United States Patent [19]

Nelems

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[54] **GUTTER FILTER FOR CORRUGATED ROOF SURFACES**

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[51] **Int. Cl.** **B01d 23/00**

[58] **Field of Search** 210/474, 473; 248/48.1; 52/12-16

[56] **References Cited**

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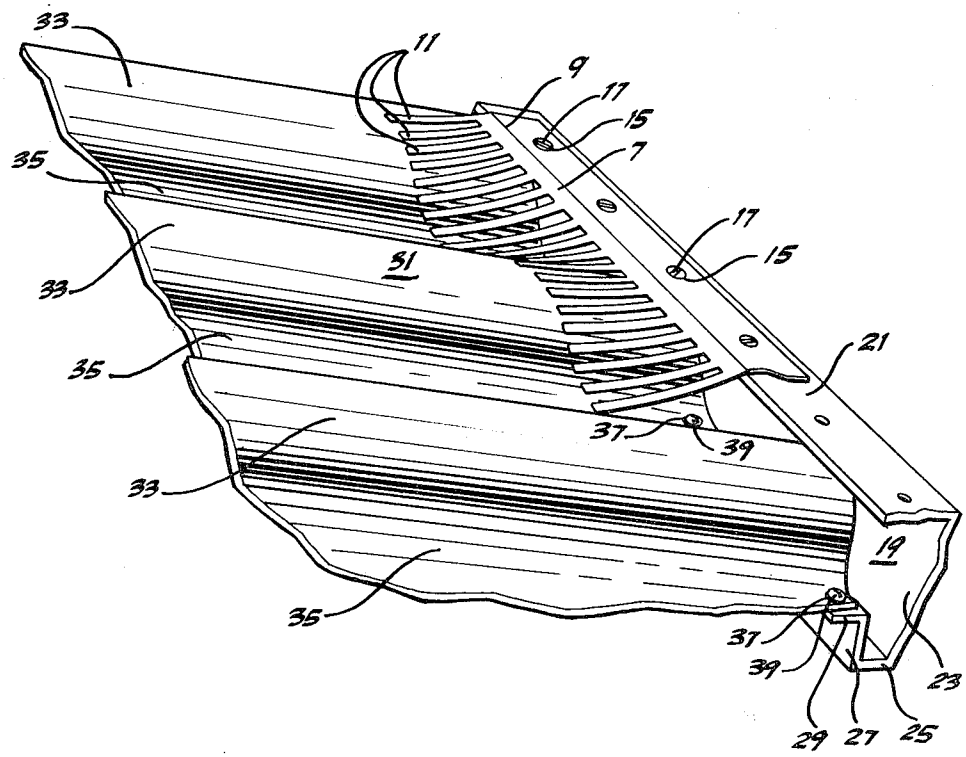
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Assistant Examiner—F. F. Calvetti
Attorney, Agent, or Firm—Raymond L. Madsen

[57] **ABSTRACT**

There is disclosed a gutter filter for a partially enclosed gutter channel member abutting the edge a corrugated roof surface. An elongated base member is attached to the gutter channel, the base member having a multiplicity of tines or flexible fingers attached thereto, the tines being arranged and positioned to extend outwardly from the base member to flexibly engage and contact the undulating surface of the corrugated roof in a manner to intercept and hold debris which may accumulate on the surface from entering the gutter channel member.

