange 10' into the inside of the window.

Embodiment of the invention in Figure 3.—The construction of Figure 3 is very much the same as that of Figure 1 except that I provide the bottom 11'' with an inclined baffle portion 11a spaced from the sill C and the zinc plate 14' thereon to perform the identical function of the spaced relation of the bottom 11 of Figure 1. The inclined portion 11a of the bottom of the channel member of Figure 3 has the weep holes 13' similar to the bottom 11 of Figure 1 construction and these weep holes are disposed staggered or off-set in relation to the weep holes 9b in the outer or weather flange 9c. The inner flange 9b' of Figure 3 construction is very similar to that of Figure 1 construction, the volumetric capacity of the channel member of Figure 3 being practically the same as that of the construction of Figure 1.

Embodiment of invention in Figure 4.—Now passing to Figure 4, the construction illustrated is practically the same as that of Figure 3, with the exception that instead of having the bottom 11c inclined upwardly to provide the baffle member such baffle member consists of an integral flange 11d slightly inclined in reference to the bottom 11c or it may be disposed vertically. The important thing is that this baffle member 11d is spaced from the flange 4' of the weather side 9f of the channel. The advantage derived from this construction is involved in the fact that the water that may pass around the hook 3 will pass on down the inside of the flange 9f or drip off the flange 4' directly to the bottom of the channel member, and is, therefore, not likely to reach the upper side of the bottom 11c inwardly of the flange or partition 11d. The parts 9f and 11d are equipped with the staggered or off-set weep holes designated 9b and 13e much the same as the parts 9c and 11a are constructed as per the description of Figure 3 device.

Embodiment of invention in Figure 5.—The construction of the weatherstrip in Figure 5 is analogous to that of Figure 3 excepting that I use in this construction a flat strip of sheet metal bent from the attaching flange 20 upwardly and downwardly to provide the inner flange 21 and thence bent laterally to form the bottom 22 inclining downwardly to accord with the angle of the sill C respecting the stool B. Hence, the metal is bent upwardly to provide the outer weather flange or side 23, thence laterally upon itself to form the inwardly projecting flange 24, and thence downwardly, and inwardly, in such direction to provide the baffle means or partition element 25. From the partition or baffle means member 25 the metal is bent to provide the overlying second attaching flange 26. Weep holes 27 are formed in the weather side 23 and other weep holes 28 are formed in the baffle member 25, being staggered or off-set in relation to the weep holes 27 as for the purposes previously set forth.

Embodiment of the invention in Figure 6.— The construction of the invention as depicted in Figure 6 is very similar to that of Figure 3, and the parts are designated similarly, which are practically identical. The main difference in this construction from that of Figure 3 lies in the fact that the channel member 11a has its outer weep holes 9h equipped with small hood portions 29. Likewise, in this construction, a wood or similar strip 30 is shown disposed below the channel member for raising the latter. This ar-

rangement is employed to take the place of an unusually high sub-sill. Parts not different from those in Figure 3 have similar designations to the corresponding parts of Figure 3. According to Figure 7, the inner sealing strip 6*x* has the upper sealing portion 6*y* and engages around the flange 10, being held thereon by the hook 6*z*.

General description.—It will be understood, of course, that the casement window of the type of the present invention is of inwardly swinging construction. As it moves inwardly, the sealing strip 6*a* disengages from the flange 10, see Figure 1 and the hook sealing strip 3 likewise disengages from the inwardly projecting flange 4 of the channel member 2. This construction, in the above respect, is like that of my previous patent, so far as the swinging mounting in the casement window is concerned. In all my constructions of channel members, it is observable that the depth feature of construction is retained, affording the water pressure action and the water containing capacity feature previously set forth.

It will, therefore, be seen that if water reaches the inner portion of the channel member through the joints of the sash, the swinging edges of the sash, or meeting edges of two sash, so that the volume of water is relatively larger in the channel, there will be no liability of leakage over the inner flange 10 to the inside of the window. My construction, of course, as previously suggested, affords a channel member that in no way requires the cutting off of any material portion of the lower edge of the sash which is a cause of weakening the sash structure in the use of many devices designed for the general purpose of my present invention.

