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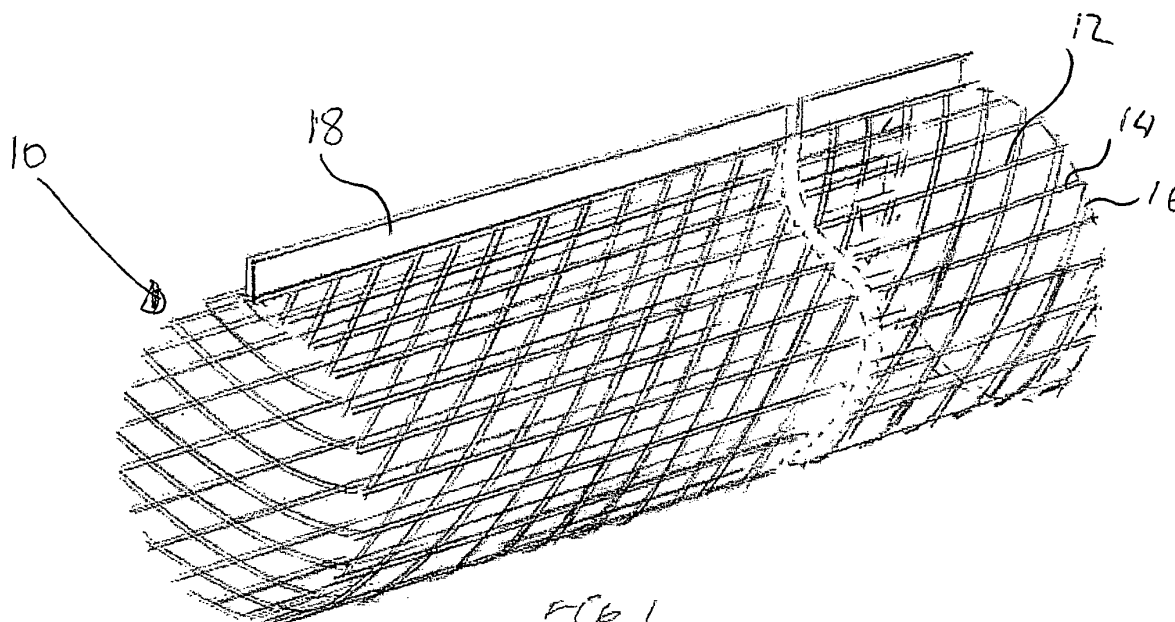
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(54) **A Snow Guard**

(57) A snow guard comprises a body having a wall of a mesh structure, said body made from a flexible material, said body defining a substantially cylindrical geometry and a length-wise direction, said body being non-flexible in a direction parallel to the length-wise direction and a flange integrally formed on a surface of the body, and a method of producing a snow guard using an apparatus comprises a reservoir for storing granulate material, the reservoir having a first inlet and a first outlet, a heating and pressurising unit including a chamber having

a second inlet and a second outlet, the second inlet in communication with the first outlet, a path of travel defined from the second inlet to the second outlet, the heating unit comprising heating and pressurising elements distributed along the path of travel, an extruder unit mounted downstream relative to the heating and pressurising unit at the second outlet, the extruder unit further including an extruder heating unit, the extruder defining an extruder outlet, the extruder unit generating a mesh-type tubular structure.



Description

[0001] The present invention relates to snow guards, particularly to snow guards for being installed in houses, e.g. under roofs or in joints in a brick wall.

[0002] Related technical descriptions may be found in publications such as US 2006/0002772, US 4,932,634 and JP 2000257025. Reference is made to all of the above US publications, all of which are hereby incorporated in the present specification by reference in their entirety for all purposes.

[0003] The snow guard according to the teachings of the present invention is preferably used for controlling windblown particles, e.g. snow and/or other particles. The snow guard may be installed in parts of constructions of houses, e.g. roofs or slits or joints in walls.

[0004] A first aspect of the present invention relates to a snow guard. The snow guard according to the teachings of the present invention may comprise:

a body having a wall of a mesh structure, the body made from a flexible material, the body defining a substantially cylindrical geometry and a length-wise direction, the body being non-flexible in a direction parallel to the length-wise direction and a flange integrally formed on a surface of the body.