5 Claims, 2 Drawing Figures



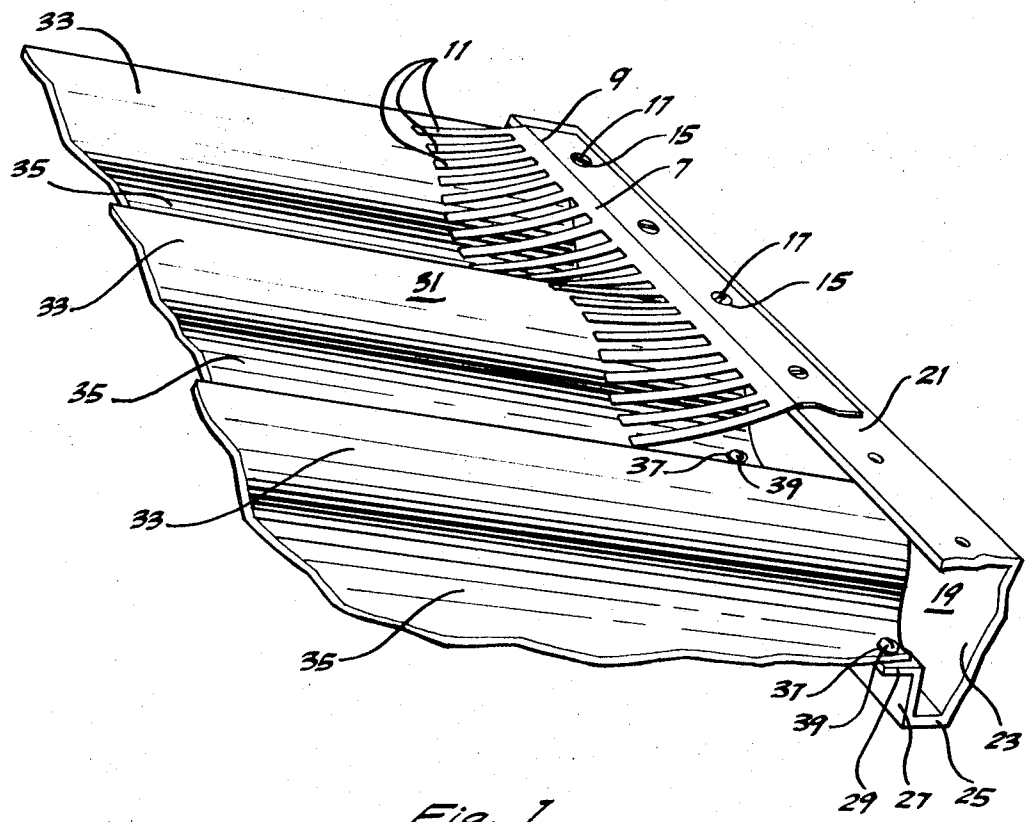

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Fig. 1

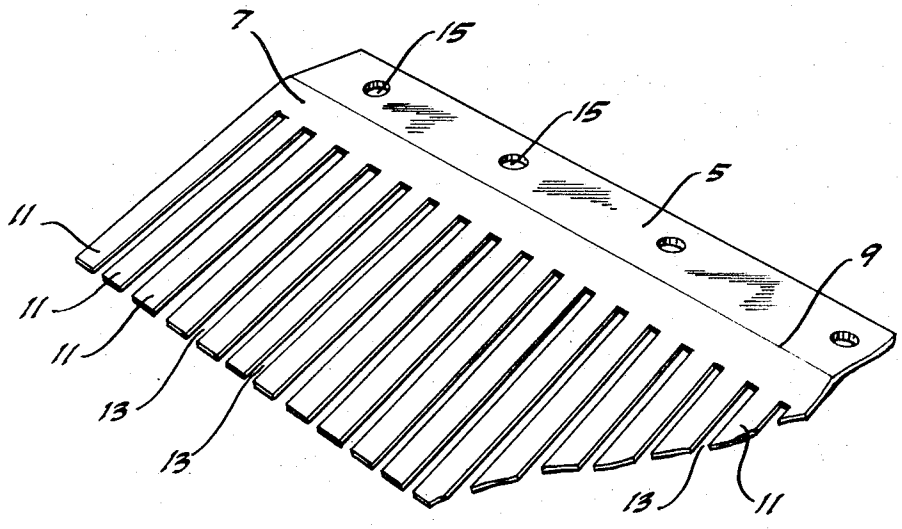

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Fig. 2

GUTTER FILTER FOR CORRUGATED ROOF SURFACES

The present invention relates to gutter filters and screens and more particularly to a gutter filter for use with corrugated or undulating roof surfaces having a partially enclosed gutter end channels.

In the field of roof design and construction, it has been the general practice to employ gutter screens and eve guards to cover the gutters employed in connection with flat roof construction to prevent unwanted debris from entering into the gutter or trough but to permit rain water to pass freely through into the trough. Although such devices have served the purpose, they have not proved entirely satisfactory under all conditions of service for the reason that considerable difficulty has been experienced in adapting such screens and gutter guards to undulating roof surfaces such as tile and corrugated metal, fiberglass, and plastic where the type of gutter employed requires the guard or screen to contact and follow the peaks and valleys of the roof surface.

