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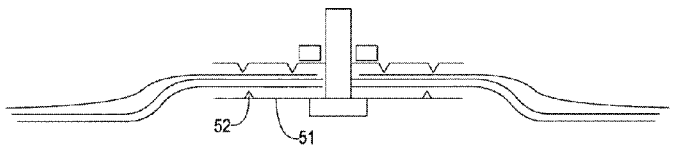

FIG. 5

(57) Abstract: The present invention relates to a roof anchoring for attachment to a roof, such as a fiat roof, wherein the roof anchoring comprises: - a placing member for placing the roof anchoring on a surface of the roof, which placing member preferably comprises a fiat plate material, - a fixing member for fixing an element for anchoring to the roof anchoring, wherein - the placing member is provided with a plurality of openings for receiving therein or feeding therethrough a deformable material, such as a glue material or a roof covering material such as bitumen, for the purpose of providing by means of the roof covering material an adhesive effect between the roof covering material and the placing member.

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ROOF ANCHOR, DROP SAFETY DEVICE AND METHOD

The present invention relates to a roof anchoring for attachment to a roof, such as a flat roof. The present invention also relates to a fall restraint comprising a roof anchoring.

The present inventor is developer of a fall restraint with a retarding member for providing a fall restraint for safeguarding persons on a roof against a fall from the roof. Tests have shown that such a fall restraint represents a significant improvement on already existing fall restraints.

The present invention has for its object to provide a simplified device for placing on a roof with more multifunctional application options.

The present invention provides for this purpose a roof anchoring for attachment to a roof, such as a flat roof, wherein the roof anchoring comprises:

- a placing member for placing the roof anchoring on a surface of the roof, which placing member preferably comprises a flat plate material,

- a fixing member for fixing an element for anchoring to the roof anchoring, wherein

- the placing member is provided with a plurality of openings for receiving therein or feeding therethrough a deformable material, such as a glue material or a roof covering material such as bitumen, for the purpose of providing by means of the roof covering material an adhesive effect between the roof covering material and the placing member.

An advantage of such a roof anchoring is that it can be attached in highly reliable manner to a surface of a roof by means of the deformable material. It is a particular advantage that in many locations roof covering ma-

terial that is already present can be used for this purpose. Also provided for is that additional roof covering material can be applied in the placing of the roof anchoring. It is a particular advantage that the fixing member can be used to fix many types of elements for fixing, such as elements for placing on the roof or cords for anchoring roofers.

In a first preferred embodiment the roof anchoring comprises an elevating member arranged or arrangeable above the placing member for providing an elevation above the placing member, wherein the elevating member is preferably manufacturable from a plate material. An advantage of such an elevating member is that it imparts a thermal insulation between the elevating member and the placing member. The attachment between the roof anchoring and the roof is hereby greatly enhanced, particularly under the influence of sunlight or high ambient temperatures.

In a further preferred embodiment the roof anchoring preferably comprises a crumple zone for absorbing forces, such as pulling forces and/or pushing forces, on the fixing member, wherein the fixing member is preferably arranged in the vicinity of, in the area of or substantially in the middle of the crumple zone. An advantage of such a crumple zone is that a shock to a person from for instance a harness attached to the roof anchoring is alleviated. The anchor can hereby be used as a safe roof anchor for a person and preferably functions as a fall retardant.

The crumple zone is more preferably provided in the placing member or in the elevating member. Hereby possible is a roof anchoring comprising a placing member as well as a roof anchoring comprising a placing member and the elevating member.

In a further preferred embodiment the crumple zone is formed by plate material forming the placing member or the elevating member. A deformation of such plate material enclosing the fixing member provides a damping effect on a shock or sudden pulling force on the fixing member.

The crumple zone is more preferably formed by a weakening material forming the placing member and/or the elevating member, such as by means of a large number of openings such as drilled holes or punched holes or by means of a wave pattern arranged in plate material. Plate material with drilled holes or punched holes can deform easily and the drilled holes can stretch from a substantially round shape to a substantially oval shape. Such a deformation imparts a damping effect. A wave pattern arranged all around the fixing member, preferably comprising concentric wave shapes around the fixing member, provides the option that, in the case of sudden lateral pulling force, material which is being pulled is stretched and on the other side is compressed. This also provides a damping effect. Such a wave shape can for instance be manufactured by means of a pressing or deep-drawing process.

In a further preferred embodiment the crumple zone, the placing member and/or the elevating member are covered by means of an insulating material such as white bitumen, sand, foam material or the like. Peak temperatures of the placing member and/or the elevating member are hereby tempered.