[0005] The wall of the body is of a mesh-type structure. The wall of a mesh-type structure allows air to pass through the device while most windblown particles are halted in or at the device. This allows for the device to act as a kind of grid. The device may be installed in e.g. a roof, this allows for ventilation of an enclosure under the roof to be ventilated while e.g. snow and/or insects are kept from entering the enclosure. The insects and/or snow are both contemplated to be harmful to e.g. insulation and wooden constructions.

[0006] The body is made from a flexible material. The body is not flexible in the length-wise direction defined by the body. The body is resilient and after being pressed or deformed to a certain degree the body is able to return to its original state.

[0007] The flange is contemplated to provide several advantageous features. It is contemplated that the flange may be used during the installation of the device in e.g. a slit in a roof construction. The flange may be used for positioning the device e.g. by allowing the device to be turned more easily. The flange may also be used for fastening the device once it is in place. Fastening means, such as nails, screws and the like, may be used to fasten the device. The nails etc. may penetrate the flange, thereby fastening the device to a surface of the structure on or in which the device is to be fastened.

[0008] A feature of the present invention relates to the flange extending from the surface of the body parallel to the length-wise direction. The flange need not extend the entire length of the body. The flange need not be continuous along the length of the body. The flange may in some

embodiments comprise several pieces or sections positioned along the length of the body. The flange is preferably made from the same material as the body, but may in some embodiments be made from a material different from that used to make the body.

[0009] In one embodiment of the present invention, the body is made from an extruded material and the flange is co-extruded with the body. To simplify production of the device according to the present invention, the flange and the body may be made at substantially the same time.

[0010] It is a further feature of the present invention that the mesh body may comprise a first plurality of threads orientated substantially parallel to the length-wise direction and a second plurality of threads orientated in a direction so as to define a specific angle to the length-wise direction.

[0011] The mesh structure is defined by a first plurality of threads going in a first direction and a second plurality of threads going in a second direction different from the first direction. One of the directions may be in the length-wise direction defined by the body.

[0012] The first and second threads may be arranged in two layers, where the threads in one layer are all orientated in one direction and the threads in the second layer are all orientated in the second direction. It is contemplated, amongst other things, that such an arrangement of the threads is advantageous in the production of the device according to the present invention. In other embodiments of the present invention, the threads may be woven or interlaced.

[0013] The specific angle may be in the interval 1 to 90 degrees, such as 5 to 75 degrees, such as 10 to 60 degrees, such as 20 to 50 degrees, such as 30 to 50 degrees, such as 40 to 48 degrees, such as 1 to 5 degrees, such as 5 to 15 degrees, such as 15 to 25 degrees, such as 25 to 35 degrees, such as 35 to 40 degrees, such as 40 to 50 degrees, such as 50 to 65 degrees, such as 65 to 75 degrees, such as 75 to 80 degrees, such as 80 to 90 degrees, preferably approximately 45 degrees.

[0014] The mesh and the flange may be made from polyethylene, HDPE, PP, LDPE, PVC, NYLON, ABS or any other polymer material.

[0015] The body may define a width of 1 to 25 cm, such as 2 to 20 cm, such as 5 to 15 cm, such as 10 to 12 cm, such as 1 to 2 cm, such as 2 to 4 cm, such as 4 to 6 cm, such as 6 to 8 cm, such as 8 to 10 cm, such as 10 to 12 cm, such as 12 to 14 cm, such as 14 to 16 cm, such as 16 to 18 cm, such as 18 to 20 cm, such as 20 to 25 cm, preferably 3 to 12 cm. The size of the body may depend on its intentional use, a smaller body may be useful when used in a joint compared to a body used in a roof construction.

[0016] The area of the mesh structure may include less than 50% material, such as less than 40%. The size of the openings in the mesh structure may be varied from embodiment to embodiment, again depending on the use

of the body.

[0017] In a specific embodiment the body may include two flanges. In other specific embodiments the body may include even more flanges. Two or more flanges may e.g. be advantageous when mounting or installing the device. The flanges may be positioned parallel to each other. The flanges may be positioned opposite each other. The flanges may be positioned or placed with an angular distance different from 180 degrees, e.g. 45 degrees as a minimum angular distance.

[0018] The cylindrical body may be defined by a generatrix being a square, a triangular, a circle or any combination thereof.

