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(54) **DEVICE AND METHODS FOR PREVENTING THE OBSTRUCTION OF GUTTERS BY LEAVES AND OTHER DEBRIS**

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(58) **Field of Classification Search**
USPC 52/11, 12, 14; 210/474
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

265,716	A *	10/1882	Taylor	138/163
316,578	A *	4/1885	Schumann	210/162
524,668	A *	8/1894	Hawkins	210/460
753,660	A *	3/1904	Boyer	405/119
2,533,402	A *	12/1950	Schmitz, Jr.	210/463
2,669,197	A *	2/1954	Van Duzer	210/162
2,875,712	A *	3/1959	Blau	210/154
3,681,925	A	8/1972	Schmunk et al.	
3,699,684	A	10/1972	Sixt	
3,958,425	A *	5/1976	Maroschak	405/49

4,239,486	A *	12/1980	Gomez	432/225
4,949,514	A	8/1990	Weller	
4,950,103	A *	8/1990	Justice	405/43
4,961,442	A *	10/1990	Crespin et al.	137/312
4,964,247	A	10/1990	Spica	
5,103,601	A	4/1992	Hunt	
5,107,635	A *	4/1992	Carpenter	52/12
5,242,591	A	9/1993	Beechert et al.	
5,409,602	A *	4/1995	Sorenson	210/162
5,548,931	A *	8/1996	Bryant	52/11
5,581,934	A *	12/1996	Arnold, Sr.	43/64
D390,924	S *	2/1998	Schlatter	D23/267
5,791,091	A *	8/1998	Barbera	52/12
5,852,900	A	12/1998	Edelman	
5,960,590	A *	10/1999	Hutchison	52/11
6,739,800	B2 *	5/2004	Bevilacqua	405/48
7,017,614	B2 *	3/2006	Handley	138/109
7,469,504	B2 *	12/2008	Nocella	52/12
7,544,288	B1	6/2009	Cook	
7,740,755	B2	6/2010	Wilson et al.	
2004/0006927	A1	1/2004	Wickett	
2005/0178072	A1	8/2005	Olthoff	
2006/0191208	A1 *	8/2006	MacIntyre	52/12
2008/0271805	A1 *	11/2008	Presby	138/138
2009/0095454	A1 *	4/2009	MacKelvie	165/164

* cited by examiner

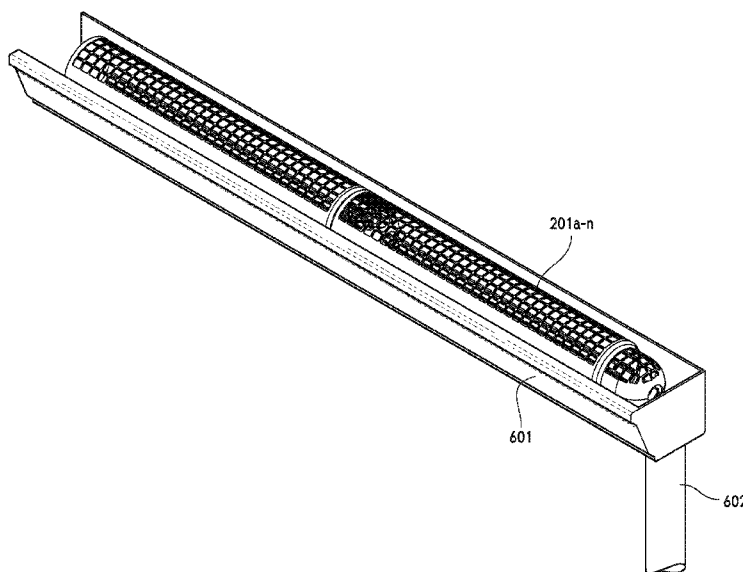
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(57) **ABSTRACT**

A gutter insert for preventing the clogging of gutters and devices that are used for conducting a fluid to a desired location. The gutter insert can be connected end-to-end to produce a modular gutter insert having a desired length for placement in a gutter or like device. Closed ends on each segment of the modular gutter insert provide a plurality of internal screens for preventing debris from flowing towards downstream gutter downspouts and outlets.

