

# United States Patent

Kessler

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[54] **LOW-FRICTION ABRASION-RESISTANT PLASTIC WEATHERSTRIP**

[72] Inventor: **Gerald Kessler**, 388 Cranberry Run, Boardman, Ohio 44512

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[51] Int. Cl. ....**E06b 7/16**

[58] Field of Search.....49/489, 488, 498, 490, 495, 49/475, 485; 277/231, 211, 227; 161/146-149; 156/244, 279

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*Primary Examiner*—David J. Williamowsky  
*Assistant Examiner*—Philip C. Kannan  
*Attorney*—Max L. Libman

[57] **ABSTRACT**

An extruded all-plastic weatherstrip of the type having a rigid base insertable into a slot in a structure to be protected and a flexible weatherstrip portion protruding from the base into engagement with the edge of a door or window to be sealed, the base and weatherstrip portion being dual-extruded together to form a unitary structure, and the weatherstrip portion having partially embedded in its exposed wearing surface a series of spaced ribs of hard, low-friction, abrasion-resistant plastic material preferably also produced by multiple extrusion.

**3 Claims, 3 Drawing Figures**

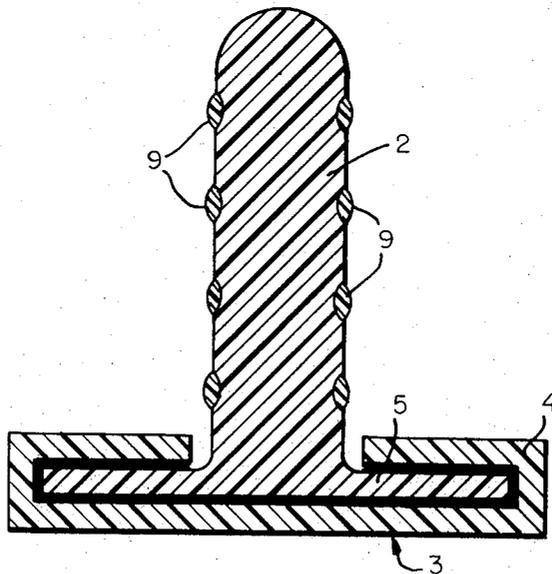


FIG. 1.

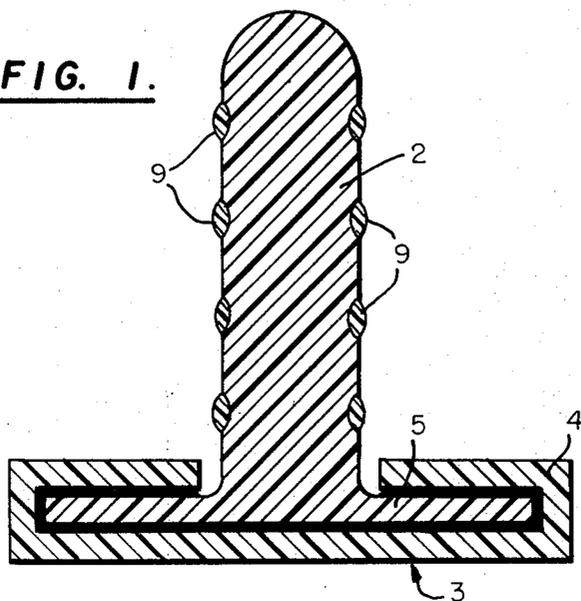


FIG. 2.

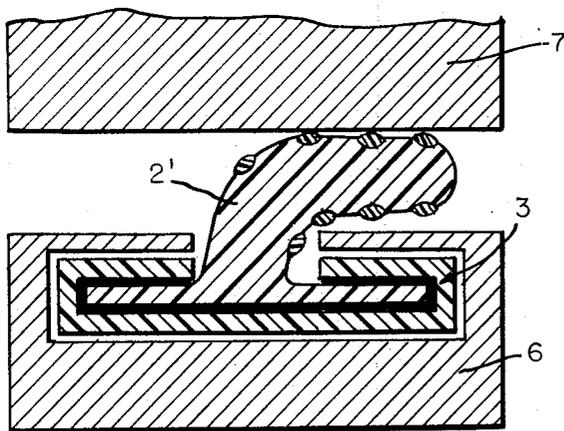
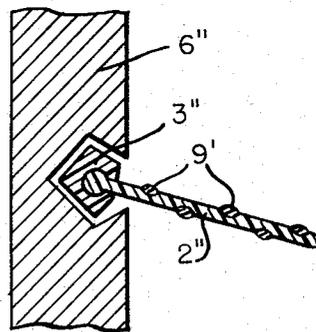


FIG. 3.



INVENTOR  
Gerald Kessler

BY *Max L. Libman*

ATTORNEY

## LOW-FRICTION ABRASION-RESISTANT PLASTIC WEATHERSTRIP

This invention is an improvement over and related to the application of the same inventor, Ser. No. 620,036, now U.S. Pat. No. 3,535,824, filed Mar. 2, 1967, for Abrasion-Resistant Rigid-Flexible Weatherstrip, which discloses the same type of weatherstrip as the present invention, but employs a surfacing of fine discrete hard particles adhered to the wearing surface of the flexible weatherstrip portion. The present invention provides an improved wearing surface with low friction which does not tend to become detached from the weatherstrip in use and is simple and economical to manufacture.