[0019] A second aspect of the present invention relates to a method of producing a snow guard. The method according to the second aspect of the present invention may be performed using an apparatus that may comprise:

a reservoir for storing granulate material, the reservoir having a first inlet and a first outlet,
a heating and pressurising unit including a chamber having a second inlet and a second outlet, the second inlet in communication with the first outlet, a path of travel defined from the second inlet to the second outlet, the heating unit comprising heating and pressurising elements distributed along the path of travel, an extruder unit mounted downstream relative to the heating and pressurising unit at the second outlet, the extruder unit further including an extruder heating unit, the extruder defining an extruder outlet, the extruder unit generating a mesh-type tubular structure, the method comprising the steps of:

supplying the granulate material to the heating and pressurising unit from the reservoir via the first outlet to the second inlet,
conveying the granulate material along the path of travel,
heating the granulate material to an elevated temperature and pressurising the granulate material to an elevated pressure while conveying the granulate material along the path in the heating and pressurising unit, the heating and pressurising performed according to a specific heating and pressurising profile,
transferring the heated and pressurised granulate material to the extruder unit,
heating the granulate material within the extruder heating unit to an elevated temperature,
extruding the mesh-type tubular structure from the granulate material, the mesh-type tubular structure defining a length-wise direction, integrally extruding a flange extending from the mesh-type tubular structure, the flange extending parallel to the length-wise direction, and cooling the extruded mesh-type tubular structure by the cooling unit according to a specific

cooling profile.

[0020] The device or snow guard resulting from the method may include any of the features of the snow guard according to the teachings of the snow guard according to the first aspect of the present invention.

[0021] Specifically, the flange may be produced in a separate processing step independently of the mesh-type tubular structure. The flange may hereafter be mounted on the outer surface of the snow guard device.

[0022] Examples of embodiments of the present invention will be disclosed with reference to the attached drawings in which:

Fig. 1 is a schematic view of a device according to the present invention,

Figs. 2 and 2a are schematic views of a device according to the present invention installed in a roof construction,

Figs. 3 and 3a are schematic views of a device according to the present invention installed in a roof construction,

Figs. 4 and 4a are schematic views of a device according to the present invention installed in brick wall construction, and

Figs. 5 and 6 are schematic views of alternative embodiments of the present invention.

[0023] Fig. 1 is a schematic view of a body generally denoted 10 having a wall 12 of a mesh-type structure. The mesh is comprised by a first plurality of threads 14 and a second plurality of threads 16. The first plurality of threads 14 are orientated in a first direction. The second plurality of threads 16 are orientated in a second direction, with an angle of approximately 45 degrees between the two orientations. The mesh structure has a hole-area of more than 50%, i.e. more than 50% of the surface area is hole or not mesh.

[0024] In the presently preferred embodiment, the mesh structure is made from polyethylene. The material is capable of withstanding down to -40 degrees centigrade.

[0025] The surface of the mesh structure is smooth, or substantially smooth.

[0026] In the embodiment shown in Fig. 1, the threads 14 are orientated in a direction parallel to the length-wise direction defined by the body 12.

[0027] On the wall 12 a flange 18 is mounted. The flange 18 is formed integrally with the wall 12. The flange 18 and the body are extruded from the same material and are extruded at substantially the same time. In alternative embodiments, the flange 18 and the wall 12 may be formed at different times and then assembled later.

[0028] The wall 12 is flexible in the direction perpendicular to the length-wise direction defined by the length of the body 10. The wall 12 is in normal use not flexible in the direction parallel to the length-wise direction of the body 10.

[0029] Figs. 2 and 2a are schematic views of devices according to the present invention installed in a roof construction. Fig. 2a is a schematic zoomed view of a device 10ⁱ installed in a slit or opening 20 defined between two wooden boards 22 and 24 of the roof construction. The device or snow guard 10 has been squeezed into the opening 20. The flexibility of the snow guard 10 allows it to be deformed so that it will fit tightly into a range of openings.

[0030] The snow guard 10 allows ventilation of the roof construction while preventing snow and other particulate matter to flow in or under the roof construction.

[0031] The flange 18 of the snow guard 10 abuts the board 24. The flange 18 may be fastened to the board 24 by using nails, screws or any other fastening means.

[0032] In further alternative embodiments the device or snow guard may include more than one flange, e.g. two flanges. In the example shown in Fig. 2a, the two flanges may then abut the two boards 22 and 24.

