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W. M. OLSON

2,367,367

METHOD OF MAKING WEATHERSTRIP

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Fig. 1

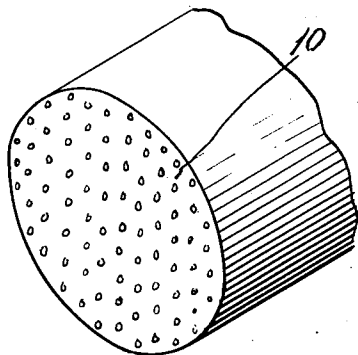


Fig. 2

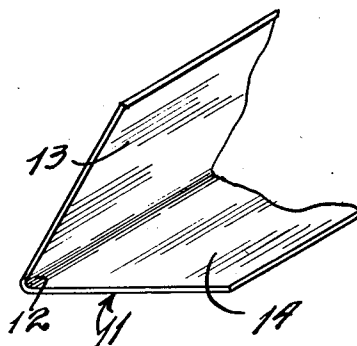


Fig. 3

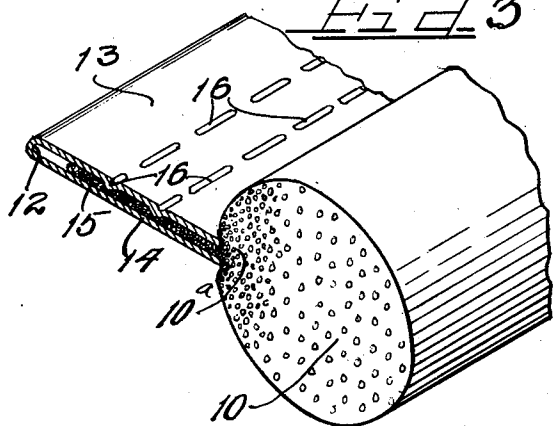
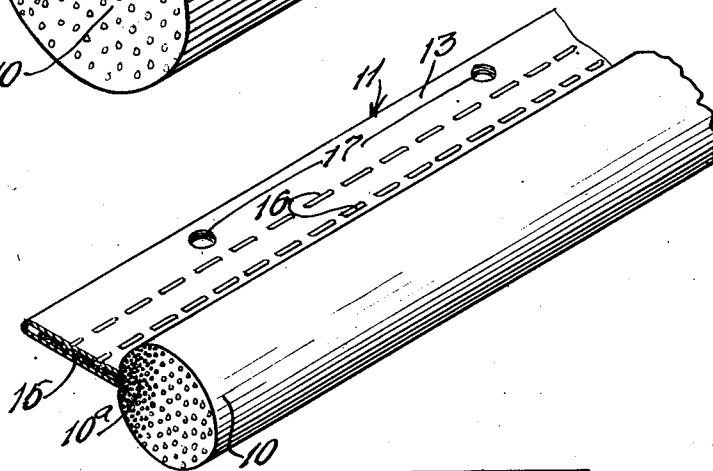


Fig. 4



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METHOD OF MAKING WEATHER STRIP

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2 Claims. (Cl. 154-2)

This invention is directed to improved weatherstrip and the method of making the same and relates particularly to a method and structure which greatly reduces the cost of manufacture and, at the same time, affords a weatherstrip of increased efficiency.

Weatherstrip of the character of that here involved is well adapted to use in public conveyances, particularly in railroad cars, and under these circumstances it is sold in quantities measured by length units at prices which necessitate a minimum cost of manufacture per unit.

One of the principal objects of my invention is to provide a weatherstrip construction which affords greatly improved weatherstripping characteristics and, at the same time, may be manufactured by the utilization of a minimum amount of material at a greatly reduced cost.

Another important object of the invention is to provide weatherstripping of the above character which may be constructed from materials which are readily available on the open market in that they do not have special configurations and formations prior to the steps of forming them into a weatherstrip in accordance with my invention.

Still another object of my invention is to provide a weatherstrip of substantially circular cross-sectioned resilient material with a rigid attachment and holding strip of metal or the like, the latter being affixed to the resilient material to provide a securely assembled, unitary structure without necessitating the presence of auxiliary-securing elements and without necessitating the pre-configuration of the parts in any special manner.

