The gutter debris screen includes a front mounting portion, a central screen portion, and a rear mounting portion. The central screen portion includes a fine mesh top layer coupled to a supporting bottom layer of expanded metal having a coarse gauge mesh. The central screen portion has at least one longitudinally extending reinforcement rib formed by a downward fold of the screen layers. The front mounting member is formed from sheet metal and provides a lip that engages the front or outer wall of the gutter channel. The rear mounting member is also formed from sheet metal, and may be flat to fit between the roof and the roof shingle, or may be formed generally as an angle adapted for fastening to the rear or shingle wall of the gutter when the roof has bent shingles. The front and rear mounting portions are crimped to the central portion.
BACKGROUND OF THE INVENTION

The present invention relates to gutter covers, and more particularly to a gutter debris screen that prevents debris from collecting in the gutter and subsequently blocking the flow of water through the gutter.

Description of the Related Art

Gutters are open-top channels that collect and direct water away from a building and its foundation. The opening to the gutter channel must remain unobstructed in order for the gutter to function properly. It is common for debris, such as leaves, cones, seeds, pine needles and the like, to collect and block water flow. Obstruction of the gutter channel causes the gutter to overflow and become ineffective. Many people clean their gutters regularly as part of a preventive maintenance program, while others resort to such devices as covers and guards in an attempt to shield the gutter from the accumulation of debris in the channel.

Many of these guards use a single wire layer to cover the open top of the gutter. Other guards combine a wire layer with a mesh layer to keep debris out. The guard helps prevent large debris, such as cones or seeds, from settling in the gutters. However, smaller particles often slip past such layers. The structure of the guards is generally flat so that the layers lay flat above the opening. Sometimes the integrity of the guard cannot be maintained against heavy debris or debris that has collected and settled on the guard over time.

Consequently, there is a need for a device that covers the open top of a gutter channel and that prevents both large and small debris from entering and collecting in the gutter with resultant obstruction of the gutter, but freely permits the passage of rain water into the gutter to prevent surface water from collecting on the roof. It is further desirable that such a device be economical and easy to install. Thus, a gutter debris screen solving the aforementioned problems is desired.

SUMMARY OF THE INVENTION

The gutter debris screen provides a shield designed to fit over an open top of a gutter to prevent debris from collecting in the gutter and obstructing the flow of water through the gutter. The screen includes a front mounting portion, a central screen portion, and a rear mounting portion. The central screen portion includes a fine mesh top layer coupled to a supporting bottom layer of expanded metal having a coarse gauge mesh. The central screen portion has at least one longitudinally extending reinforcement rib formed by a downward fold of the screen layers. The front mounting member is formed from sheet metal and provides a lip that engages the front or outer wall of the gutter channel. The rear mounting member is also formed from sheet metal, and may be flat to fit between the roof and the roof shingle, or may be formed generally as an angle adapted for fastening to the rear or shingle wall of the gutter when the roof has bent shingles. The front and rear mounting portions are crimped to the central portion.

These and other features of the present invention will become readily apparent upon further review of the following specification and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an environmental, perspective view of a gutter debris screen according to the present invention.

FIG. 2 is a section view drawn along lines 2-2 of FIG. 1.

FIG. 3 is a top view of the gutter debris screen according to the present invention.

FIG. 4 is an environmental, perspective view of a second embodiment of a gutter debris screen according to the present invention.

FIG. 5 is a section view drawn along lines 4-4 of FIG. 1.

FIG. 6 is a top view of the gutter debris screen of FIG. 4.

Similar reference characters denote corresponding features consistently throughout the attached drawings.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention is a gutter debris screen. A first embodiment of the screen is designated as 10 in the drawings and shown in FIGS. 1-3. As shown in FIGS. 1-2, the screen 10 lies over the open top of a gutter 50. The gutter 50 has a rear wall 52, a front wall 54, a front ledge 58 extending inward from the front wall 54, and a bottom wall 56 connecting the rear wall 52 with the front wall 54. The walls 52, 54, and 56 form a generally U-shaped gutter channel 51. The gutter 50 is attached to fascia 64 adjacent a roof sheath or panel 60 having fiberglass, asphalt, or other lightweight shingles 62.