A basic problem with flexible plastic weatherstripping is that when the flexible plastic is soft enough to conform to the surface which it is intended to seal, it is often too sticky to allow free movement of the member it is weatherstripping, so that it becomes difficult to open or close the door or window. Furthermore, in the common case of pre-manufactured door and window frames, which are usually made of extruded aluminum, the weatherstripping is machine-inserted into a pre-formed slot in the aluminum, and when the weatherstrip material is too soft and flexible, this operation may become very difficult, so that it is advantageous for at least the base portion of the weatherstrip to be sufficiently hard and rigid to facilitate such insertion.

Still another problem is that the flexible portion of the weatherstrip often tends to wrinkle or be somewhat wavy, and therefore does not engage the surface which it is intended to seal at all points. The present invention provides a certain amount of rigid support for the flexible portion of the weatherstrip, due to the series of ribs of relatively hard plastic material partially embedded in the surface of the flexible weatherstrip, which tends to improve its longitudinal rigidity and straightness, while permitting sufficient lateral flexing for proper sealing of engaged surfaces, even when they are somewhat uneven.

The specific nature of the invention, as well as other objects and advantages thereof, will clearly appear from a description of a preferred embodiment, as shown in the accompanying drawings, in which:

FIG. 1 is a transverse sectional view of one form of weatherstrip;

FIG. 2 is a similar view of a slightly different form of weatherstrip in a typical use situation; and

FIG. 3 is a similar view of still another form.

The only difference between the forms of weatherstrip shown in the Figures, is that FIG. 1 shows the flexible weatherstrip portion 2 extending perpendicularly from the base 3, while in FIG. 2 the flexible portion 2' extends at an angle from the base other than 90°, which is a typical situation when the weatherstrip is used with sliding doors and windows, and is also shown in FIG. 3.

The weatherstrip comprises a base portion 3 having an outer shell 4 of rigid plastic and sufficient mechanical strength to support the weatherstrip for attachment to any surface to be sealed, such as a door jamb, windowsill, or edge of a door or window frame, as indicated at 6 in FIG. 2. In a typical situation, the door or window to be sealed, which is indicated at 7 in FIG. 2, slides in its own plane, and since the weatherstrip must

press with some force against the engaged surface of the door or window 7, considerable friction can be developed along the total area of engagement, which may make it very difficult to operate the door or window. The weatherstripping may also be fastened in any other suitable way such as by gluing or nailing, as is well known. The flexible weatherstrip portion 2 is joined at one edge to the base 4 in any suitable manner, but a preferred manner is to employ an interlocking connection such as indicated in FIG. 1 by the T-shaped configuration 5, where the top of the T is embedded in the hard base portion 4. Since the two elements are produced by dual extrusion, that is, they are both extruded at the same time through a suitable orifice configuration to produce the desired combined product, it is possible by well-known techniques to produce any desired interlocking cross-section, and the one shown is only given by way of example, it being preferred, however, that an interlocking junction be employed so that the junction between the soft and hard plastic is mechanically firm as well as being thermally fused together.

While the weatherstrip is being extruded, the same dual extrusion technique is employed to also extrude a series of thin ribs 9 of rigid plastic, which may be the same material as the base 4, so that they are partially embedded and fused to the surface of the flexible strip 2, and protrude beyond the surface so as to engage and contact the surface which is to be sealed, as shown at 7 in FIG. 2. Any suitable plastic material can be employed, but vinyl plastic (PVC) is particularly suitable for this use, as it can be produced in any desired range of hardness within wide limits as is well known in the art. In general, the same degree of hardness is suitable for the ribs 9 as for the base 4, and this also simplifies production, since it does not require a different material to be employed. The flexible vinyl plastic of the sealing portion 2 is made of a material suitable for dual extrusion with the rigid; for example, flexible PVC with rigid PVC; EVA with polyethylene. The ribs 9 are spaced sufficiently apart to permit free lateral flexing of the sealing portion 2 or 2', but sufficiently close together so that they take all or substantially all of the wear which is imposed on the flexible strip 2; due to their smooth, hard surface, they also provide a greatly reduced amount of friction without appreciably interfering with the sealing action. Furthermore, the relatively rigid ribs 9 tend to control wrinkling or curving of the strip, and to produce the desired straightness of the sealing portion.

The base portion 6, which is typically also an extruded plastic element, can be of any suitable shape—slot, round, dovetail, diamond, etc. A diamond-shaped base and slot are shown by way of example in FIG. 3, with corresponding parts correspondingly numbered, but double-primed.

I claim:

1. a) An extruded all-plastic weatherstrip having a longitudinally extending base portion or rigid plastic material of sufficient mechanical strength to support the weatherstrip in a slot below a surface to be sealed, said base portion being in the form of an elongated strip,
- b. a longitudinally extending tape-like strip of flexible plastic material having one edge interlocked

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with and thermally fused to said base portion, and extending away from said base portion on one side thereof,

c. the other edge of said flexible strip being free to flex,

d. at least one of the sides of the flexible strip near the free portion having a series of parallel, spaced-apart, longitudinally extending ribs of relatively rigid plastic material partially embedded in its surface and integrally united therewith, with a portion of each rib extending beyond the surface of the flexible material to provide a series of smooth, hard low-friction ribs separated by flexible material, said ribs being sufficiently close together so that several of the ribs can engage and

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conform to a surface being sealed against the weather to provide a plurality of continuous sealing surfaces along the entire length of the engaged portion.

2. The invention according to claim 1, said base strip having two sides and two edges, said flexible strip being joined to said base strip along a line between the two edges of the base strip, leaving both edges of the base strip free for insertion into a slot as the sole support for the weatherstrip.

3. The invention according to claim 2, the plane of said flexible strip being at an angle between 30° and 90° to the plane of the base strip.

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