Still another object of my invention is to affix a rigid attachment member to a length of resilient, relatively weak weatherstripping material whereby a portion of said material is secured to the attachment member in such a manner that that portion so secured is transformed in the securing operation to compacted, relatively solid form having increased attachment qualities over the remaining resilient portion of the relatively weak weatherstripping material.

In accordance with the general features of my invention and as a further object of the invention, there is provided herein an improved weatherstrip construction including an enlarged, resilient weatherstripping section which may be of circular cross-section and a radially disposed, rigid attachment member formed from metal or the like which is secured to said first named portion solely by means of the co-engagement be-

tween said portions without the aid of additional members for attaining a secure engagement therebetween, there being an intermediate zone, compressed or loaded to an intermediate degree, to strengthen the junction between the highly compressed portion and the resilient portion.

Many other objects and advantages of the invention will become apparent from the following description and accompanying drawing, in which:

Figure 1 represents a fragmentary end view of the weatherstripping stock in the form it takes prior to its application to my invention;

Figure 2 represents a fragmentary end view of the attaching and securing member stock in the form it takes prior to its application to my invention;

Figure 3 is a fragmentary end view of the stock shown in Figures 1 and 2 after it has been assembled into a weatherstripping structure in accordance with my invention; and

Figure 4 is a fragmentary perspective view of a length of weatherstrip made in accordance with my invention, similar to that shown in Figure 3 but also showing the completed section in readiness for attachment to a window or door construction.

It is to be understood that the embodiment shown herein is for illustrative purposes only and may be modified and changed without departing from the spirit and scope of the invention as set forth in the appended claims.

While, in the preferred form of my invention, the weatherstripping stock is a cord of resilient sponge rubber having substantially circular cross-section and the clamping member is a metallic strip bent along an intermediate line to form a pair of clamping face members, it is contemplated that other materials may be utilized so long as the enlarged portion is resilient and has weatherproofing qualities and so long as the attachment flange is of formable material and of sufficient rigidity to securely engage the weatherproofing material, thereby to provide a rigid flange therefor.

In practicing my invention, a cord of resilient springy material, such as sponge rubber or felt, may be utilized. From Figure 1, it will be seen that this material may be of substantially circular cross-section and is thus readily available on the open market. Since the resilient material in this form has many other practical uses in various industries, it is made in very large quantities and thus the die cost involved is of small proportion with relation to the total output. Under such circumstances the resilient

material used may be regarded as a "stock" item, thus greatly reducing the cost thereof.

Likewise, as shown in Figure 2, the relatively rigid attachment strip 11 comprises merely a strip of metal or the like which is bent substantially centrally and longitudinally as at 12 to provide a clamping member having a pair of opposed relatively rigid faces 13 and 14. Thus it will be seen that the clamping member 11 is also available on the open market as a stock item since metallic strip of an infinite variety of widths is also widely used in industry for other purposes.

In constructing weatherstrip, as previously explained, it is highly desirable to avoid the necessity of special configurations, particularly special cross-sectional configurations, since such configurations each require a separate die or extruding mold and, as well known to those skilled in the art, such dies and molds often, and usually, are costly to a degree entirely disproportionate to the cost of the material.

Another important factor in the manufacture of weatherstrip is the avoidance, as far as possible, of an excessive number of parts and the use of excessive amounts of material, particularly in obtaining a secure weatherstripping engagement between the actual weatherstripping agent and the attachment or retaining portion. In this regard, it is highly desirable that the weatherstripping unit be so constructed that the necessity for an enveloping material for the resilient strip be avoided, so that auxiliary connecting elements between the weatherstripping material and the rigid material be avoided and so that a minimum amount of manipulation and manufacturing operations be utilized in forming the completed product.

