



(22) Date de dépôt/Filing Date: 2012/02/03

(41) Mise à la disp. pub./Open to Public Insp.: 2013/08/03

(45) Date de délivrance/Issue Date: 2018/05/08

(51) Cl.Int./Int.Cl. *F24F 7/02* (2006.01)

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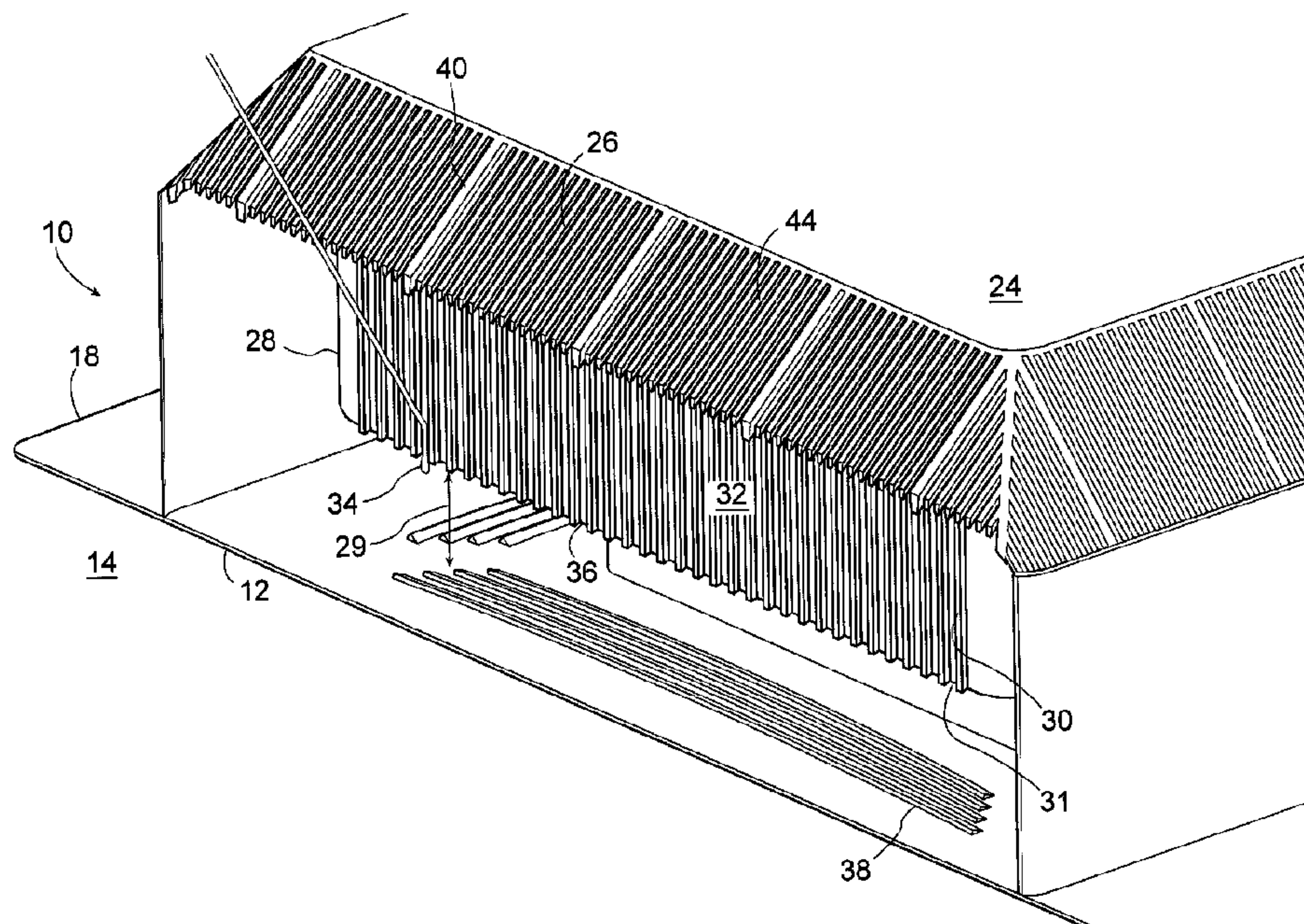
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(54) Titre : SYSTEME DE CONTROLE DES PRECIPITATIONS

(54) Title: PRECIPITATION CONTROL SYSTEM



(57) Abrégé/Abstract:

There is disclosed a roof vent having rain control means to reduce rain water splashing into the opening in a roof vent. The baffle has a number of ridges or channels that direct rain water into a number of droplet pathways. The falling water creates a rain curtain that deflects rain water that enters into the roof vent from travelling into interior of the building. At the base of the roof vent is one or more splash deflectors that changes the angle of water impacting the base of the roof vent to limit the amount of deflected water that can enter into the opening in the roof vent. The rain curtain and one or more splash deflector may act in concert to further divert rainwater.

