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(54) **Flexible roof vent**

(57) Ventilation lead-in for fitting in a membrane, preferably an underroof, where the lead-in has an upper and a lower annular flange intended to be disposed at each side of the membrane. In a first stable condition before fitting, the upper and the lower annular flanges extend frusto-conically away from the lead-in in each

their direction. In a second stable condition after fitting, the upper and the lower annular flanges extend frusto-conically away from the central hole in the same direction. Thereby, the membrane is retained between the two flanges by squeezing. The ventilation lead-in also comprises an insert with a net against drifting snow.

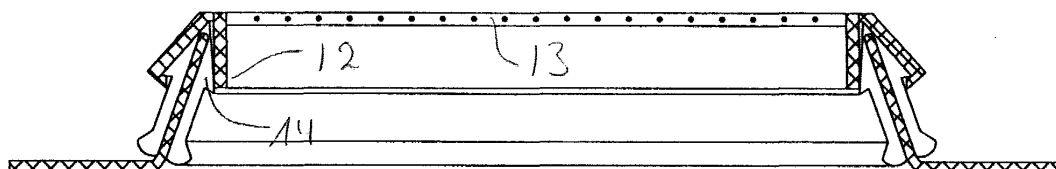


FIG. 5

Description

[0001] The present invention concerns a ventilation lead-in as indicated in the preamble of claim 1.

[0002] Roof constructions for houses most often comprise an underroof mainly consisting of a membrane which is disposed under the tiles or slabs. The membrane ensures that rain or drift snow possibly blown in under the tiles does not get into the building or into the insulation located under the roof. For ensuring sufficient ventilation to the underside of the membrane, usually a ventilation pipe is fitted through the membrane.

[0003] There are different forms of ventilation pipes described in the patent literature. A ventilation pipe is described in International patent application WO 93/18254. This ventilation pipe has a collar for fitting in a hole in a plastic membrane where the lower part of the collar has a slit so that the ventilation pipe may be mounted in the hole by a spiral movement, whereafter the membrane is disposed between the lower part and the upper part of the collar.

[0004] As most ventilation pipes of prior art, this ventilation pipe has the drawback that possible rain water running from the upper part of the roof down the membrane, may run from the upper side of the plastic membrane along the collar to the lower side of the plastic membrane. Thus the underroof becomes increasingly leaking the more ventilation pipes are mounted.

[0005] For preventing rain water from running from the upper side of the membrane to the underside of the membrane, further measures are required, as for example bonding, however making the mounting of ventilation pipes more cumbersome and expensive.

[0006] It is the purpose of the invention to provide a ventilation lead-in which is easy to fit and which prevents rain water running down along the upper side of the membrane from penetrating in under the membrane.

[0007] This purpose is achieved with a ventilation lead-in of the kind described in the introduction which is peculiar as indicated in the characterising part of claim 1.

[0008] When fitting the ventilation lead-in according to the invention, a suitable hole is provided in the membrane, preferably the membrane in the underroof. The ventilation lead-in, which is pliable, is pressed together and placed in the hole with an annular flange at each side of the membrane over the edge of the membrane. Then the two flanges are squeezed together so that they are brought to abut on each other, whereafter the flanges squeeze about an annular area of the membrane around the edge of the membrane. This fitting is very easy to perform, and the ventilation lead-in may be mounted in the membrane from the upper side of the membrane. Therefore, no access to the underroof from the underside is needed which is an advantage.

[0009] When the two annular flanges extend fiusto-conically downward after the fitting, the annular edge area of the membrane at the hole is shaped subsequently,

i.e. this annular area adjacent to the hole is bending upwards. Rain water running down the membrane will thus not run along the flange and into the hole but is led around the hole, thus fulfilling the purpose of the invention.

[0010] In a preferred embodiment, the ventilation lead-in comprises an insert with net for fitting in the lead-in, where the insert has central insert hole formed by a second annular connecting wall. The insert has an upper and a lower annular insert flange, where the lower insert flange extends downwards, and where the upper insert flange extends fiusto-conically upwards in a first stable condition, preferably before fitting, and where the upper insert flange extends fiusto-conically downward in a second stable condition, preferably after the fitting, whereby the lower and the upper insert flanges are squeezing the two annular flanges of the lead-in after fitting.