In the practical use of my invention, as shown in the drawings, another special advantage is derived from the disposition of the channel bar weather strip in the angle between the main sill C and the stool B. This is due to the fact that the base or cross web member 11, 11', 11'', 11*c*, 22 in reference to the several modifications, connects with the inner vertical flange (10, 10', 9*b*' of the different constructions), at a point considerably below the top of the stool B. Now the effect of this under conditions of actual use, affords a novel phase of action of the weatherstrip means. The part 10, 10', 9*b*' is protected by the stool so that rapid conduction of heat from the inside window or the compartment for which the window is used, through the said base part or web is prevented. As a result the condensation of moisture in the room or compartment for which the window is used, which would otherwise cause frosting on the inner face of the member 10, 10', 9*b*', etc., is prevented. In this manner there is no liability of the melting of the condensate or frost that would otherwise be formed on the inner face of the part 10 etc., and which would collect as water on the stool B requiring to be wiped off or having a tendency to rot the stop B which is usually made of wood.

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

1. In weatherstrip construction for casement windows, as described, in combination, a window sash, a channel member disposed beneath said sash and comprising an inner flange located approximately in line with the inner face of the sash and an outer weather flange approximately in line with the outer face of the sash, and weatherstrips mounted on the sash at the portions thereof adjacent to said flanges to engage with said flanges for sealing action when the sash is closed against the channel member.

2. The combination of parts as set forth in claim 1, wherein the sealing strip coacting with the weather flange of the channel member is of hook-like form, said weather flange having an inwardly extending flange to be received by the last mentioned sealing strip, and wherein the weatherstrip cooperating with the inner flange of the channel member comprises a resilient member to engage said inner flange.

3. The combination of parts as set forth in claim 1, wherein the sealing strip coacting with the weather flange of the channel member is of hook-like form, said weather flange having an inwardly extending flange to be received by the last mentioned sealing strip, and wherein the weatherstrip cooperating with the inner flange of the channel member comprises a resilient member to engage said inner flange, said last sealing strip comprising a body to be received in a recess in the sash and an offstanding resilient securing flange projecting from said body so that when received in such recess of the sash, it will engage a side of the recess and automatically lock the sealing strip in place, the sash having a recess for receiving said last sealing strip for attachment purposes with its resilient sealing portion freely cooperating with the inner flange of the channel member.

4. In a weatherstrip construction of the class described, in combination, with sill attached weatherstrip means, of a window sash provided with a recess therein, and a sealing strip on the sash for cooperation with the sill weatherstrip means and comprising a resilient sealing portion to engage the sill weatherstrip means and disposed for resilient movement at the edge of the sash, together with attaching means for said sash weatherstrip means, including a body portion extending from the resilient portion into the recess of the sash and having a resilient angularly projecting engaging flange, the edge of which may automatically engage and interlock with a side of the sash recess.

5. In combination, a sill, a channel member disposed thereon, and comprising an inner flange and an outer weather flange, the latter having weep holes for draining of the water from the trough-like surface of the channel member, a casement window sash, weatherstrip means between the window sash and the channel member, and a baffle member extending upwardly from the bottom of the channel member and spaced from the outer or weather flange of the channel member throughout the area of the baffle member, said baffle member being provided with weep holes staggered in relation to the weep holes of the outer weather flange of the channel member.

6. As a new article of manufacture, a channel member for casement window weatherstrip structures, comprising a piece of flat metal folded to extend upwardly and downwardly to provide an inner channel flange, thence extended laterally to provide a bottom element for the channel member, thence extended upwardly to provide an outer weather flange, and thence bent downwardly to provide a diagonal baffle member terminating adjacent to the bottom element, said portion forming the outer weather flange having weep holes and said baffle member having weep holes.

7. A channel as set forth in claim 6, wherein edge portions of the flat piece of metal are

brought together at the lower end of the baffle member, and the lower inner portion of the inner flange, together with screw fastenings adapted to pass through these parts for attaching the channel member to a sill.