[0033] Fig. 2 schematically shows four snow guards 10ⁱ, 10ⁱⁱ, 10ⁱⁱⁱ, 10^{iv} installed in a roof construction.

[0034] Figs. 3 and 3a are schematic views of a device according to the present invention installed in a roof construction. Figs. 3 and 3a show the device installed in an alternative type of roof construction.

[0035] The snow guard 10 shown is mounted between two wooden boards 26 and 28 of the roof construction. As before, the snow guard allows ventilation of the roof construction while preventing snow and other particulate matter to flow in or under the roof construction.

[0036] Figs. 4 and 4a are schematic views of a device according to the present invention installed in brick wall construction. The snow guard 10 shown in Fig. 4 is installed in a joint or slit 30 in a brick wall 32. The snow guard is installed in a slit or joint 30 between two bricks of the brick wall 32. This allows for ventilation of the interior of the wall construction while keeping out insects, snow and other particulate matter.

[0037] Figs. 5 and 6 are schematic views of alternative embodiments of the present invention.

[0038] Fig. 5 schematically shows an embodiment of a snow guard 10^v. The body comprises threads of a plurality 34 orientated in a direction approximately 45 degrees relative to the length-wise direction defined by the length of the body of the snow guard. The body further comprises threads of a plurality 36 orientated in a direction approximately 45 degrees relative to the length-wise direction defined by the length of the body of the snow guard, but 90 degrees relative to the other plurality of threads 34.

[0039] Fig. 6 schematically shows an embodiment of a snow guard 10^{vi}. The body comprises threads of a plurality 38 orientated in a direction approximately parallel to the length-wise direction defined by the length of the body of the snow guard 10^{vi}. The body of the snow guard 10^{vi} further comprises threads of a plurality 40 orientated in a direction approximately perpendicular relative to the length-wise direction defined by the length of the body

of the snow guard, but 90 degrees relative to the other plurality of threads 38.

5 Claims

1. A snow guard comprising:

a body having a wall of a mesh structure, said body made from a flexible material, said body defining a substantially cylindrical geometry and a length-wise direction, said body being non-flexible in a direction parallel to said length-wise direction and

a flange integrally formed on a surface of said body.

2. The snow guard according to claim 1, wherein said flange extends from said surface of said body parallel to said length-wise direction.

3. The snow guard according to any of the claims 1 or 2, wherein said body is made from an extruded material and said flange is co-extruded with said body.