[0011] This insert is significant if drifting snow is blown in under the roof covering. The net in the insert causes that drift snow is not blown into the hole but is blown over across the net in the insert.

[0012] In a second preferred embodiment, the lower flange of the lead-in comprises a projection at its inner side facing the central hole. The projection is shaped with a straight edge and so that the straight edge after fitting the lead-in is mainly perpendicular to the plane of the membrane.

[0013] The projection is formed to facilitate the fitting of the insert as the straight edge forms a suitable abutment for the insert.

[0014] In a further preferred embodiment, the lead-in is symmetrical about the plane of the membrane. In this case, it is unimportant how the lead-in is facing when performing the fitting, thereby facilitating the fitting for the user.

[0015] In a further preferred embodiment, the lead-in has the shape of a solid of revolution. Even though the ventilation lead-in in principle may have many different shapes, like elliptical or polygonal, for example with rounded corners, most often it is preferred that the hole through the membrane is circular. This embodiment is advantageous for making a product in a simple way.

[0016] In a farther preferred embodiment, the ventilation lead-in is made of a material comprising polymer, for example plastic. The material has to be long-term durable and waterproof, and therefore synthetic polymers with the right elasticity are suitable materials even though it is possible to use other materials in connection with the invention.

[0017] The invention will be explained in more detail in the following with reference to the drawing, where:

Fig. 1 shows a cross-section of a lead-in according to the invention in moulded shape,

Fig. 2 shows a cross-section of a lead-in according to the invention after placing the lead-in in a hole in the membrane,

- Fig. 3 shows a cross-section of a lead-in according to the invention after fitting the lead-in,
 Fig. 4 shows a cross-section of the insert according to the invention in moulded shape,
 Fig. 5 shows a cross-section of the insert according to the invention after fitting in the lead-in.

[0018] Fig. 1 shows a cross-section of a lead-in 1 according to the invention in moulded shape. The lead-in 1 has a central through-going hole 2 formed by a first annular connecting wall 3 between an upper flange 4 and a lower flange 5. The lead-in is shown in the first stable condition where the upper 4 and the lower annular flange 5 extend frusto-conically away from the first central annular connecting wall 3 in each their direction.

[0019] (Fig. 2) The lead-in 1 according to the invention is made of a flexible material so that the lead-in 1 may be folded together and thereby passed into a hole in membrane 6, after which the lead-in 1 may be placed with one of the annular flanges at each their side of the membrane over the edge 7 of the membrane. Fig. 2 shows the lead-in 1 according to the invention after placing in the hole of the membrane 6.

[0020] (Fig. 3) Then the two flanges 4,5 are squeezed together after which these are squeezing about an annular edge area 16 of the membrane 6 around the membrane edge 7. Hence, the lead-in 1 is in the second stable condition. Fig. 3 shows a cross-section of a lead-in 1 according to the invention after fitting. Both flanges 4,5 extend frusto-conically away from the first central annular connecting wall 3 in the same direction as the membrane 6 is thereby fixed by squeezing between the two flanges 4,5. As the membrane 6 has a certain elasticity, the edge area 16 of the membrane between the two flanges 4,5 is forced to bend upwards. Water flowing on the surface 17 of the membrane 6 will therefore run around the lead-in 1 and will not penetrate into the hole 2 and under the membrane.

[0021] The lower flange 5 is provided with a projection 14 causing that the uppermost part of the hole 2 has a vertical wall 15. In this embodiment of the invention, the projection 14 is chosen because it facilitates fitting of the insert. The projection 14 may be shaped in many other ways and in principle is not necessary for the invention. As shown in the Figure, also the upper flange 4 is provided with a corresponding projection. By designing the upper and the lower flange identically, the user is relieved of deciding which side is the upper side and by which orientation the lead-in 1 is to be fitted. This is a considerable relief for the user and thereby speeds up the fitting.