A space formed by the placing member and/or the elevating member is more preferably filled by means of insulating material. The placing member can hereby be thermally insulated relative to the elevating member. It is here also the case that a weakening of the attachment to

the roof under the influence of high temperatures or radiation is prevented or reduced.

The roof anchoring is more preferably provided with a fixation material, such as bitumen or a glue material arranged in prefabricated manner. Such an addition avoids processing costs at the location where the anchoring is arranged.

In a further preferred embodiment the openings have a size of between 0.1 mm and 3 cm, preferably between 0.5 cm and 2 cm, more preferably between 0.5 cm and 1.5 cm, more preferably between 0.5 cm and 1 cm, more preferably between 1 cm and 1.5 cm. Such sizes provide the advantage that, following deformation and preferably curing, the deformable material has a firm 'grip' on the opening. The deformable material in the roof covering is deformed here during arranging of the roof anchoring and it connects to the edges of the openings by forming a 'spherical' shape or 'toadstool' shape on the other side. In more extreme form materials of different openings come into contact with each other on this other side, whereby a solid body of deformable material connects a plurality of openings.

In a further embodiment the fixing member preferably comprises an opening, preferably provided with a vertically arranged bolt with more preferably an engaging member such as a fixing eye pivotally placed or placeable therearound. A flexible connection to a person with a line is hereby possible in advantageous manner.

The fixing member more preferably comprises a support element for placing thereon an element for placing on the roof, such as a solar panel or an antenna. Depending on the element to be attached, the fixing member can com-

prise a screw thread or other fastening means suitable for fastening an element for placing on the roof.

A further aspect according to the present invention relates to a fall restraint for safeguarding a person against a fall from a roof, comprising a roof anchoring according to one or more of the foregoing claims. This aspect provides advantages as described in the foregoing or as stated in greater detail hereinbelow.

A further aspect according to the present invention relates to a method for safeguarding a person against a fall by means of a fall restraint according to the present invention, comprising steps for:

- making placing preparations for the purpose of manufacturing and/or placing the device according to one or more of the foregoing claims, and/or

- manufacturing and/or placing a part of a device according to one or more of the foregoing claims.

A further aspect according to the present invention relates to an anchoring, preferably a roof anchoring usable as a fall restraint, comprising:

- a placing assembly for placing the device on a roof,

- a primary member, such as a peripheral member, such as a fixing member, such as a plate element, comprising an opening for attachment thereof to the roof,

- a secondary member such as a central member, such as a central element, such as a plate element, such as a central element with fixing means arrangeable in the opening, for coupling thereof to the primary member,

- coupling means for coupling the primary member to the secondary plate element.

An advantage of such a roof anchoring is that it is easy to place, for instance is attachable very firmly

to the roof. The coupling means here provide possibilities of providing a certain measure of flexibility between the peripheral member, or fixing element, and the central member. The primary member provides the primary attachment, while the secondary member provides a further function, such as a fixing member for a roof anchor, and/or a secondary attachment, such as to a roof.

A roof anchor is therefore hereby provided with which a fall can be broken of someone who is attached to the secondary member, since the forces are absorbed with retardation by means of the coupling means.

Measures in accordance with this aspect and all preferred embodiments thereof can be combined freely within the scope of the present description by the skilled person in the field with all other aspects according to this document and with all measures of any preferred embodiment as described in this document.

The coupling means preferably comprise a membrane of material with a greater flexibility than the primary member and/or the secondary member.

The primary and secondary members can be manufactured from suitable material such as a metal, such as steel or stainless steel, and/or a plastic such as a rigid plastic.

The primary members are preferably provided with a plurality of openings which serve as engaging member for material of the coupling means, similarly to openings in other preferred embodiments.

The coupling member is preferably formed by means of a stiff and/or somewhat flexible material such as a plastic, rubber, material comprising bitumen, or mixtures thereof.

This material is preferably arranged by means of a casting or moulding process, preferably at temperatures of 50-90, 60-80, 65-75, 70, 100-200°C, more preferably of 120-180°C, more preferably between 140-160°C.

Alternatively, the material is arranged in sheet form, preferably following heating thereof by means of for instance a warm airflow.

According to a further embodiment which can be combined with any further embodiment, such material preferably comprises a plastic such as a two-component plastic, such as EPDM, more preferably natural or synthetic rubbers, preferably a polyurea coating such as hotspray polyurea, alcor bright™.