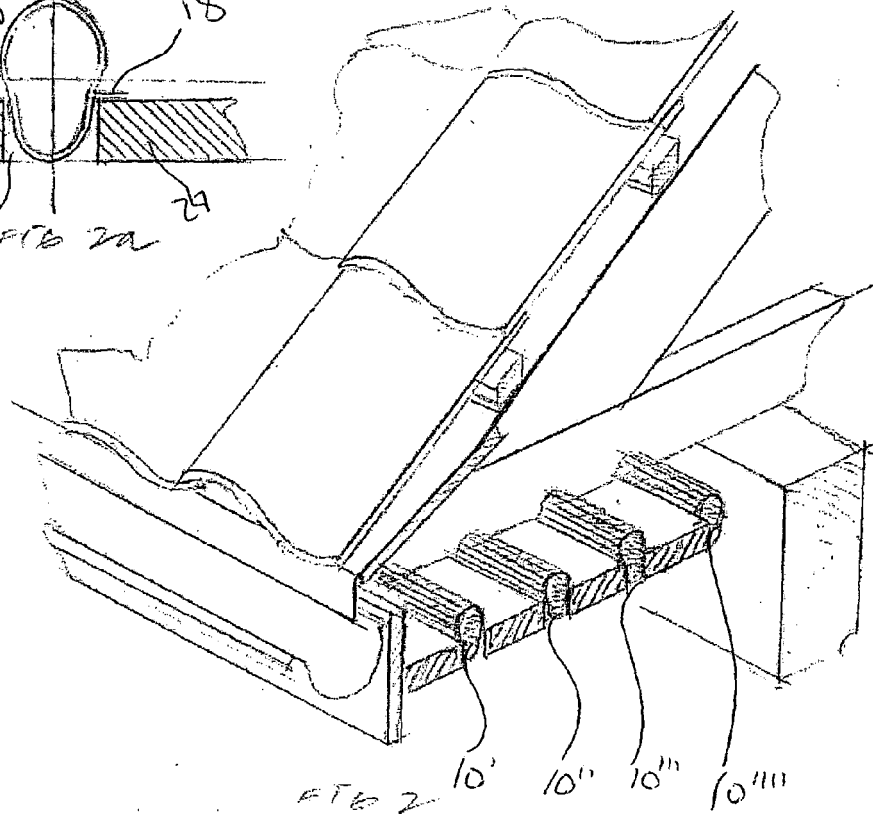
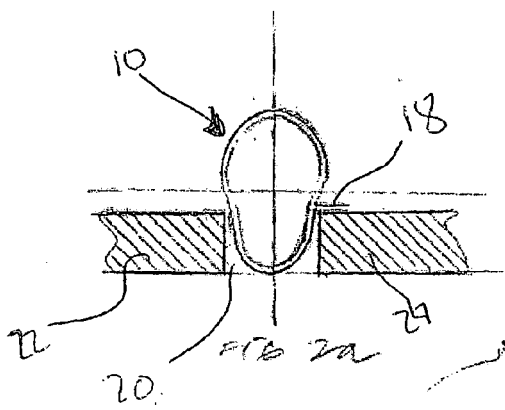
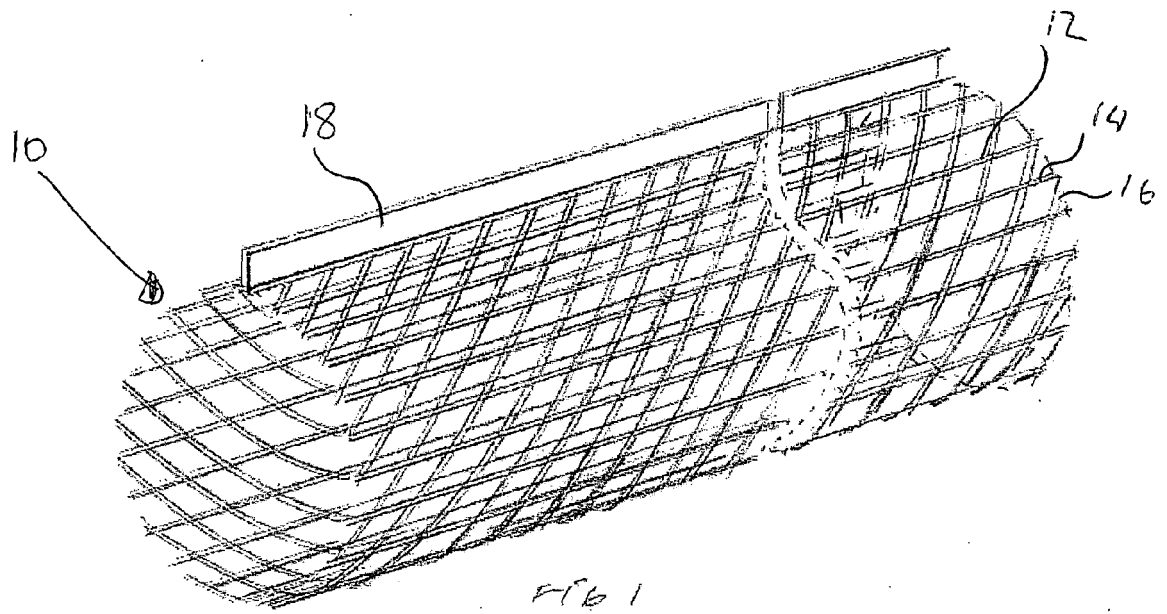
4. The snow guard according to any of the claims 1-3, wherein said mesh body comprises a first plurality of threads orientated substantially parallel to said length-wise direction and a second plurality of threads orientated in a direction so as to define a specific angle to said length-wise direction.