[0022] Fig. 4 shows a cross-section of an insert 8 according to the invention in moulded shape and in a first stable condition. The insert 8 has a central insert hole 9 formed by a second annular connecting wall 10. The insert 8 has an upper 11 and a lower annular insert flange 12, where the lower insert flange 12 extends downwards, and where the upper insert flange 11 extends

frusto-conically upwards. The insert is furthermore provided with a net 13.

[0023] Fig. 5 shows a cross-section of an insert 8 according to the invention after fitting in the lead-in 1. During fitting the insert 8, the insert 8 is placed with the lower insert flange 12 in the hole 2 of the lead-in 1. The outer side of the lower insert flange 12 abut on the inner side of the lead-in 1, where this inner side is constituted by the projection 14. By turning the upper insert flange 11 down against the upper flange 4 of the lead-in 1, the insert 8 is brought from its first stable condition to the second stable condition where the upper 11 and the lower insert flange 12 are squeezing about the lead-in 1.

[0024] The net 13 protects against drifting snow as snow drifting over the insert hole will be lead by the hole and not fall down into the hole under the net due to the eddies arising over the net.

20 Claims

1. A ventilation lead-in for fitting in a membrane, preferably an underroof, where the lead-in has a central hole formed by a first annular connecting wall between an upper and a lower annular flange arranged to be disposed at each their side of the membrane, **characterised** in that

- the lead-in is pliable,
- before fitting, the upper and the lower annular flanges extend frusto-conically in each their direction away from the first central annular connecting wall in a first stable condition,
- after fitting, the upper and the lower annular flanges extend frusto-conically in the same direction away from the first central annular connecting wall in a second stable condition as the membrane is thereby retained by squeezing between the two flanges.

2. A ventilation lead-in according to claim 1, **characterised** in that the lower flange has a projection at its inner side facing the central hole, and that the projection is designed with a straight edge and so that the straight edge after fitting the lead-in is mainly perpendicular to the plane of the membrane.

3. A ventilation lead-in according to any preceding claim, **characterised** in that the lead-in is symmetrical about the plane of the membrane.

4. A ventilation lead-in according to any preceding claim, **characterised** in that the lead-in has shape like a solid of revolution.

5. A ventilation lead-in according to any preceding claim, **characterised** in that it is made of a material comprising at least one polymer.

6. An insert for fitting in a ventilation lead-in according to any of claims 1 - 5, **characterised** in that

- the insert has a net, 5
- the insert has central insert hole formed by a second annular connecting wall,
- the insert has an upper and a lower annular insert flange, where the lower insert flange extends downwards, and where the upper insert flange extends frusto-conically upwards in a first stable condition before fitting, 10
- the upper insert flange extends frusto-conically downward in a second stable condition after the fitting, whereby the lower and the upper insert flanges are squeezing about the two annular flanges of the lead-in after fitting. 15

7. An insert according to claim 6, **characterised** in that it is made of a material comprising at least one polymer. 20

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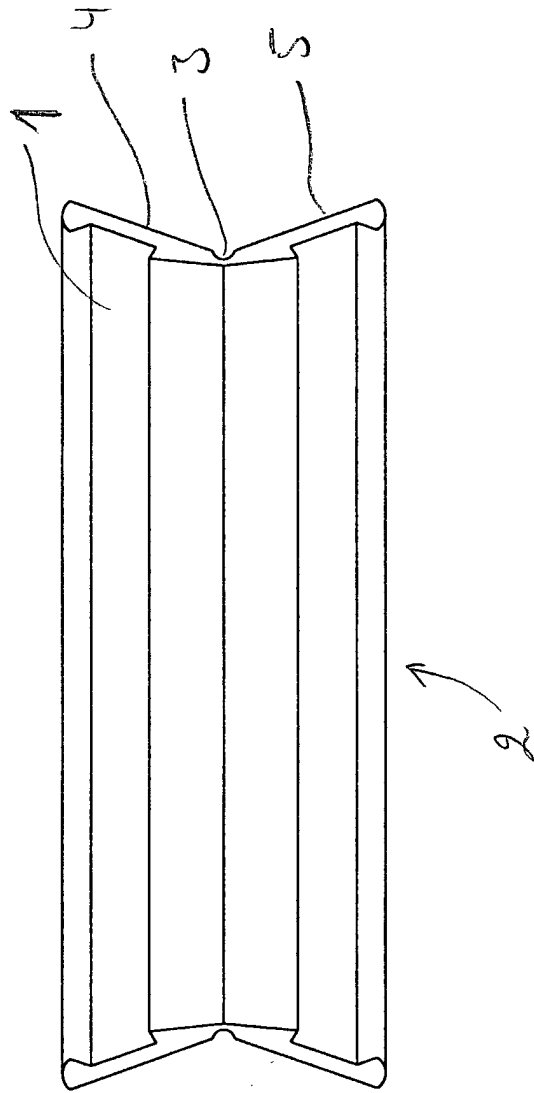