8. In a weatherstrip construction of the class described, the combination with a main sill, a stool at the side of said sill and extending above the same and an inwardly opening window sash, of a channel bar disposed in the angle between said sill and stool and having outlet drain means, said bar having its inner wall snugly fitting against the edge of the stool and extending substantially above the same, and its outer wall substantially higher than the inner one, the space between the said inner and outer walls being open at the top of the bar a major portion of the area between said walls, and the thickness dimension of the bar corresponding to the thickness dimension of the window sash.

9. In combination, a casement window of the in-swinging type, a frame therefor comprising a main sill, a stool at the inner side of the main sill and projecting upwardly from the innermost portion of said main sill forming an angle relative thereto, said frame of the type in which a wooden sub-sill is usually located at the angle formed between said main sill and stool, a weatherstrip construction located beneath the sash and comprising a channel bar having a base seated on the main sill, an outer weather flange extending vertically from the base at its outer edge and an inner flange also extending vertically from the base but at its inner edge, the said channel bar having a dimension from its outer weather flange to its inner flange substantially equal to the thickness of the sash and occupying the space at the angle between the main sill and the stool from which an original sub-sill has been displaced if previously used, the outer faces of the weather flange and the inner flange of the channel bar being substantially in alignment with the outer and inner sides of the sash, the major portion of the area between the flanges of the channel bar being open so that water leaking through the joints of the sash or around the ends of the sash will pass directly into the channel portion of the channel bar, the channel bar having weepholes adjacent to the outer edge of the base and the lower edge of the weather flange, the lower edge of the sash being provided with a recess formed to receive the uppermost portion of the original sub-sill by cooperating to receive the uppermost portion of the weather flange of the channel bar, and fastenings for attaching the channel bar to the main sill in substantially the same location as that of an original sub-sill removed from the angle between the stool and the main sill.

10. In weatherstrip construction of the class described, a channel shaped bar adapted to be disposed upon the main sill of a window frame for cooperation with an in-swinging casement sash, said bar comprising a base of a width substantially the same as the thickness of the sash with which it is to cooperate, and including an outer substantially vertical weather side flange provided at its portion adjoining the base with weep-holes for exit of water trapped by the channel bar, the inner-most portion of said channel shaped bar including a substantially vertical inner flange, the vertical dimension of the outer weather side flange being substantially the same as the dimension of the base from said flange to the inner flange and the vertical dimension of the said inner flange being less than that of the weather side or outer flange aforesaid, and the major portion of the area between the inner and outer flanges being open at the top so that water leaking through the joints of the sash or around the ends of the sash above the strip will drop directly into the channel portion between the inner and outer flanges aforesaid, the height of the inner and outer flanges being such as to provide substantial depth for the channel of the strip enabling the same to receive the maximum amount of water that may be trapped in the channel under most adverse conditions of service, without leakage of the water over the inner flange to the inside of the window equipped with the sash with which the channel shaped weatherstrip cooperates.

11. In combination, a casement window of the in-swinging type and a frame therefor comprising a main sill, the lower edge of the window being rabbetted from the outer side thereof to provide a stepped formation for cooperation with an ordinary wooden sub-sill disposed upon the main sill, and a weatherstrip construction adapted to be substituted for the sub-sill when removed from the main sill of the window frame to occupy the position of the ordinary sub-sill beneath the lower edge of the window sash, said weatherstrip construction including a channel shaped bar the base of which inclines downwardly and outwardly, the inner and outer sides of the channel shaped bar consisting of flanges projecting upwardly from the base and spaced apart a distance such that the outer sides of the said flanges are substantially in line with the inner and outer sides of the sash, said channel shaped bar being open at the top for substantially the major amount of the space between the inner and outer flanges, the outer flange being provided near the point of juncture of the same with the base with weep-holes so that water trapped in the space between the flanges will pass downwardly on the base out of the weep-holes, the height of the outer flange being substantially equal to the dimension of the base from the outer flange to the inner flange, and the upper portions of the outer and inner flanges being juxtaposed to the lower edge of the sash, the open upper portion of the channel shaped bar extending beneath the joint portions of the sash so that water which may leak through the joint portions or around the ends of the sash will be directly received in the space between the inner and outer flanges aforesaid.

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