15 Claims, 5 Drawing Sheets



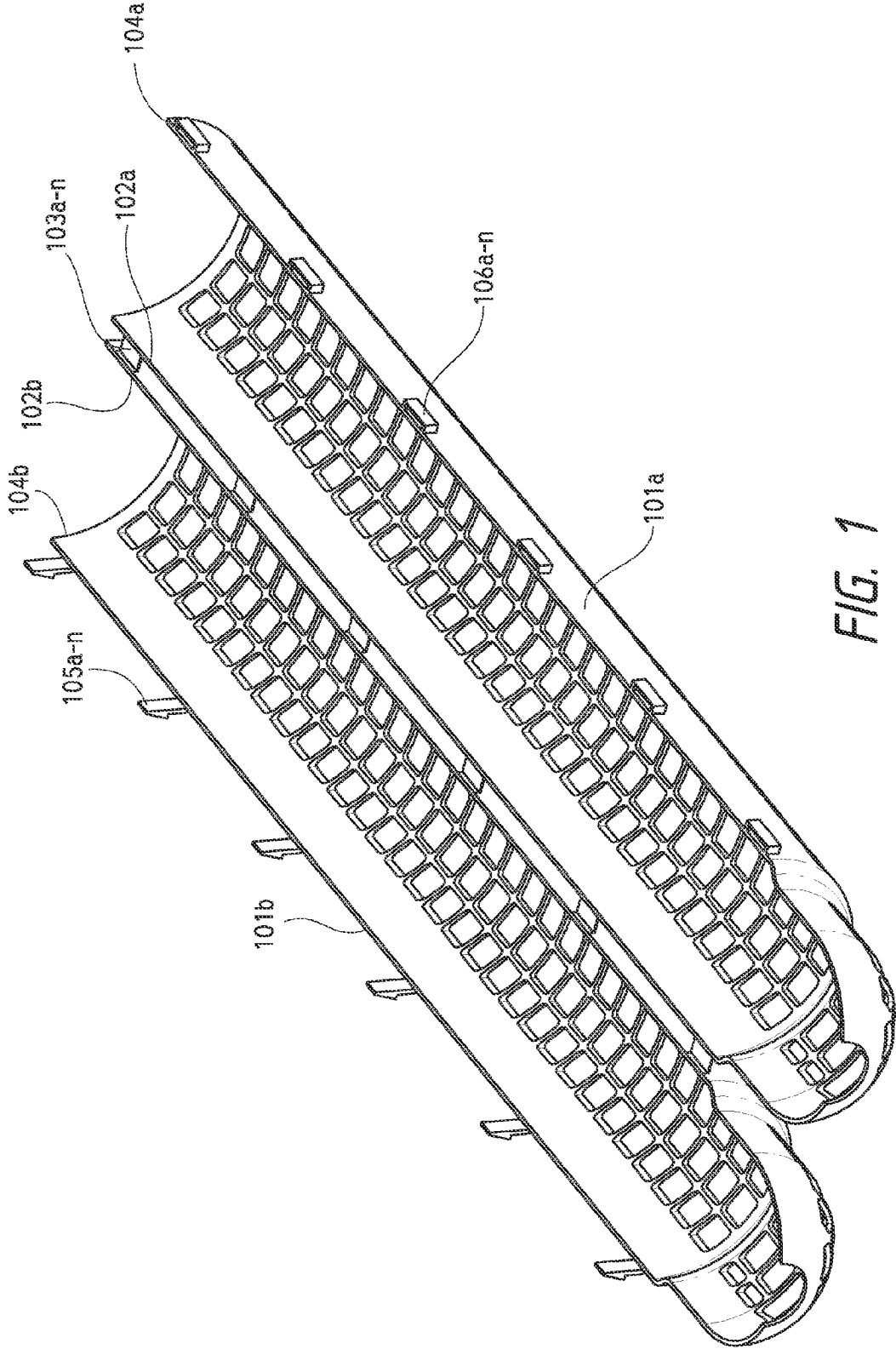


FIG. 1

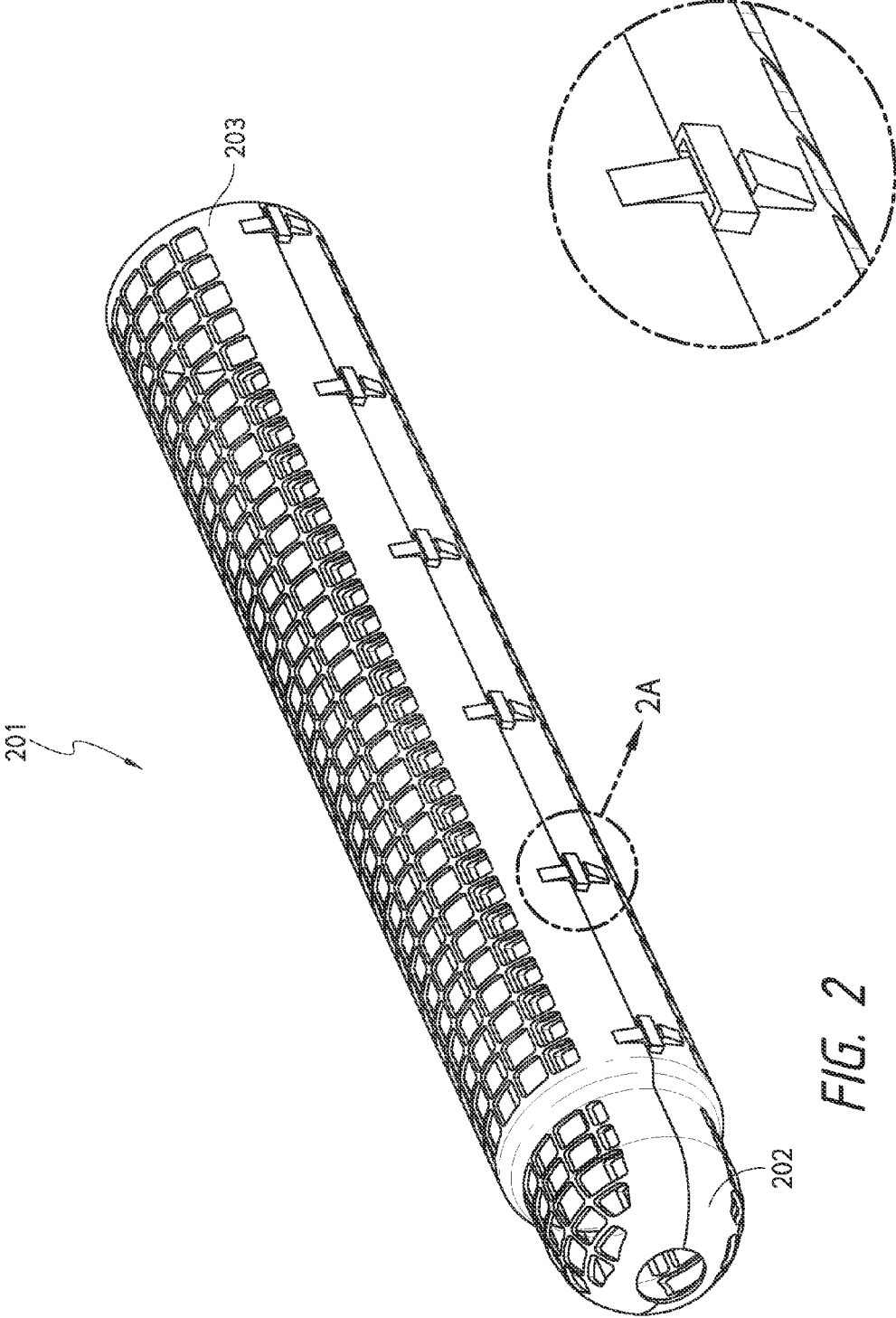


FIG. 2

FIG. 2A

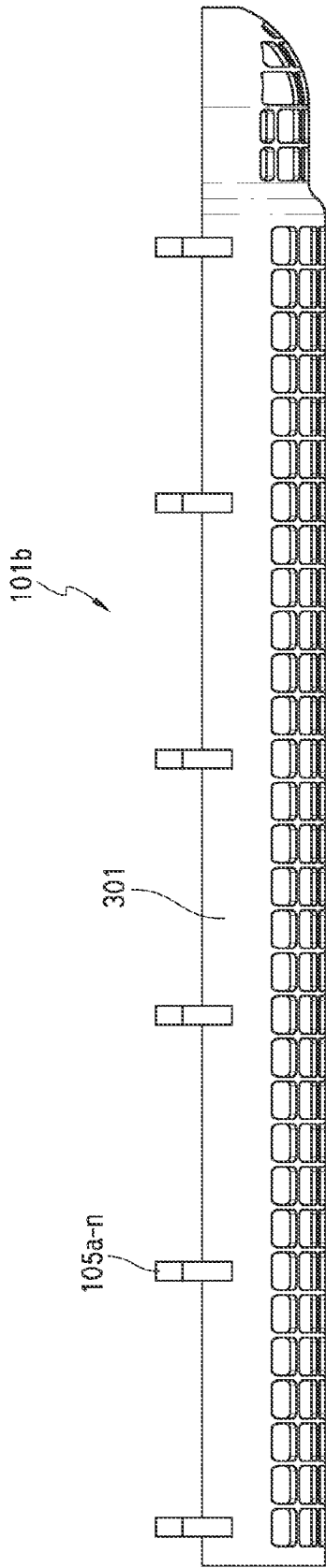


FIG. 3

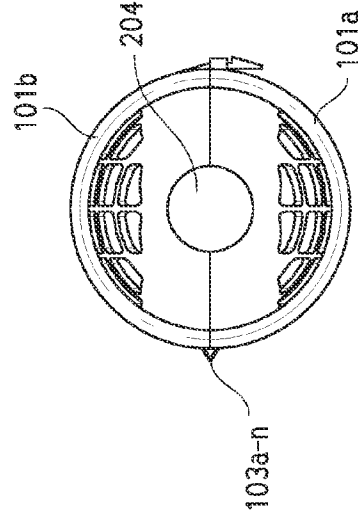


FIG. 5

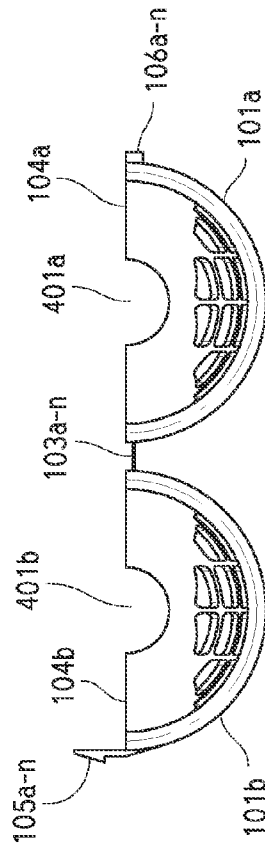


FIG. 4

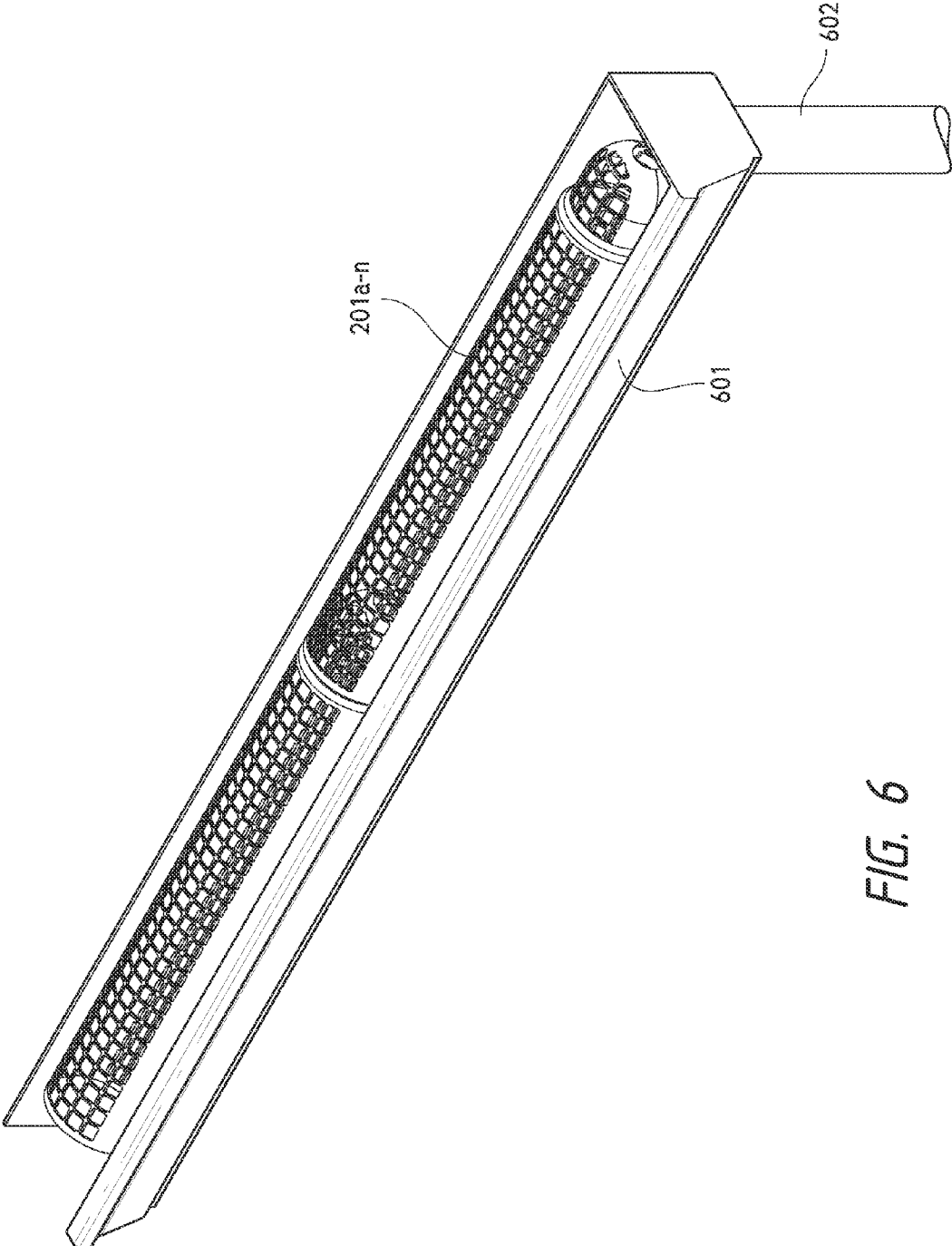


FIG. 6

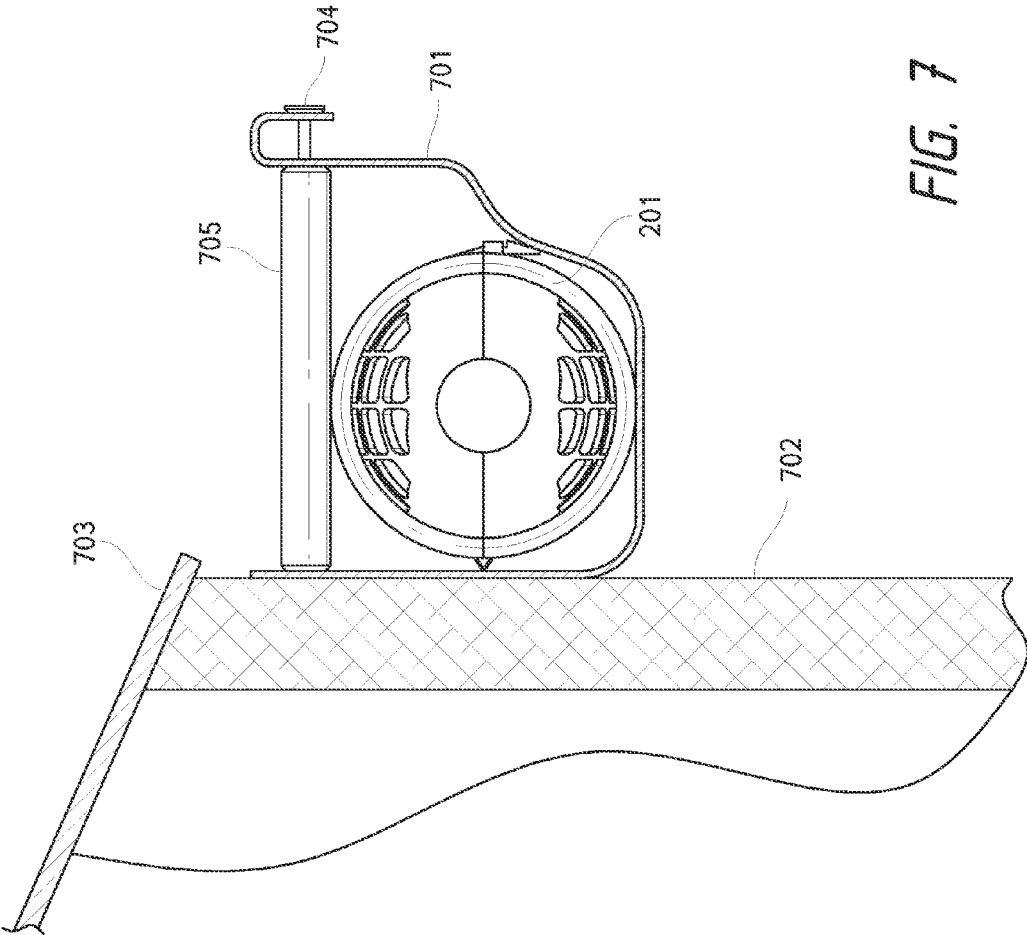


FIG. 7

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DEVICE AND METHODS FOR PREVENTING THE OBSTRUCTION OF GUTTERS BY LEAVES AND OTHER DEBRIS

BACKGROUND

The invention relates to devices and methods for preventing the obstruction of gutters by leaves, pine needles and other debris.

Rain gutters provide an effective means for conducting rainwater to a desired location, such as away from the foundation of a home or to a reservoir for collection. Rain gutters