FIG. 1

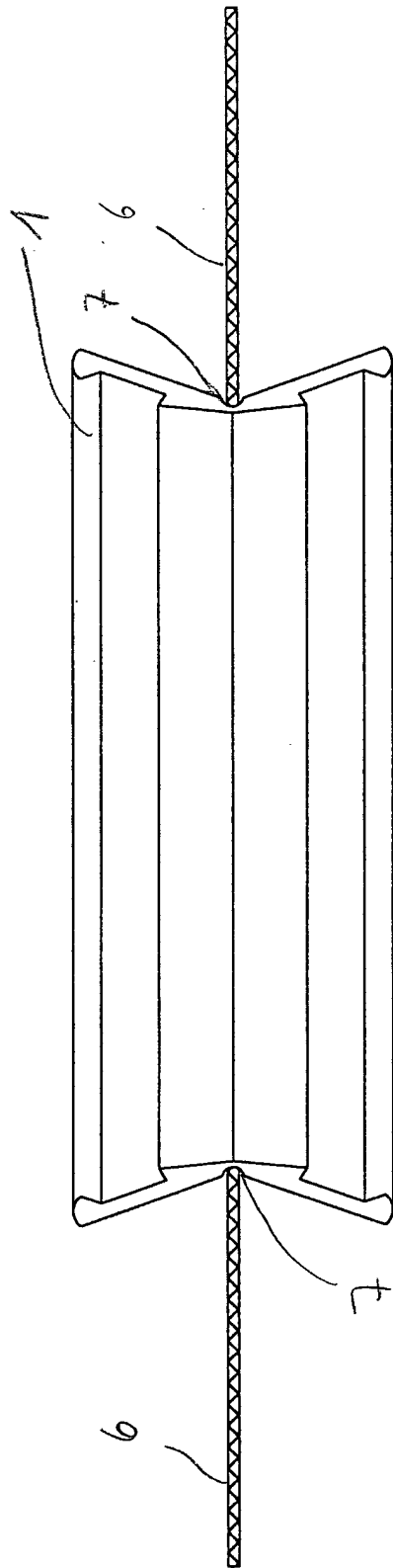


FIG. 2

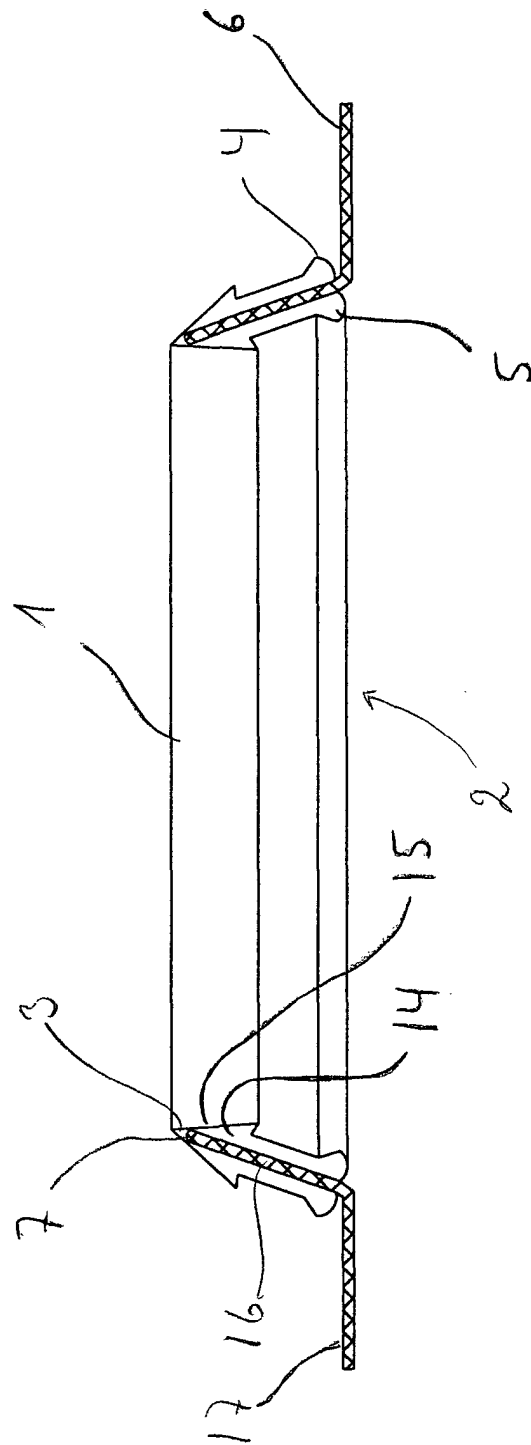