ABSTRACT OF THE DISCLOSURE

There is disclosed a roof vent having rain control means to reduce rain water splashing into the opening in a roof vent. The baffle has a number of ridges or channels that direct rain water into a number of droplet pathways. The falling water creates a rain curtain that deflects rain water that enters into the roof vent from travelling into interior of the building. At the base of the roof vent is one or more splash deflectors that changes the angle of water impacting the base of the roof vent to limit the amount of deflected water that can enter into the opening in the roof vent. The rain curtain and one or more splash deflector may act in concert to further divert rainwater.

Title: PRECIPITATION CONTROL SYSTEM**FIELD OF THE INVENTION**

This patent document relates to the field of roof vents, and in particular relates to passive roof vents for allowing air to vent from building spaces such as attics through openings in the roof. Most particularly this invention relates to roof vents of the sort that are designed to let air out through a roof of a building enclosure while at the same time limiting or preventing the passage of moisture or precipitation back through the roof opening.

BACKGROUND OF THE INVENTION

Passive roof vents typically include covers which are structures that are used to reduce the likelihood of precipitation such as rain or snow in through a roof opening on which the vent is mounted. However, simple roof vent cover designs often do allow rain droplets to get under the cover, especially in extreme weather events such as in extreme downpours or driving rain storms. Rain that gets under the cover can deflect off interior surfaces within the roof vent and splash into and through the roof opening. The influx of moisture into the interior structure may cause damage to the building and is undesirable.

U.S. Patent No. 6,767,281 issued on July 27, 2004 to Canplas Industries Ltd. discloses a weather resistant design including a precipitation baffle that reduces the likelihood of precipitation passing under the roof vent cover and into the building enclosure. Although this patent discloses an improvement to conventional roof vents, it may still be possible in severe weather events for moisture to find its way into the roof opening, so improvements are desired.

U.S. Patent No. 1,794,673 issued on March 3, 1931 to Creager discloses a spark plug cover that uses ribs to direct water flow on a

surface. Creager discloses dispersing water away from a central location, which does not provide any advantage for reducing splashing below the spark plug cover.

U.S. Patent No. 6,129,628 issued on October 10, 2000 to O'Hagin
5 et al. discloses a roof vent with a mesh screen to prevent material from falling into the interior of the building, but does not disclose preventing water from being deflected into the roof opening.

U.S. Patent Publication No. 2008/0287055 published on November
20, 2008 by Exposito discloses a cover for an outdoor roof opening. The
10 cover in Exposito has a conical element that reduces the amount of water splatter that enters directly into the roof opening after impacting on the roof. The conical element is large and cumbersome. U.S. Patent No. 4,585,243 issued on April 29, 1986 to Lockwood et al. discloses a splash guard for a truck-type vehicle with elongated ribs and conical projections
15 to reduce splashing from the splash guard.

Other examples of roof vents include: U.S. Patent No. 7,780,510 issued on August 24, 2010 to Polston; U.S. Patent Publication No. 2003/0153262 published on August 14, 2003 to Mantyla et al.; U.S. Patent Publication No. 2004/0235411 published on November 25, 2004 to
20 Jones et al.; and U.S. Patent Publication No. 2007/0049190 published March 1, 2007 to Singh. A mesh structure with interlaced ribs is disclosed in U.S. Patent No. 5,716,718 issued on February 10, 1998 to Lai.

There is a need for further improvements in the design of roof vents to impede water, in the form of rain for example from passing under
25 the cover of the roof vent and into the building enclosure.

SUMMARY OF THE INVENTION

These and other needs are addressed by the invention described herein.

What is desired is a roof vent that reduces the amount of precipitation that can pass through a roof vent opening.

In an embodiment of the invention, there is a roof vent comprising a base for securing the roof vent to a roof. The base includes a perimeter
5 securing flange and upstanding walls defining a central passageway. The passageway is sized and shaped to register with the ventilation opening in the roof to permit air to pass through said opening and through said passageway of said base. There is a cover on said base for covering said passageway. The cover includes a grill for permitting air to pass through
10 said cover. A baffle is located between said grill and said passageway to block precipitation from passing directly through said grill and into said passageway. At least one of said base and said cover includes a means to control rain to further limit rain water from passing through said grill and indirectly splashing into said passageway. In a preferred form of the
15 invention the base includes splash deflectors to cause raindrops which may have penetrated the grill to splash laterally rather than up and into the central passageway. In another preferred form of the invention the baffle includes an air opening at a bottom edge thereof and has a plurality of generally vertically extending ribs facing towards an outside of the roof
20 vent, wherein rain impinging on the ribs is separated into discreet streams and forms a droplet curtain off a lower edge thereof to further limit the ability of raindrops to splash up and over the walls defining the central passageway.

These and other aspects of the invention are described in the
25 claims, which are incorporated herein by reference.