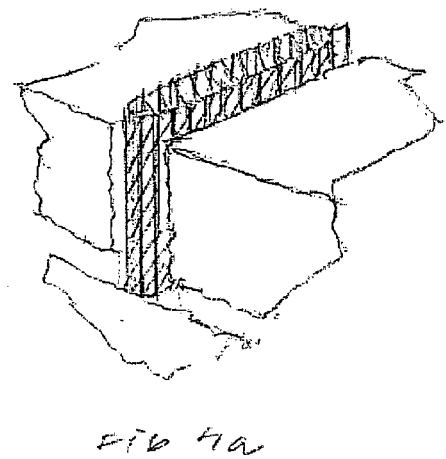
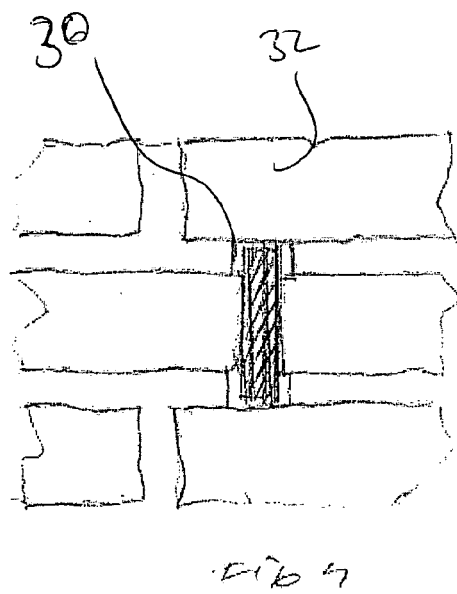
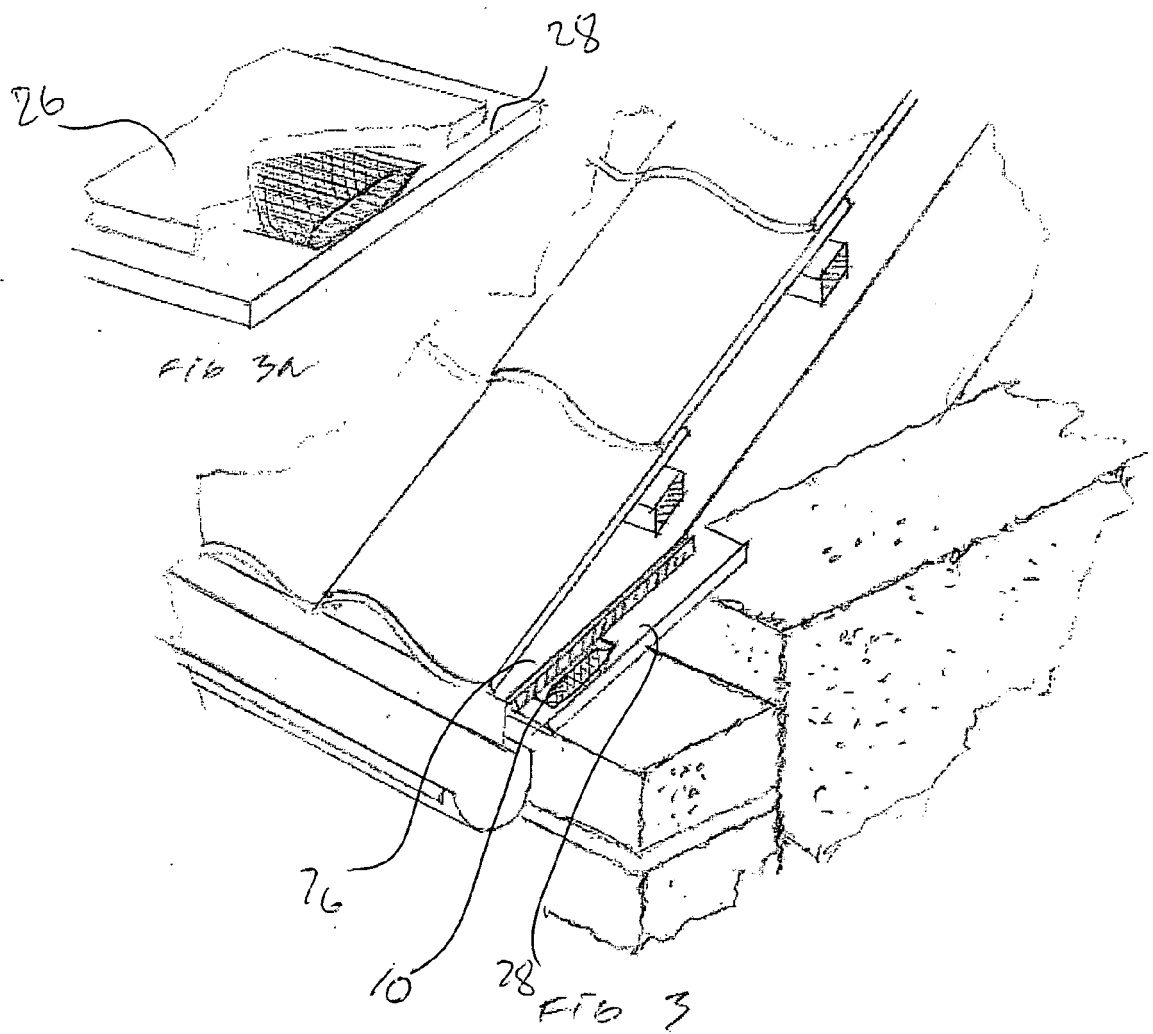
5. The snow guard according to claim 4, wherein said specific angle is 1 to 90 degrees, such as 5 to 75 degrees, such as 10 to 60 degrees, such as 20 to 50 degrees, such as 30 to 50 degrees, such as 40 to 48 degrees, such as 1 to 5 degrees, such as 5 to 15 degrees, such as 15 to 25 degrees, such as 25 to 35 degrees, such as 35 to 40 degrees, such as 40 to 50 degrees, such as 50 to 65 degrees, such as 65 to 75 degrees, such as 75 to 80 degrees, such as 80 to 90 degrees, preferably approximately 45 degrees.