Those concerned with the development of gutter guards and filters have long recognized the need for a gutter filter which can be utilized with all types of corrugated roof surfaces having partially enclosed gutter channels such as encountered with corrugated patio awnings end frames. The present invention fulfills this need.

One of the most critical problems confronting the designers of gutter guards and filters has been the design of a universal gutter guard which can be used with irregular and undulating roof surfaces having end frames forming partially enclosed gutter channels. This problem is overcome by the present invention.

The general purpose of this invention is to provide a gutter filter for undulating roof surfaces with partially enclosed gutter channels which embraces all the advantages of similarly employed gutter screens and guards and possesses none of the aforedescribed disadvantages. To attain this, the present invention contemplates a unique mechanical assembly of flexible fingers distributed along a base member such that fastening the base member to the end frame of a corrugated roof surface biases the flexible fingers in engagement with the undulating surface, each finger flexing and bending to follow the contours of the depressions and projections of the roof surface opposite therefrom.

An object of the present invention is the provision of a flexible gutter filter which readily adjusts to any irregular or undulating roof surface.

Another object is to provide a gutter filter which covers the opening to the end frame and gutter channel at the edge of a corrugated patio awning surface.

A further object of the invention is the provision of a gutter filter which can be attached to one edge of a patio awning end frame and rain gutter and which contacts and readily adapts to any irregular or undulating roof surface adjacent thereto.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings in which like reference numerals designate like parts throughout the figures thereof and wherein:

FIG. 1 shows a pictorial view partly in section of a preferred embodiment of the invention; and

FIG. 2 illustrates a section of a pictorial view of the apparatus shown in FIG. 1 installed on a patio awning end frame and gutter attached to the edge of an undulating roof surface.

Referring now to the drawings, wherein like reference characters designate like or corresponding parts throughout the several views, there is illustrated in FIG. 1 an elongated flat rectangular segment or strip which forms base member 5 and which in turn is integrally joined to elongated rectangular segment 7 along bend 9. Rectangular segment 7 has rectangular flexible fingers or tines 11 formed therein, tines 11 being positioned perpendicular to bend 9 and having slots 13 therebetween. Segment 5 has holes 15 distributed therealong for mounting the assembly of FIG. 1 onto the edge of a gutter channel and patio awning end frame.

FIG. 2 illustrates the assembly of FIG. 1 attached to the end frame and gutter channel of a corrugated roof surface. Screws 17 are inserted through holes 15 of the gutter filter and fastened to surface 21 of end frame and gutter channel 19. Gutter channel 19 is partially enclosed and has upper surface 21 connected at right angles to end surface and gutter wall 23 which in turn is connected at right angles to gutter channel base 25 which is further connected at right angles to gutter wall 27 having a mounting lip 29 attached along the edge thereof. The edge of a corrugated or undulating roof surface having ridges 33 and valleys 35 is attached to lip 29 by fastening screws 39 through holes 37 into lip 29. Flexible tines 11 bend to misalign the tips thereof to contact ridges 33 and valleys 35 and follow the contour of the roof surface. It is to be noted that the gutter channel is formed by intersecting end connected surfaces 23, 25, and 27 of the end frame.

Operation of the invention can best be understood by reference to FIG. 2. When the gutter filter is fastened to surface 21 of end frame 19, the angle formed between segments 5 and 7 at bend 9 biases the tips of flexible fingers 11 in contact and engagement with the undulating surface of the corrugated roof. Since fingers 11 are flexible, they bend to adapt to the peaks 33 and valleys 35 of the corrugated roof surface so that the tip of biased flexible finger engages and contacts the undulating roof surface. It should be noted that the distance between peaks and valleys of the roof surface do not affect the capability of fingers or tines 11 to contact the surface and it should be clear the gutter filter adapts itself readily to any irregular or undulating roof surface. Consequently, flexible fingers 11 making contact with the undulating roof surface form a screen or filter to prevent debris, leaves, and other undesirable matter from being washed into or entering the gutter channel of end frame 19 to clog and to impede the flow of water therethrough. Heretofore, there has been no gutter filter or eve guard that would contact and engage the surface of a roof and adapt to irregular or undulating contours of a corrugated roof. The present invention with flexible fingers 11 provides a structure which conforms to the peaks 33 and valleys 35 of a corrogated roof or tile roof structure. The gutter filter of FIG. 1 can be made from sheet metal or plastic in the form of a long rectangular strip which is punched or cut to form fingers 11 and slots 13 and punched or drilled to form holes 15 therein. Bend 9 is formed between segment 5 and rectangular segment 7 having finger 11 formed therein. It should be clear that other configurations are