BRIEF DESCRIPTION OF THE DRAWINGS

Reference will now be made to the preferred embodiments of the present invention with reference, by way of example only, to the following
30 drawings in which:

Figure 1 is a partial perspective view of an embodiment of a roof vent with a baffle;

Figure 2 is a partial perspective view of the embodiment shown in Figure 1;

5 Figure 3 is a partial perspective view of an embodiment of a roof vent with channels in an exterior face of a baffle;

Figure 4 is a partial perspective view of an embodiment of a roof vent with a plurality of angled faces; and

10 Figure 5 is a side view of a baffle in an embodiment of a roof vent with rain droplets forming a droplet curtain.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

In the claims, the word "comprising" is used in its inclusive sense and does not exclude other elements being present. The indefinite article
15 "a" before a claim feature does not exclude more than one of the feature being present.

The present invention is described in more detail with reference to exemplary embodiments thereof as shown in the appended drawings. While the present invention is described below including preferred
20 embodiments, it should be understood that the present invention is not limited thereto. Those of ordinary skill in the art having access to the teachings herein will recognize additional implementations, modifications, alterations and embodiments which are within the scope of the present invention as disclosed and claimed herein. In the figures, like elements
25 are given like reference numbers. For the purposes of clarity, not every component is labelled in every figure, nor is every component of each embodiment of the invention shown where illustration is not necessary to allow those of ordinary skill in the art to understand the invention.

An embodiment of the present invention is shown as a roof vent
30 in Figures 1 and 2. The roof vent 10 includes a base 12 that may be

secured to a roof 14 in a conventional manner. The roof 14 is located on a building enclosure and the roof 14 has an opening (not shown) that allows passage of air out of the building enclosure through the roof. A perimeter securing flange 18 on the base 12 may be used to secure the roof vent 10 to the roof 14. The perimeter securing flange 18 may be secured to the roof by any means, including nailing, stapling, welding, gluing or other securing means. Upstanding walls 20 define a central passageway 22 that is shaped and sized to register with the opening (not shown) in the roof 14 to permit air to pass through the opening and through the passageway 22 of the base 12.

A cover 24 is provided on the base 12 for limiting the ability of precipitation to enter the passageway 22. In particular the cover 24 covers the top opening of the central passageway. The cover 24 includes a grill 26 for permitting air to pass through the cover 24. A baffle 28 is located between the grill 26 and the passageway 22 to block rain drops, which may be coming in at an angle, from passing through the grill 26 and then passing into the passageway 22. A ventilation opening 29 is located below the baffle 28, generally towards a base of the upstanding perimeter wall which defines the central passageway.

As shown, in a preferred form of the present invention the roof vent 10 includes a plurality of ridges 30 that are formed on an exterior face 32 of the baffle 28. In Figure 1, the exterior face 32 of the baffle 28 is the side of the baffle 28 that faces towards the grill 26. The plurality of ridges 30 define a parallel set of grooves 31 which together function as a rain control means on the baffle 28 as described below.

As shown in Figure 1, the ridges 30 and grooves 31 are generally parallel, vertical and in spaced apart relation. Moreover they extend to the bottom of the baffle and thus end at a location towards a top edge of the ventilation passage 29. Essentially, what is provided is the baffle, to block the water passing in through the grill in the first place, and then the

surface features on the outside of the baffle to distribute the water across the baffle surface in a controlled manner. As will be understood by those skilled in the art, the ridges and grooves are one form of surface feature that provides the functional requirement desired, but that there are many other forms of surface features that might also provide adequate results, all of which are comprehended by the present invention. All that is required is that the surface features act to control and direct the water streaming off the lower edge of the baffle in the manner described below. The ridges 30 and grooves 31 together form a plurality of droplet passageways 34. The droplet passageways 34 are sized and shaped to divide precipitation passing through the grill 26 and impinging on the baffle 28 into a plurality of separate streams so as to form a droplet curtain 42 (Figure 5) extending downwardly from a lower edge 36 of the baffle 28 as the water drops off the lower edge of the baffle 28.

The roof vent 10 also preferably includes a plurality of splash deflectors 38. As shown in Figure 2, the splash deflectors 38 lie on the base 12 generally below the baffle 28 and spaced laterally from the grill 26. In particular the splash deflectors 38 are positioned at a location below the grill and the baffle where rain drops might pass at an angle through the grill relatively unimpeded and still impinge onto the base flange adjacent to the upstanding wall. The splash deflectors 38 include a shallow angled surface 52 for directing splashes generally along the base 12. The splash deflectors 38 may be oriented so that each of the splash deflectors direct splashes at different angles to one another. The splash deflectors in Figure 2 are multiple ridges each having two angled surfaces. The first angled surface 52 has a shallow angle relative to the base 12 and the second angled surface 54 has a steep angle relative to the base 12. The splash deflectors 38 are spread apart to permit water to run therebetween. The splash deflectors 38 together function as a rain control means on the base 12 of the roof vent 10. In Figure 2, the splash

deflectors 38 are located beneath the droplet curtain 42 (Figure 5) which extends below the lower edge 36 of the baffle 28. Placing the splash deflectors 38 below the droplet curtain 42 (Figure 5) allows the splash deflectors and droplet curtain to work together to prevent rain water from
 5 deflecting into the roof opening.