6. The snow guard according to any of the claims 1-5, wherein said mesh and said flange are made from polyethylene, HDPE, PP, LDPE, PVC, NYLON, ABS or any other polymer material.

7. The snow guard according to any of the claims 1-6, wherein said body defines a width of 1 to 25 cm, such as 2 to 20 cm, such as 5 to 15 cm, such as 10 to 12 cm, such as 1 to 2 cm, such as 2 to 4 cm, such as 4 to 6 cm, such as 6 to 8 cm, such as 8 to 10 cm, such as 10 to 12 cm, such as 12 to 14 cm, such as 14 to 16 cm, such as 16 to 18 cm, such as 18 to 20 cm, such as 20 to 25 cm, preferably 3 to 12 cm.

8. The snow guard according to any of the claims 1-7, wherein the area of said mesh structure includes less than 50% material, such as less than 40%.
9. The snow guard according to any of the claims 1-8, wherein said body includes two flanges.
10. The snow guard according to claim 9, wherein said flanges are positioned parallel to each other.
11. The snow guard according to any of the claims 1-10, wherein said cylindrical body is defined by a generatrix being a square, a triangular, a circle or any combination thereof.
12. A method of producing a snow guard using an apparatus comprising:
- a reservoir for storing granulate material, said reservoir having a first inlet and a first outlet,
- a heating and pressurising unit including a chamber having a second inlet and a second outlet, said second inlet in communication with said first outlet, a path of travel defined from said second inlet to said second outlet, said heating unit comprising heating and pressurising elements distributed along said path of travel,
- an extruder unit mounted downstream relative to said heating and pressurising unit at said second outlet, said extruder unit further including an extruder heating unit, said extruder defining an extruder outlet, said extruder unit generating a mesh-type tubular structure,
- the method comprising the steps of:
- supplying said granulate material to said heating and pressurising unit from said reservoir via said first outlet to said second inlet,
- conveying said granulate material along said path of travel,
- heating said granulate material to an elevated temperature and pressurising said granulate material to an elevated pressure while conveying said granulate material along said path in said heating and pressurising unit, said heating and pressurising performed according to a specific heating and pressurising profile,
- transferring said heated and pressurised granulate material to said extruder unit,
- heating said granulate material within said extruder heating unit to an elevated temperature,
- extruding said mesh-type tubular structure from said granulate material, said mesh-type tubular structure defining a length-wise direction,
- integrally extruding a flange extending from said mesh-type tubular structure, said flange extending parallel to said length-wise direction, and
- cooling said extruded mesh-type tubular structure by said cooling unit according to a specific cooling profile.
13. The method according to claim 12, wherein said flange is produced in a separate processing step independently of said mesh-type tubular structure.
14. The method according to any of the claims 12 or 13, wherein said mesh-type tubular structure includes any of the features of any of the claims 1-11.