however can easily be clogged and rendered ineffective by debris such as leaves and pine needles from trees which are often in close proximity to the home. Even a small handful of debris can block the proper function of a gutter by collecting in the corners and down spouts of rain gutters.

A number of devices have been introduced to protect rain gutters from being clogged by debris. However, many of these devices are difficult and time-consuming to install. For example, many gutter protection devices require the installation of clips and the difficult manipulation of rigid screens which can lead to damage to parts of the home such as shingles and eaves, as well as injury to the installer. The location of gutters high on rooftops further complicates their installation. In addition, the installer requires a knowledge of the gutter type, size and configuration to determine compatibility with a given gutter protection device. The combination of the difficulty of installation and required knowledge of compatible shields prevents a large fraction of the home owners from using these products. Moreover, many gutter protection devices often slip out of position after installation due to wind, rain or snow, making these devices require repair and maintenance.

What is needed in the art therefore is a simple, inexpensive device for keeping gutters from being clogged by debris without requiring complicated installation or maintenance.

SUMMARY OF THE INVENTION

The invention overcomes the problems with known gutter protection devices by providing an inexpensive and effective gutter insert that is easily installed within an already mounted rain gutter. The invention does not require complicated brackets, tools or permanently mounted hardware thereby eliminating much of the effort required for maintaining and installing known gutter protection devices, in addition, the gutter inserts of the invention are easily customized to fit a desired length of rain gutter.

It is therefore an object of the invention to provide a modular device for keeping a gutter from being clogged by debris, wherein the device comprises a hollow linear member having a first end and a second end, wherein the hollow linear member is perforated and wherein the first end is configured to connect to the second end thereby allowing a plurality of said modular devices to connect to one another end-to-end for placement inside a gutter.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is perspective view of a device according to the invention wherein the device is in an open configuration.