Figure 1 also shows the grill 26 is formed from a number of ribs 44 as well as a number of intermittent thicker ribs 40 spaced along the grill 26. Intermittent thicker ribs 40 may be used to reduce the size of potential rips, tears or punctures in the grill work. The thicker ribs 40 will minimise
 10 the size of an opening that results from damage to the grill 26.

Figure 3 shows a plurality of channels 46 that lie on an exterior face 32 of the baffle 28. The channels 46 together define a plurality of droplet passageways.

Figure 4 shows angled faces 48 which act as splash deflectors.
 15 The angled faces 48 have multiple angled surfaces 52,54 which face in different directions. Between the peaks of the angled faces 48 are passageways to allow water to flow from the angled faces 48.

Figure 5 shows a droplet curtain 42 extending from below the lower edge 36 (Figure 1) of a baffle 28.

20 In operation, as rain hits and runs down the ridges 30 or channels 46 of the roof vent 10, which channel the water downwardly to a lower edge of the baffle 28 so the water may fall as droplets onto the base 12. The drops, as they fall through the air gap between the lower edge 36 of the baffle 28 and the base 12, may collide with and redirect or divert other
 25 rain drops which may have passed directly through the grill relatively unimpeded and hence have a high velocity. Such rain drops might otherwise have travelled further inside the vent interior by hitting the base and splashing up. The ridges 30 or channels 46 act to create a wall of water droplets, or water curtain, that impede other rain droplets that
 30 encounter the water curtain.

The splash deflectors also act to ensure that splashes from any rain droplets are directed away from the top of the upstanding walls 20 so that moisture does not enter into the passageway 22 and into the opening in the roof. The splash deflectors 38 may be placed directly below the
 5 ridges 30 or channels 46 so that water droplets falling from the baffle 28 do not deflect into the passageway 22 and into the opening in the roof. According to the present invention the splash deflectors are positioned on the base at a position where rain drops passing through the grill could impinge on the base below the baffle 28. The splash deflectors and
 10 ridges or channels may act in unison to ensure that rain water is directed away from the passageway 22 and the opening in the roof.

Various modifications can be made to the angled faces 48 as long as the angled faces 48 reduce the amount of deflected water that enters into the opening (not shown) on the roof 14. Instead of employing a
 15 plurality of splash deflectors, one single splash deflector could be used. The single splash deflector could, for example, be an angled or curved surface placed beneath the baffle 28 that would redirect water away from the opening in the roof. The splash deflectors may be a smooth curved surface or may consist of a series of angled arms extending from the
 20 surface which act to deflect falling droplets of water away from the roof opening. Different angles and curves for the splash deflectors may be chosen based on the location of the baffle 28 and the height and location of the upstanding walls 20 in order to reduce the entry of deflected rain droplets into the roof opening.

25 The ridges 30 and channels 46 that allow for the creation of droplet passageways do not need to extend continuously along the full height of the baffle 28. The ridges or channels could be placed only on the lower end of the baffle 28. The ridges or channels may also be a collection of discontinuous channels and ridges that are sufficient to form a droplet
 30 passageway 34 for precipitation that enters the roof vent 10 and strikes

the baffle 28. Ridges and channels could be used interchangeably along the baffle 28 as long as a droplet passageway 34 can be formed.

**THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE
PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:**

1. A roof vent for venting a building enclosure to an outside, said roof vent
5 comprising:
- a base for securing the roof vent to said building enclosure, the base
including a perimeter securing flange and upstanding walls defining a central
passageway, said passageway sized and shaped to register with an opening in
said building enclosure to permit air to pass through said opening and through said
10 passageway of said base;
- a cover mounted to said base for covering said passageway, said cover
including a grill for permitting said air to pass through said cover;
- a baffle extending from an underside surface of said cover toward said base
between said grill and said passageway to block rain water passing through said
15 grill from passing into said passageway, said baffle terminating at a lower edge,
said baffle comprising ridges on at least a portion of an exterior face of said baffle,
said ridges defining droplet pathways sized and shaped to direct said blocked rain
water toward said base in separate streams to form of a droplet curtain extending
from said lower edge of said baffle to said base; and
- 20 an air gap defined between said lower edge of said baffle and said base to
permit said air to pass between said passageway and said grill; and
- at least one splash deflector on said base opposite said lower edge of said
baffle, to deflect said droplet curtain;
- wherein when said roof vent is installed on said building enclosure, said
25 baffle is substantially vertical, and said ridges are adapted to direct said blocked
rain water in a substantially vertical direction.
2. The roof vent of claim 1, wherein said at least one splash deflector is
positioned on said perimeter securing flange substantially below said baffle, and
30 spaced laterally from said grill.