One of the past difficulties in handling the relatively weak, resilient weatherstripping materials, particularly with regard to their attachment to more rigid members, has been that the inherent qualities of the weatherstripping materials are such that difficulty is encountered in maintaining any attachment attained due to breakage of the weatherstripping material. For instance, it has been found that to secure sponge rubber or felt weatherstripping material by means of puncturing the same, as with nails or screws, ultimately results in the tearing of the material, whereby the punctured apertures are unduly enlarged and the weatherstripping thus breaks away from the desired attached relationship. In this regard, I have found that when the resilient, relatively weak weatherstripping material is compressed to a considerable degree, it assumes the characteristics of a solid of considerable density, in which form it is well adapted to be secured to a rigid element in permanent relationship thereto.

In order that a round, resilient weatherstripping cord of sponge rubber or the like, such as that shown at 10 in Figure 1, may be securely attached to the relatively rigid attachment member 11 shown in Figure 2, and to the end that this junction may be obtained without materially changing the cross-sectional configuration of the weatherstripping material and without materially reducing the dimension thereof, the two parts above described are assembled in the relationship shown in Figure 3. As shown, the inner opposed faces of the face members 13 and 14 of the clamping strip 11 have been pressed together by further bending at the corner 12 while a longitudinal segment of the resilient element 10 has been sandwiched therebetween, whereby this seg-

ment is drawn out of the normal, cross-sectional confines of the element 10 and is compacted into a dense, relatively strong, solid plate-like projection 15. As will be readily understood, the completed weatherstrip assembly, in use, will utilize a flexing action of the remaining expanded weatherstripping member about its junction with the free ends of the element 11. From Figure 3, it will be seen that due to the compacting action above described, the resilient material will be compacted not only throughout the plate-like portion 15 but also at the portion thereof shown as 10a, which surrounds the above mentioned junction.

Thus there is provided, in effect, a weatherstrip assembly in which the resilient member 10 has been pressed to provide a highly loaded, relatively solid, strong zone 15, a resilient, springy, weatherproofing zone 10, and an intermediate, partially loaded or compacted zone 10a, the latter affording a junction between zones 15 and 10 which is of increased strength, yet which affords sufficient resiliency to enhance the weatherstripping action of the completed assembly. The term "loaded" as used herein refers to the maintenance of a resilient material under a compressed or compacted condition.

After or during the closing operation of the element 11, the face members 13 and 14 thereof are dented or distorted inwardly, as at 16, so that the material thereof is impressed into the attaching plate-like portion 15 to maintain the same between the face members 13 and 14 against slippage outwardly thereof.

As shown in Figure 4, the assembly may be completed by the provision of retaining apertures 17, which are punched through the element 11 and adapted to receive securing screws or the like.

A comparison of Figures 1 and 3 clearly shows the small degree in the reduction of the overall dimension of the circular weatherstripping agent 10.

From the foregoing it will be seen that there is provided herein a unitary weatherstrip assembly which is constructed from stock materials readily available on the open market and which utilizes only these stock materials to the exclusion of auxiliary members and materials in their co-engagement to provide the unitary structure. Furthermore, it will be seen that there is provided herein an improved weatherproofing assembly and method of constructing the same wherein a portion of the relatively weak weatherproofing material is deformed or loaded by compression and then utilized in its compacted state as a relatively solid flange for receiving the relatively rigid attachment member. Furthermore, the resilient weatherstripping element 10 has been so loaded by compression during the clamping of the face members 13 and 14 together that an intermediately loaded zone 10a has been provided at the junction between the solidified plate-like member 15 and the still resilient weatherproofing portion 10. Thus the intermediate zone 10a, while it is strengthened by being partially loaded to increase the security of the junction between the resilient portion and the solid portion, also retains enough resiliency to permit the necessary compression and expansion of the enlarged weatherproofing member during use.

What I claim is:

1. The method of forming a weatherstrip unit from a body of normally expanded, resilient weatherproofing material which includes draw-

ing a segment outwardly from the cross-sectional confines of the body, loading said segment to compact the same into a radially disposed plate-like flange and gathering the portion of the body at the junction of said flange and the remaining normally expanded portion to form an intermediate, partially compacted zone at said junction.

- 5 2. The method of forming a weatherstrip unit from a resilient cord of weatherproofing material which includes nipping an outer longitudinal segment from said cord to form an integral, radially disposed plate-like flange, loading said flange to compact the same, and maintaining said flange in its compacted state.

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