FIG. 2 is a perspective view of a device of according to the invention wherein the device is in a closed configuration.

FIG. 2A is a callout showing a connecting means from FIG. 2.

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FIG. 3 is a side view of a device according to the invention wherein the device is in an open configuration.

FIG. 4 is an end view of a device according to the invention wherein the device is in an open configuration.

5 FIG. 5 is an end view of a device according to the invention wherein the device is in a closed configuration.

FIG. 6 is an operational view of a device according to the invention wherein the device is installed within a rain gutter.

10 FIG. 7 is an end view of a device according to the invention wherein the device is inside a rain gutter.

DETAILED DESCRIPTION

15 FIGS. 1-7 show various embodiments of gutter inserts consistent with principles of the present invention. It should be understood that these embodiments are exemplary only and that various features from the embodiments can be imported into other embodiments while remaining consistent with the principles of the present invention. Like reference characters are used wherever possible throughout the figures.

The inventive device relates to a gutter insert for keeping rain gutters and similar devices from being obstructed by debris such as leaves, pine needles, ice, or hail stones, for example. When referring to a gutter, the term "obstructed" or "clogged" means that the flow of water (or other fluid) through the gutter (and/or gutter downspout) is being inhibited by debris by a measurable amount relative to the flow of water through the gutter in the absence of such debris. "Clogging," or "obstruction" therefore includes debris completely preventing the flow of a fluid through a gutter and/or gutter downspout. The term "gutter" as used herein refers to systems for conducting a fluid to desired location. The term gutter includes, but is not limited to, rain gutters and in-ground trenches, for example.

25 FIG. 1 depicts a gutter insert according to the invention wherein the insert assumes a hinged arrangement such that the device can be closed to produce the hollow linear body depicted in FIG. 2.

FIG. 1 depicts an embodiment of the inventive gutter insert comprising a pair of opposing halves **101a** and **101b** which are perforated along their length. Opposing halves **101a** and **101b** are connected to one another along edges **102a** and **102b** by hinges **103a-n**. The perimeter of the device is formed by outer edges **104a** and **104b**. Affixed to portions of outer edges **104a** and **104b** is a connecting means for holding opposing halves **101a** and **101b** together. According to the embodiment depicted in FIG. 1, this connecting means comprises a plurality of hooks **105a-n** and loops **106a-n** which interact and lock the device in a closed configuration when opposing halves **101a** and **101b** are brought together (see e.g. FIG. 2A). It will be understood however that the gutter inserts of the invention may use a single connecting means, or other locking mechanisms such as a slide lock, ball and socket, zip ties, velcro, or a combination thereof, for example. It will also be understood that opposing halves **101a** and **101b** may be separate, unhinged pieces wherein the hinges **103a-n** are replaced with connecting means that enable opposing halves **101a** and **101b** to be held together to form a hollow linear body such as that depicted in FIG. 2.

30 When opposing halves **101a** and **101b** are closed, the device of the invention forms gutter insert **201** as depicted in FIG. 2. Gutter insert **201** has leading end **202** and trailing end. **203**. Leading end **202** and trailing end **203** are configured to interact with one another to allow multiple gutter inserts to be connected end-to-end in a modular fashion. In the embodiment depicted in FIG. 2, leading end **202** comprises a taper or neck for fitting within trailing end **203**. In the closed position,

opposing halves **101a** and **101b** form aperture **204**. Alternatively, leading end **202** may be free of aperture **204** in which case the area occupied by aperture **204** comprises either a perforated wall or non-perforated (i.e. solid) wall.

FIG. 3 depicts a side view of half **101b** with hooks **105a-n** attached to sidewall **301**. Though not depicted directly, it will be appreciated that half **101a** comprises an opposing sidewall of the similar or the same proportions as sidewall **301**, but with loops **106a-n**.

FIG. 4 depicts an end view of leading end **202** of the gutter insert with opposing halves **101a** and **101b** in an open configuration. Each of opposing halves **101a** and **101b** optionally contain on the end of edges **104a** and **104b** a pair of indentations **401a** and **401b** that form aperture **204** when opposing halves **101a** and **101b** are closed as depicted in FIG. 5. In some aspects of the invention, aperture **204** is larger than the apertures of leading end **202** (and/or the apertures on the neck or taper of leading end **202**) so as to permit debris to flow through leading end **202** should the smaller apertures become clogged with debris.