FIG. 3

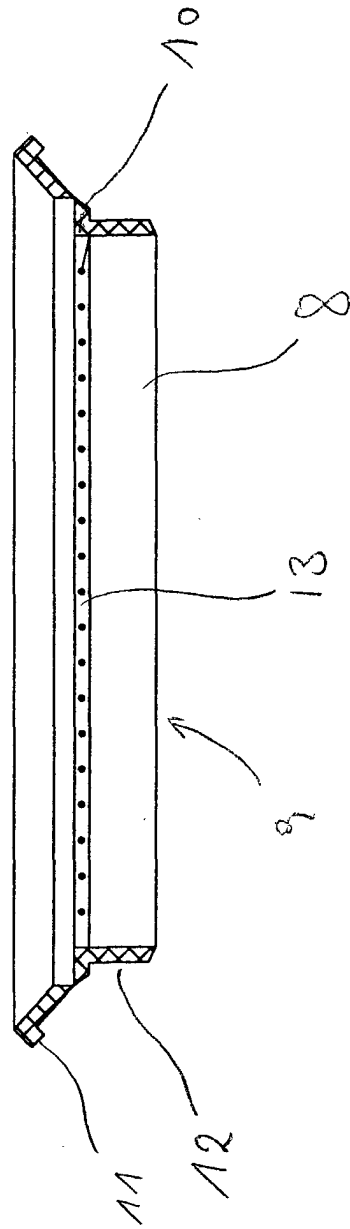


FIG. 4

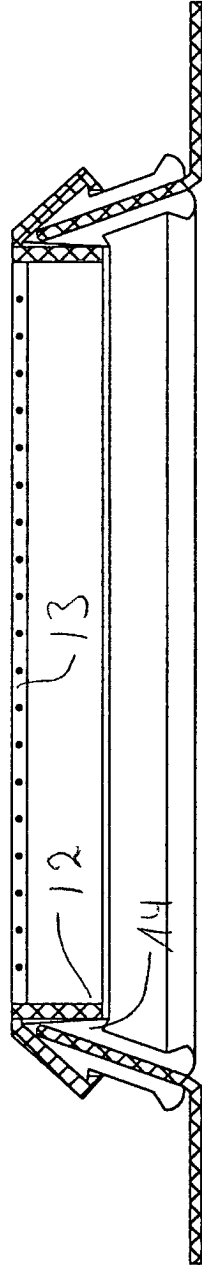


FIG. 5