The screen 10 rests under the shingles 62 on the roof panel 60, and the other end abuts the front ledge 58 of the front wall 52 of the gutter 50.

The screen 10 includes a rear mounting portion 12, a central screen portion 20 and a front mounting portion 40. The central screen portion 20 includes a fine mesh top layer 22 disposed over a bottom support layer 24 of expanded metal having a coarse gauge mesh. The layer 24 of expanded metal is relatively strong and rigid, the coarse gauge mesh providing an open grate or lattice framework that provides mechanical support for the fine mesh top layer 22. The central screen portion 20 has a front end 26, a rear end 28 and a plurality of depending ribs 30, 32, two ribs 30 and 32 being shown in the drawing. The two ribs 30, 32 extend the length of the screen 10 and are parallel to the front mounting portion 40 and the rear mounting portion 12. The number of ribs is not critical, and in other embodiments, the screen 10 may have only one rib or more than two ribs.

The ribs 30, 32 preferably have a depth 1.2 of about one-half of an inch. The half-inch length permits the ribs 30, 32 to rest comfortably within the channel 51 of the gutter 50 without contacting the bottom wall 56, or any brackets or spikes that may extend within the channel 51. The rib 30 is about one and one-quarter inches apart from the outermost edge of the front mounting portion 40, and rib 32 is about two and one-half inches from the outermost edge of the front mounting 40.
The ribs 30, 32 are formed by folding the two layers 22 and 24 into rounded dips loosely crimping the layers together. The roundness of the folds permits the expanded metal layer 24 and the fine mesh layer 22 to be held close together without being too tight, which might cause the central portion 20 to be weak. The ribs 30 and 32 strengthen the central screen portion 20 and ensure the structural integrity of the central screen portion 20 against the weight of debris that may collect and settle on the screen 10 and that may otherwise cause the central screen portion 20 to sag in the middle.

The mesh layer 22 has a mesh screen size 94, or ninety-four meshes per inch, and is made of stainless steel. The 94 mesh weave grade is of a suitable gauge to allow rainwater to flow freely through the central screen portion 20, but is fine enough to prevent small particles of debris from passing through to accumulate in channel 51. The expanded metal layer 24 is a hard metal that is perforated and flattened, being made of stainless steel 3152 or similar types of materials.

The rear mounting portion 12 is formed from sheet metal having a first end 14 and a second end 18. The first end 14 is formed into a single accordion pleat defining a slot 16 on the underside of the rear mounting portion 12 for receiving the rear end 28 of the central screen portion 20. Once the rear end 28 of the central portion 20 is received by the accordion pleat, the first end 14 is crimped together to rigidly retain the rear end 28 of the central portion 20. The second end 18 is generally flat but may have a hooked end 19. The second end 18 of the rear mounting portion 12 is designed to rest between the roof panel 60 and the lightweight shingles 62 on a building.

The front mounting portion 40 is also made from sheet metal and forms a depending lip or flange 44 that is attached to the front end 26 of the central screen portion by a fold 42 that is crimped over the two layers 22 and 24. The lip 44 may be curved or arcuate, and is dimensioned and configured to bear against the front wall 52 of the gutter 50, the fold 42 resting on the ledge 58. The generally U-shaped portion 42 of the front lip 40 is crimped or otherwise joined to the fold 42 of the central portion 20, preferably by a double row of crimps, as seen most clearly in FIG. 3.

As shown in FIGS. 1-3, the screen 10 is set in place by disposing the second end 18 of the rear mounting portion 12 between the shingles 62 and the roof panel 60 and abutting the front mounting portion 40 of the gutter 50 against the front wall 52. The second end 18 is installed over the roof panel 60 by lifting the shingles 62 and sliding the screen 10 in place. The screen 10 may be secured over the gutter 50 by fasteners 53 to secure the front mounting portion 40 to the front ledge 58 of the gutter 50.