possible such as attaching flexible fingers or tines to a separate base member which in turn is attached to a gutter channel.

It now should be apparent that the present invention provides a mechanical arrangement of flexible fingers or tines attached to a base member which may be employed in conjunction with end frame gutters utilized with corrugated patio awnings and roof surfaces to intercept and trap unwanted debris and to prevent it from entering the gutter channel.

Although particular structures, etc., have been discussed in connection with a specific embodiment of a gutter filter constructed in accordance with the teachings of the present invention, others may be utilized. Furthermore, it will be understood that although an exemplary embodiment of the present invention has been disclosed, and discussed, other applications and mechanical arrangements are possible and that the embodiments disclosed may be subjected to various changes, modifications, and substitutions without necessarily departing from the spirit of the invention.

What is claimed is:

1. A gutterfilter for the end frame gutter channel of a corrugated roof surface wherein said gutter channel has a flat surface extending above the roof surface adjacent the edge thereof, said filter comprising:

an elongated base member for connection to the flat surface of the end frame gutter of a corrugated roof surface; and

a multiplicity of flexible tines attached to said base member, said tines extending outwardly at an angle from said base member to bias the tips of said tines against the corrugated roof, said tips being misaligned to engage and contact the undulating surface of the corrugated roof adjacent the end frame gutter in a manner to intercept and hold debris which may accumulate on the surface from entering the end frame gutter channel.

2. The gutter filter described in claim 1 wherein said elongated base member is a flat rectangular strip having mounting holes positioned therealong for fastening said flat rectangular strip to the flat surface of the end frame gutter channel.

3. The gutter filter described in claim 2 wherein said multiplicity of tines are flat rectangular fingers integrally attached to said flat rectangular strip, said fingers being flexible so as to bend and adapt the tips thereof to contact the undulating contour of the corrugated roof surface.

4. A gutter filter for covering the opening to the gutter channel of an end frame positioned along the edge of a corrugated roof surface wherein said gutter channel has a flat surface extending along and above the edge of the roof surface, comprising:

an elongated flat rectangular sheet having a multiplicity of slots distributed along one edge of the longest dimension, such slots having segments of said elongated flat rectangular sheet therebetween which form a multiplicity of flexible fingers, a portion of said elongated flat rectangular sheet adjacent the other edge of longest dimension having openings therein for fastening said sheet to the flat surface of the end frame of the corrugated roof surface, said flexible fingers being bent with respect to said portion of said elongated flat rectangular sheet adjacent the other edge of longest dimension to bias the tips of said fingers in flexible engagement and contact with the undulating surface of the corrugated roof to form a filter covering the opening to the gutter channel.

5. A gutter filter for the end frame and gutter channel of a corrugated patio awning of the type wherein the end frame and gutter channel has a flat surface extending along and above the edge of the corrugated patio awning, comprising:

an elongated rectangular base member having a bend therein parallel to the edges of longest dimension, said bend dividing said elongated rectangular base member into two rectangular segments, one segment being larger than the other, the larger segment having slots therein to form flexible fingers therebetween which fingers extend parallel to the smallest dimension of said rectangular base member and perpendicular to said bend, said smaller segment having means for fastening the gutter filter to the end frame and gutter channel of a corrugated patio awning, each of said flexible fingers of said larger segment extending outwardly and at an angle formed by said bend with respect to said smaller segment, said angle being sufficient to bias the tips of each of said fingers into flexible engagement with the undulating surface of the corrugated awning adjacent thereto to form a filter to restrict debris from entering the gutter and to pass water therethrough into the gutter.

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