3. The roof vent of claim 2, wherein said at least one splash deflector includes an angled face for directing splashes of said rain water substantially along said perimeter securing flange.
- 5 4. The roof vent of claim 3, wherein said perimeter securing flange comprises a plurality of splash deflectors, each of said splash deflectors directing said splashes at a different angle to one another.
- 10 5. The roof vent of claim 4, wherein said splash deflectors are spread apart allowing said rain water to run therebetween.

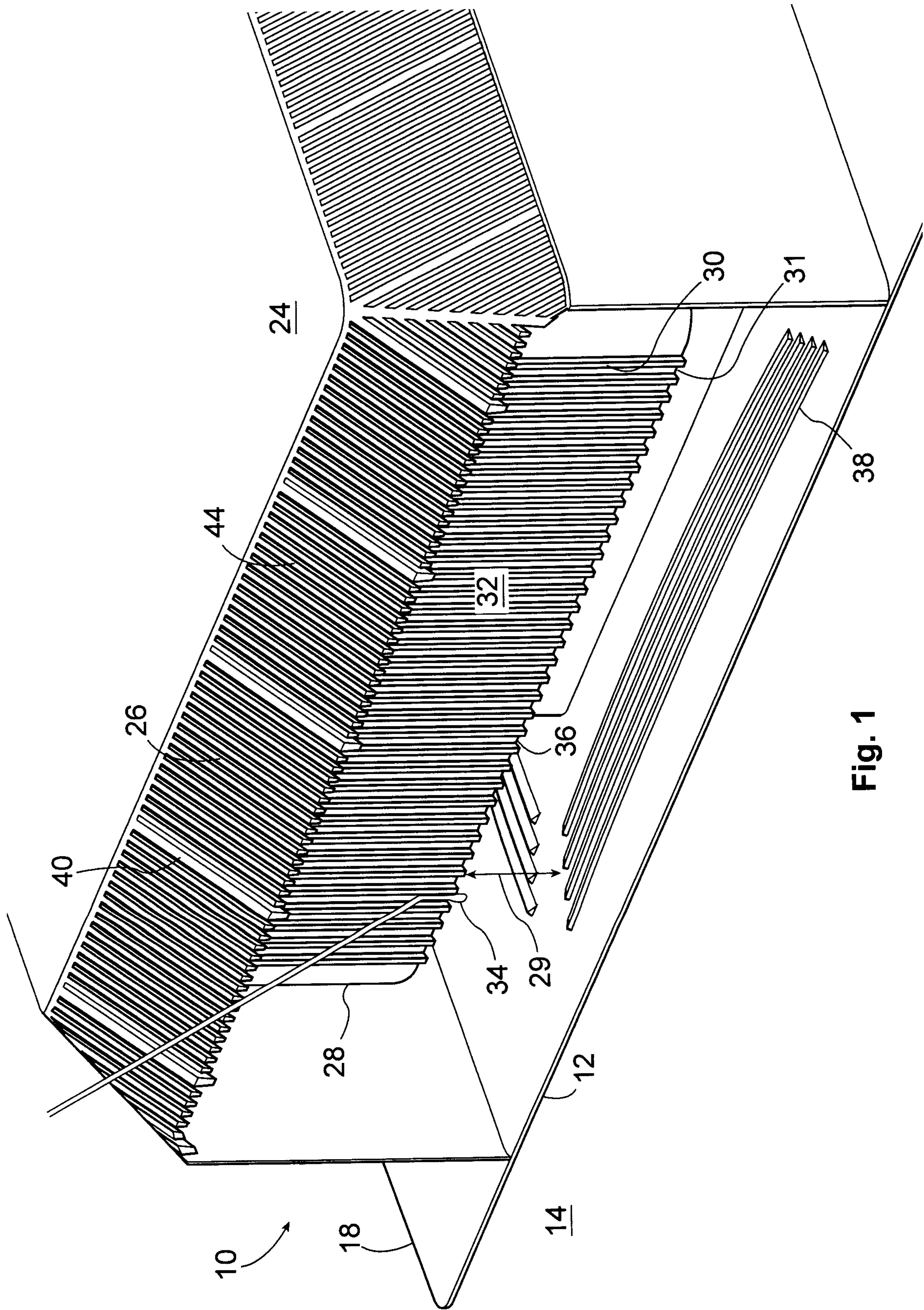


Fig. 1