FIG. 6 depicts an operational view wherein a plurality of gutter inserts **201a-n** are joined end-to-end in a modular fashion and placed inside gutter **601**. As depicted in FIG. 6 gutter inserts **201 a-n** are preferably of a size and dimension that permits gutter inserts **201a-n** to fit inside gutter **601**. Though not essential, the size and dimension of the inventive device preferably permits gutter inserts **201a-n** to fit snugly inside gutter **601** so as to prevent gutter inserts **201a-n** from becoming dislodged from gutter **601**. Gutter inserts **201a-n** may also be of a size and shape wherein the sides of the tubular body do not contact the inner sidewalk of gutter **601**. In such configurations, gutter inserts **201a-n** still form a hollow conduit through which water (or other liquids) may flow despite debris collecting between the inner sidewalls of gutter **601** and the outside wall of gutter inserts **201a-n**. While the gutter inserts of the invention may comprise any diameter that permits them to be placed within a desired gutter, a non-limiting range for the outside diameter of the gutter inserts is between about 3.25 to 3.5 inches, or greater than 3.25 inches, for example.

In their connected configuration, and still referring to FIG. 6, gutter inserts **201a-n** form a series of internal screening portions. That is, when the gutter inserts of the invention are connected end-to-end, leading ends **202** create a plurality of closed, perforated walls that prevent the flow of debris that may pass through the outer wall of gutter inserts **201a-n** thereby preventing such pass-through debris from collecting at gutter downspout **602**. In addition, apertures **204** may provide an overflow should the small apertures on leading ends **202** become clogged with pass-through debris.

In operation, the outer perforated walls of gutter inserts **201a-n** form a barrier to keep debris from entering the hollow space inside gutter inserts **201a-n**. Should any debris pass through the outer perforated walls of gutter inserts **201a-n**, such debris may be collected by the perforated barrier(s) formed by leading end **202** thereby preventing such pass-through debris from reaching down spout **602**. Thus, the outer walls of gutter inserts **201a-n** form a first barrier that inhibits debris from entering the inside of the hollow space inside gutter inserts **201a-n**, while the barrier(s) formed by leading end **202** form a second barrier for keeping pass-through debris from reaching down spout **602**. Therefore, when a plurality of gutter inserts **201a-n** are connected end-to-end, leading ends **202** create a series of internal barriers for capturing any pass-through debris before it can reach down spout **602**.

One aspect of the invention concerns the apertures that occupy leading end **202** (including the neck or taper thereof) and the outer walls of opposing halves **101a** and **101b** (or gutter insert **201** when opposing halves **101a** and **101b** are closed). It will be appreciated that the size and number of apertures that are selected will depend on the size of the debris that is desired to be blocked. Suitable aperture sizes for the opposing halves **101a** and **101b** (and leading end **202**) include, but are not limited to about ¼ inch to ¾ inch holes. Suitable shapes for such apertures include, but are not limited to, squares; diamonds, ovals, circles, or combinations thereof. Collectively, the apertures may create between about 65%-85% open area, although more or less open area may be utilized without departing from the scope of the invention, provided that such apertures inhibit the passage of debris.

The perforations in the outer walls of gutter inserts **201a-n** (i.e. opposing halves **101a** and **101b**) may be of the same size, or different size, as the perforations of leading end **202**. That is, gutter insert **201** (and its individual halves) may have the same open area, more open area or less open area than leading end **202**, per square unit of area. In an aspect of the invention, leading end **202** has smaller perforations than the outer wall of gutter insert **201** (i.e. opposing halves **101a** and **101b**) so as to catch debris that passes through the larger holes of the outer wall of gutter insert **201 a-n**.

FIG. 7 shows an end view of a gutter insert of the invention inside rain gutter **701**. Rain gutter **701** is secured to wall **702** next to roof **703** by nail **704** which passes through spacer **705**. In some aspects of the invention, gutter insert **201** is of a size and dimension to permit it to fit snugly under spacer **705** so as to secure gutter insert **201** inside rain gutter **701**. While depicted with a nail and spacer, the gutter inserts of the invention may be configured to fit snugly under other types of attaching systems that use a cross support member. The gutter inserts of the invention may be of any length that makes it practical to connect a plurality of them together end-to-end so that they can be placed inside a gutter. In some aspects of the invention, the gutter inserts are between about 12 to 24 inches, for example. It should be noted that shorter lengths of the gutter insert may be desirable to create a greater number of internal barriers so that larger amounts of pass-through debris can be collected. The length of gutter insert **201** may of course be shortened by a user by cutting gutter insert **201** to a desired length.

Although the gutter insert of the invention has been described as keeping gutters (e.g. rain gutters) from clogging up, it will be appreciated that the gutter inserts of the invention may be used in other systems that are designed for conducting water to a desired location, such as in-ground trenches. Thus, the particular shape, dimensions and rigidity of the gutter insert of the invention may be modified to fit the water conducting system that is desired to be protected from debris. Gutter insert **201** may therefore assume a variety of shapes including, but not limited to, round, square, elliptical or oval-shaped cylinders.

The gutter inserts of the invention may be made from any material that permits them to be manufactured and used as disclosed herein. Suitable materials for constructing the gutter insert of the invention include, but are not limited to, plastic, stamped sheet metal, wire, or a combination thereof. While the gutter inserts of the invention are depicted as a pair of opposing halves (to facilitate injection molding, for example), it will be appreciated that gutter insert **201** may be formed as a single continuous unit.