The screen 10 has width L1 of about six inches. The width L1 is sufficient to allow the screen 10 to rest over the gutter 50 without causing the shingles 62 to be raised. The screen 10 may have any desired length, but preferably is manufactured as four-foot panels. Each panel of the screen 10 is placed next to each other end-to-end. To prevent gaps from forming between screens 10 when they are placed end-to-end, the mesh layer 22 of the central portion 20 is extended out a bit past the expanded metal layer 24 to allow some overlap as the panels of the screen 10 lay next to each other.

Referring now to FIGS. 4-6, a second embodiment of the gutter debris screen, designated as 100, is shown for use on a building having heavy shingles 162, such as metal or tile shingles, that are heavy and difficult to lift and are frequently non-flat, being bent, arched, or corrugated. The gutter 150 has a rear wall 152, a front wall 154, a front ledge 158 extending from the front wall 154 and a bottom wall 156 connecting the rear wall 152 with the front wall 154. The walls 152, 154, and 156 form a gutter channel 151. The rear wall 152 of the gutter 150 is attached to a building wall 164 just below the shingles 162.

Referring now to FIGS. 4-6, a second embodiment of the gutter debris screen, designated as 100, is shown for use on a building having heavy shingles 162, such as metal or tile shingles, that are heavy and difficult to lift and are frequently non-flat, being bent, arched, or corrugated. The gutter 150 has a rear wall 152, a front wall 154, a front ledge 158 extending from the front wall 154 and a bottom wall 156 connecting the rear wall 152 with the front wall 154. The walls 152, 154, and 156 form a gutter channel 151. The rear wall 152 of the gutter 150 is attached to a building wall 164 just below the shingles 162.

The screen 100, like screen 10, has a central screen portion 120 that is flanked by a rear mounting portion 112 and a front mounting portion 140. Here, however screen 100 has a width L3 of about four and a half inches. The central screen portion 120 of the screen 100 includes a fine mesh top layer 122 disposed over a bottom support layer 124 of expanded metal. The fine mesh layer 122 extends a slightly beyond the expanded metal layer 122, as shown in FIG. 6.

The central portion 120 has a front end 126, a rear end 128 and two depending ribs 130, 132 that extend the length of the screen 100 parallel to the front mounting portion 140 and the rear mounting portion 112. Folding both the mesh layer 122 and the expanded metal layer 124 of the central portion 120 and crimping the layers together forms the ribs 130, 132. The rib 130 is about one and one-quarter inches from the outermost edge of the front mounting portion 140, and rib 132 is about two and one-half inches from the outermost edge of the front mounting portion 140. The ribs 130, 132 serve the same purpose as ribs 30 and 32, described above. Like screen 10, the screen 100 may have only one rib or more than two ribs. Each rib 130, 132 has a depth L4 of about one-half inches.

The structure of front mounting portion 140 is essentially identical to front mounting portion 40, similar parts having the same reference number incremented by 100, so that the description of front mounting portion 140 will not be repeated here.

The rear mounting portion 112 has a first end 114 that forms a single accordion pleat and a second end 118, disposed perpendicular to the first end 140, generally forming an angle shape, but with the vertical flange having a first wall 115 hinged to a second wall 117. The accordion pleat of the first end 114 forms a slot 116 on the underside of the rear panel 112 to receive the rear end 128 of the central screen portion 120, which is secured by crimping.

In this embodiment, the screen 100 is used with buildings having heavy shingles or tiles 162 that are too burdensome to lift to permit a flat panel, such as the rear panel 12 of the screen 10, to slide between the heavy tiles 162 and a roof panel 160. The screen 100 has a width L3 of about four and one-half inches. The width L3 permits the second end 118 to rest comfortably within a gutter channel 151 and bear against rear wall 152 of the gutter 150. By hinging the first wall 115 to the second wall 117, the second end 118 is able to expand or contract to fit against the rear wall 152 of the gutter 150. Once the screen 100 is set in place, a fastener 165 can be used to secure the second end 118 to the rear wall 158 of the gutter 150. The second wall 117 may have a curved or hooked end 119, as shown in FIG. 5.