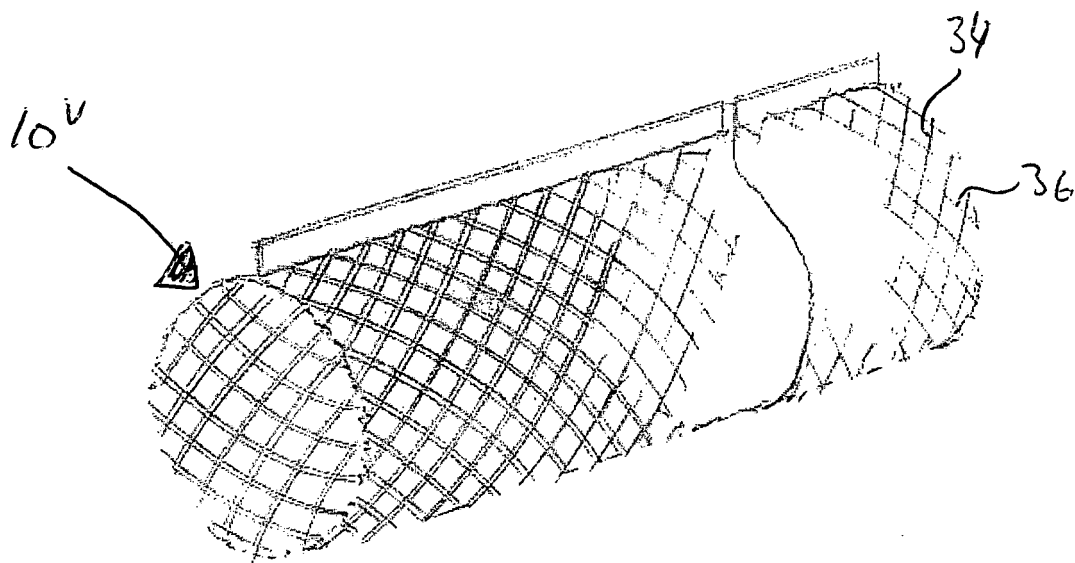


FIG 5

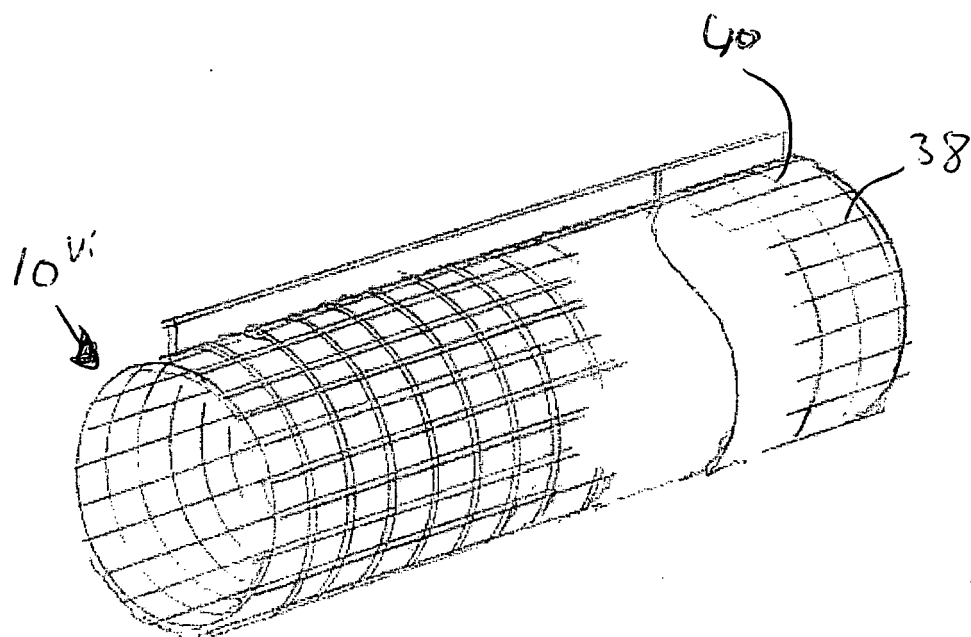


FIG 6



European Patent
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EUROPEAN SEARCH REPORT

Application Number
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 25 June 2007	Examiner Righetti, Roberto
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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