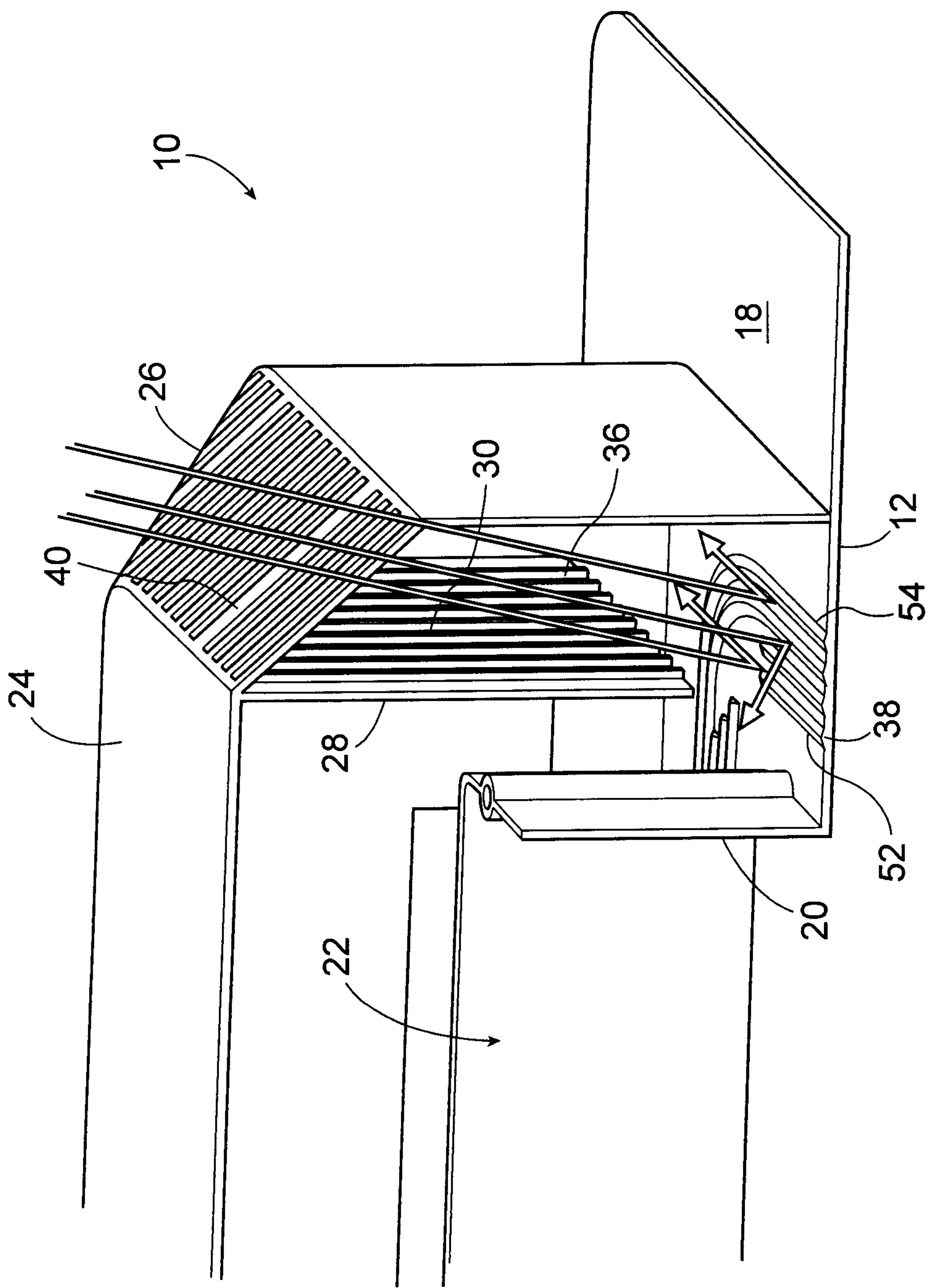


Fig. 2

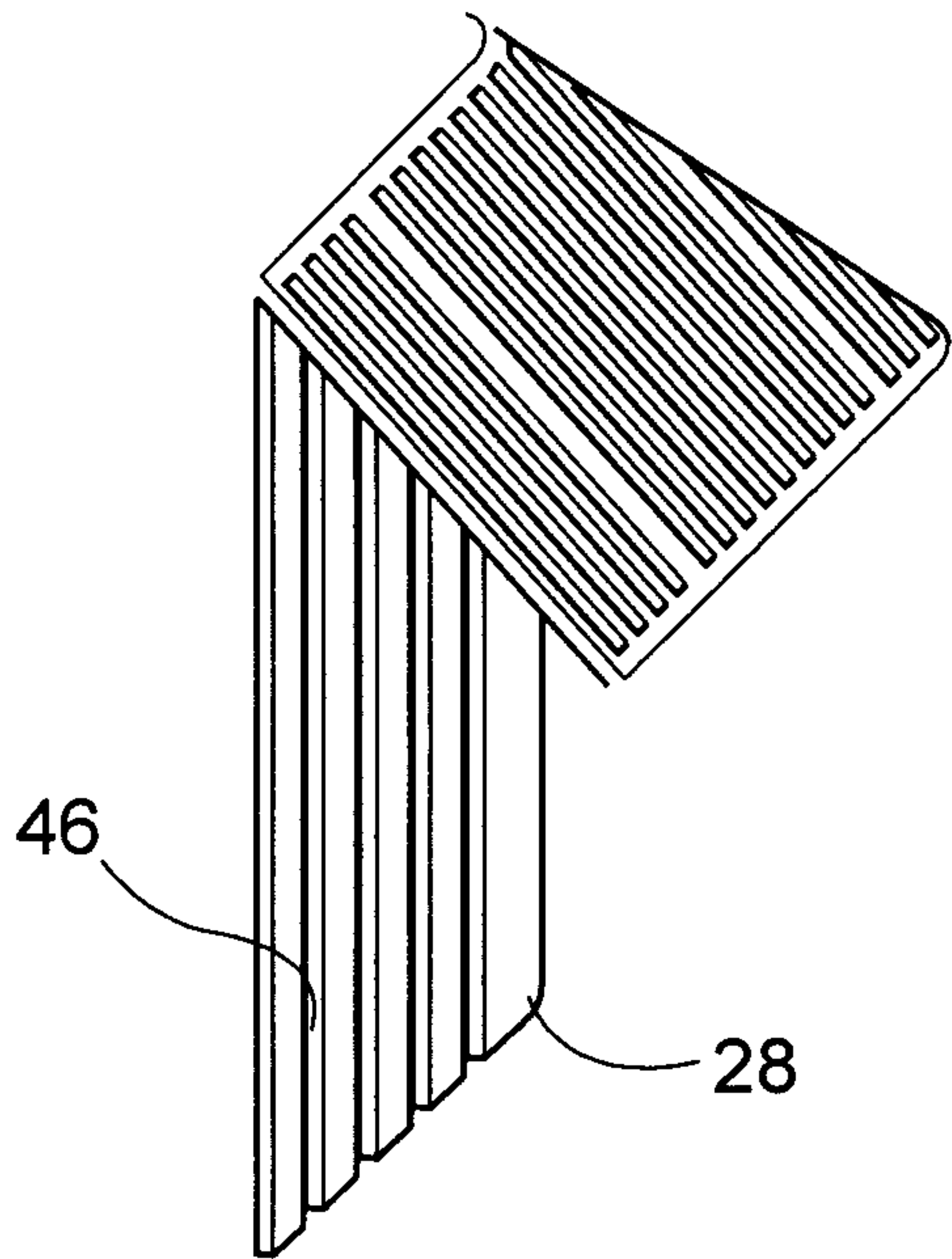


Fig. 3

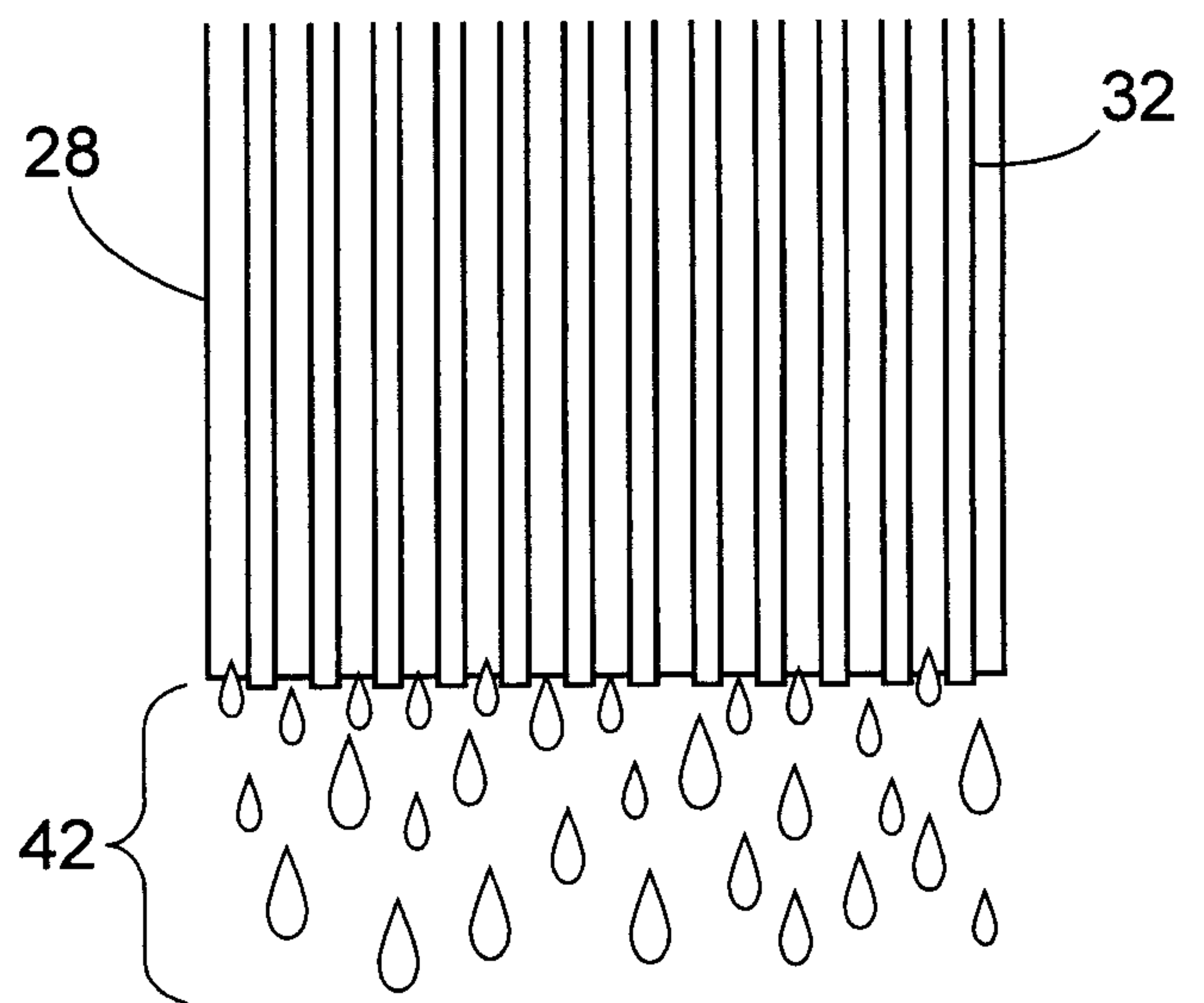


Fig. 5

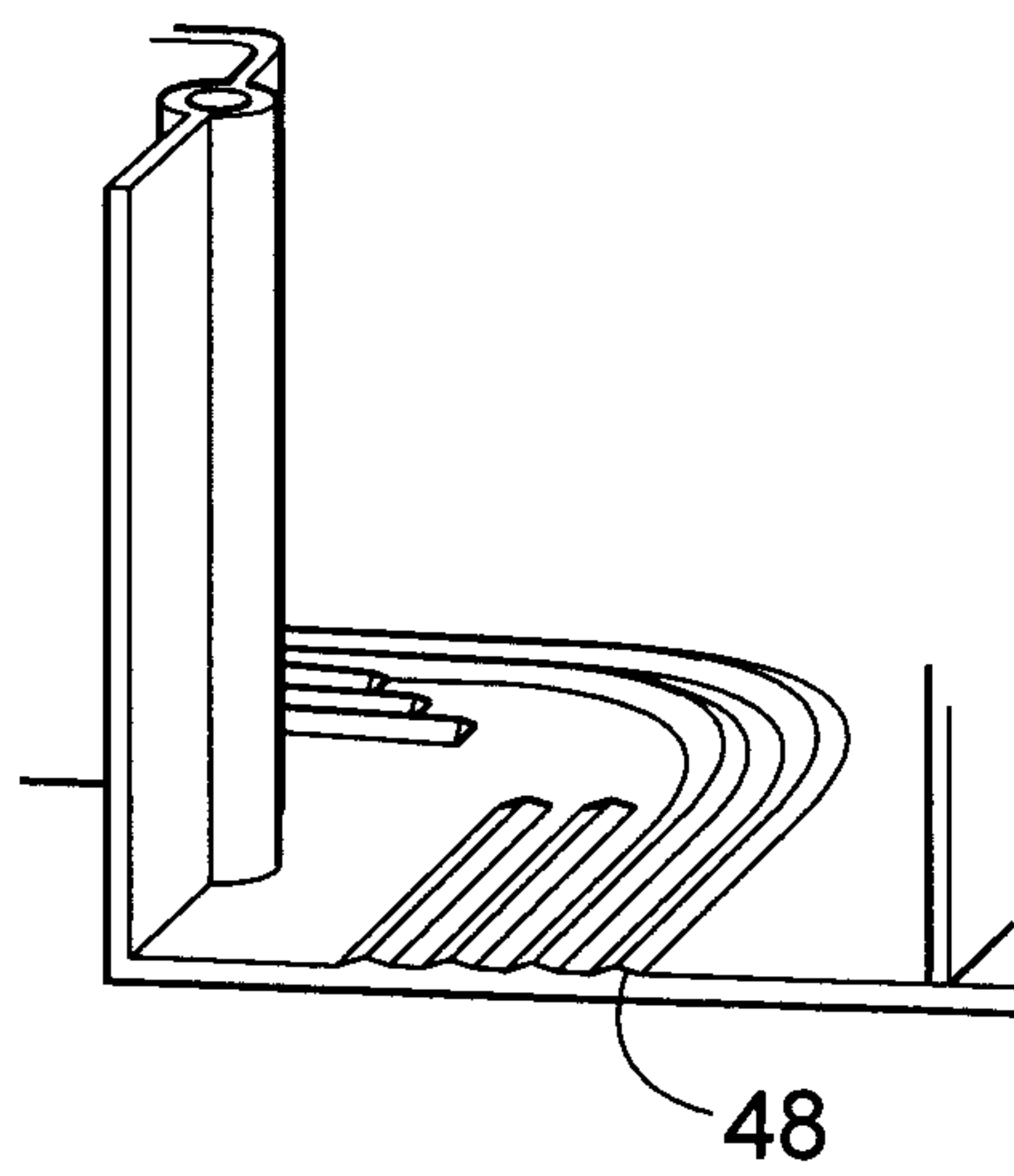


Fig. 4