Both screens 10, 100 utilize aluminum 0.25 expanded metal -500 having a standard diamond or lattice
pattern for its expanded metal layer 24, 124. The mesh layers 22, 122 are made of stainless steel having a mesh screen size of 94. The mesh layers 22, 122 will not allow particles smaller than half the size of a grain of sand to pass through the screen 10, 100. The rear mounting portion 12, 112 and the front mounting portion 40, 140 are made of sheet metal and can be finished to match the color of the gutter 50, 150 the screen 10, 100 is used on. The screen 10, 100 can have an aluminum finish, a white finish or a finish of another color.

[0033] It is to be understood that the present invention is not limited to the embodiments described above, but encompasses any and all embodiments within the scope of the following claims.

1 claim:

1. A gutter debris screen for use with a gutter, the gutter having a rear wall, a front wall, a front ledge extending inward from the front wall and a bottom wall connecting the front wall with the rear wall, the gutter being disposed adjacent a roof having shingles, the gutter debris screen comprising:

   a rear mounting portion;

   a front mounting portion; and

   a central screen portion extending between the front and rear mounting portions and having:

   a fine mesh top layer, the mesh having a 94 mesh screen size; and

   an expanded metal bottom support layer forming a grate beneath the mesh layer, the central screen portion having a front end and a rear end and at least one reinforcement rib depending therefrom.

2. The gutter debris screen according to claim 1, wherein the rib extends parallel to the front the rear mounting portions.

3. The gutter debris screen according to claim 1, wherein the rib is about one-half of an inch deep.

4. The gutter debris screen according to claim 1, wherein said at least one rib comprises two ribs.

5. The gutter debris screen according to claim 1, wherein said rib comprises a fold in the top and bottom layers loosely crimped together.

6. The gutter debris screen according to claim 1, wherein the rear mounting portion has a first end and a second end, the first end forming a single accordion pleat defining a slot beneath the rear mounting portion for receiving the rear end of the central screen portion, the accordion pleat being crimped to rigidly retain the rear end of the central screen portion, the second end being generally flat and adapted for being received between a roof panel and shingles mounted on the roof panel.

7. The gutter debris screen according to claim 1, wherein the front mounting portion includes a flange depending from the central screen portion and having an edge folded over and crimped to the front end of the central screen portion.

8. The gutter debris screen according to claim 1, wherein the screen has a width of about six inches.

9. The gutter debris screen according to claim 1, wherein the mesh layer extends slightly beyond the expanded metal layer.

10. A gutter debris screen for use with a gutter, the gutter having a rear wall, a front wall, a front ledge extending from the curved wall and a bottom wall connecting the rear wall with the front wall, the gutter debris screen comprising:

    a rear mounting portion having a first end and a second end, the second end being perpendicular to the first end, the second end being adapted for attachment to the rear wall of the gutter;

    a front mounting portion; and

    a central screen portion extending between the front and rear mounting portions and having:

    a fine mesh top layer, the mesh having a 94 mesh screen size; and

    an expanded metal bottom support layer forming a grate beneath the mesh layer, the central screen portion having a front end and a rear end and at least one reinforcement rib depending therefrom.

11. The gutter debris screen according to claim 10, wherein the rib is about one-half of an inch deep.

12. The gutter debris screen according to claim 10, wherein said at least one rib comprises two ribs.

13. The gutter debris screen according to claim 10, wherein the first end of the rear mounting portion forms a single accordion pleat defining a slot beneath the rear mounting portion receiving the rear end of the central screen portion, the accordion pleat being crimped to rigidly retain the rear end of the central screen portion.

14. The gutter debris screen according to claim 10, wherein the second end of the rear panel includes a first wall hinged to a second wall, the first wall and the second wall being normal to the central screen portion and capable of expanding or contracting to bear against the rear wall of the gutter.

15. The gutter debris screen according to claim 10, wherein the front mounting portion includes a flange depending from the central screen portion and having an edge folded over and crimped to the front end of the central screen portion.

16. The gutter debris screen according to claim 10, wherein the mesh layer has mesh screen size of 94.

17. The gutter debris screen according to claim 10, wherein the screen has a width of about four and one-half inches.

18. The gutter debris screen according to claim 10, wherein the mesh layer extends slightly beyond the expanded metal layer.

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