Methods of using the presently disclosed gutter insert are also within the scope of the invention. Such methods may be practiced by providing a plurality of gutter inserts and con-

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necting them together end-to-end to form a modular gutter insert, and placing the modular gutter insert inside a rain gutter. As noted above, the gutter inserts of the invention may be modified by having a user cut the gutter insert to a desired length. Thus, it may be desirable to manufacture the gutter insert out of a material such as plastic to permit it to be easily cut by a user by scissors or garden shears, for example.

We claim:

1. A gutter insert configured to rest inside an existing rain gutter and a prevent said rain gutter from becoming obstructed with debris, said gutter insert comprising:

- a) a perforated hollow linear member having a first end and a second end; and
- b) a perforated cylindrical body having a base and terminating in a perforated dome opposite said base, said perforated cylindrical body being connected to said first end of said perforated hollow linear member by said base, wherein said perforated cylindrical body has a narrow section that is smaller than the cross section of said perforated hollow linear member and is configured to fit inside said second end in a manner that permits a plurality of said gutter inserts to connect to one another end-to-end to form a modular gutter insert;
- c) wherein said perforated hollow linear member and said perforated cylindrical body are formed from a pair of opposing portions;
- d) at least one hinge joining said pair of opposing portions; and
- e) a first one or more connections configured to hold said pair of opposing portions in a close configuration.

2. The gutter insert of claim 1, wherein said perforated hollow linear member is circular, square or oval.

3. The gutter insert of claim 1, wherein the perforations in said perforated hollow linear member provide said perforated hollow member with at least 65% open surface area.

4. The gutter insert of claim 1, wherein said modular gutter insert comprises (a) an external perforated barrier formed by the perforations in said perforated hollow linear member, and (b) at least one internal perforated barrier formed by said perforated dome, wherein said at least one internal perforated barrier is configured to prevent debris from flowing longitudinally through said modular gutter insert.

5. The gutter insert of claim 1, wherein said pair of opposing portions are joined by a second one or more connections.

6. The gutter insert of claim 1, wherein said perforated dome comprises a center having a circular opening therein.

7. A method for preventing a rain gutter from becoming obstructed with debris, said method comprising:

- a) providing a plurality of gutter inserts that are configured to rest inside said rain gutter, each of said plurality of gutter inserts comprising:
 - i) a perforated hollow linear member having a first end and a second end;
 - ii) a perforated cylindrical body having a base and terminating in a perforated dome opposite said base, said perforated cylindrical body being connected to said first end by said base, wherein said perforated cylindrical body has a cross section that is smaller than the

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cross section of said perforated hollow linear member and is configured to fit inside said second end in a manner that permits said plurality of gutter inserts to connect to one another end-to-end to form a modular gutter insert;

- iii) wherein each of said plurality of gutter inserts is formed from two opposing linear portions;
 - iv) at least one hinge joining said opposing linear portions; and
 - v) a first at least one connection configured to hold said opposing linear portions in a closed configuration;
- b) connecting said plurality of gutter inserts end to end to form a modular gutter insert; and
- c) placing said modular gutter insert inside said rain gutter wherein said modular gutter insert prevents debris from obstructing said rain gutter.

8. The method of claim 7, wherein said perforated hollow linear member is circular, square or oval.

9. The method of claim 7, wherein the perforations in said perforated hollow linear member provide said perforated hollow linear member with at least 65% open surface area.

10. The method of claim 7, wherein said modular gutter insert comprises (a) an external perforated barrier formed by the perforations in said perforated hollow linear member, and (b) at least one internal perforated barrier formed by said perforated dome wherein said at least one internal perforated barrier is configured to prevent debris from flowing longitudinally through said perforated hollow linear member.

11. The method of claim 7, wherein said opposing linear portions are joined by a second at least one connection.

12. The method of claim 7, wherein said perforated dome comprises a center having a circular opening therein.

13. A gutter insert configured to rest inside an existing rain gutter and prevent said rain gutter from becoming obstructed with debris, said gutter insert comprising:

- a) a perforated tubular body having a first end and a second end;
- b) a perforated cylindrical body having a base and terminating in a perforated dome opposite said base, said perforated cylindrical body being connected to said first end by said base, wherein said perforated cylindrical body (i) has a cross section that is less than the cross section of said perforated tubular body, and (ii) is configured to nest within said second end;
- c) wherein said perforated tubular body and said perforated cylindrical body are formed from a pair of opposing portions;
- d) at least one hinge joining said pair of opposing portions; and
- e) a first one or more connecting means for holding said pair of opposing portions in a closed configuration.

14. The gutter insert of claim 13, wherein said pair of opposing portions are joined by a second one or more connecting means.

15. The gutter insert of claim 13, wherein said perforated dome comprises a center having a circular opening therein.

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