The size, preferably a cross-section, of the primary member is more preferably 0.1-2 metres, more preferably 0.2; 0.25; 0.3; 0.4; 0.5; 0.7; 0.8; 0.9; 1; 1.1; 1.2; 1.3; 1.4; 1.5; 1.6; 1.7; 1.8; 1.9 metre.

In a further preferred embodiment the secondary member has a size of at least 0.1 or 0.2 or 0.3 or 0.4 or 0.5 or 0.6 or 0.7 or 0.8 or 0.9 or 1 or 1.1 metre.

In a preferred embodiment the thickness of a membrane lies within a range of 0.5-20 mm, preferably 1-10 mm, more preferably 3-5 mm.

The membrane is preferably arranged over a part of the thickness from a first side, such as the underside during use, of the members and over a further part of the thickness from a second side, such as the upper side during use.

Applied in a further preferred embodiment for the purpose of attaching the membrane is an adhesive, such as a glue, with which it is possible to fill openings in the primary and secondary members between the membrane. A

thickness of 1 to 3 mm is preferably filled herewith in the openings.

A method here is providing a lower membrane part or sheet, applying an adhesive thereto, and arranging the primary and secondary member thereon, applying adhesive thereto, and finally arranging the upper membrane part thereon. The membrane parts here form the coupling means.

A further aspect according to the present invention relates to a method for manufacturing a roof anchoring or roof anchor according to the present invention. This method comprises steps for:

- providing a casting receptacle, or a mould,
- casting a base material, such as a bitumen material, rubber material, plastic material or further roof covering material, in the casting receptacle, wherein the base material preferably has a temperature at which it is fluid but still retains the desired material properties,
- placing a primary member, secondary member, placing member or the like in the casting receptacle for the purpose of providing an adhesive contact with the base material,
- wherein the primary member, secondary member, placing member or the like is preferably arranged in the base material such that, after cooling of the base material, the base material is situated above and below the primary member, secondary member, placing member.

An advantage of such a method is that a roof anchoring or roof anchor is provided by means of a simple method for the purpose of cost-effectiveness.

In a preferred embodiment of this aspect the casting receptacle is also a container for later transport and storage of the roof anchoring or the roof anchor. Hereby realized in advantageous manner is that the roof anchor

can be transported without a packaging having to be provided and without operations being required to release a cast roof anchor from a mould.

The mould is more preferably formed by means of a base plate, preferably provided with a protruding tongue for facilitating release, more preferably provided with a coating for enhancing release, a casting wall extending all around the base plate and preferably manufactured from a sheet-like or plate-like material of a plastic or a cardboard, and more preferably provided with a casting wall holder, preferably formed by the complement of a plate material of the base plate.

A disposable mould can hereby be provided in advantageous manner which can be strengthened in advantageous manner by means of the optional casting wall holder.

In a further preferred embodiment the casting material is, in addition to the stated bitumen, a further mouldable plastic or rubber. A further advantage of such a preferred embodiment is the adherability to or fusibility with plastic roofs or roof materials.

Further advantages, features and details of the present invention will be described in greater detail hereinbelow on the basis of one or more preferred embodiments with reference to the accompanying figures. Similar, though not necessarily identical, components of different preferred embodiments are designated with the same reference numerals.

Fig. 1 is a schematic top view and cross-section of a first preferred embodiment according to the present invention.

Fig. 2 is a schematic top view and cross-section of a further preferred embodiment according to the present invention.

Fig. 3 is a schematic side view of a further preferred embodiment.

Fig. 4 is a schematic top view of a further preferred embodiment.

Fig. 5 is a schematic view of a further preferred embodiment.

Fig. 6-7 are further views of preferred embodiments.

Fig. 8-9 are further views of preferred embodiments.

Fig. 10-11 are further views of preferred embodiments.

A first preferred embodiment (Fig. 1) according to the present invention relates to a roof anchoring 1. This comprises a placing member such as a plate 2 which is provided with a number of (partially shown) openings distributed over the surface for admitting deformable material such as bitumen or a glue. An elevation is provided substantially in the middle of plate 2 by means of a deep-drawn or pressed flange 5.

Provided for the purpose of fixing an element for placing on the roof is a nut 34 which is sealed on one side and which is fixed by means of welding to the underside of elevation 3. Bolt 31 is fixed on the upper side by means of a nut 33 and provided at the top with a per se known head 32. A screw thread is provided on the bolt for the fixation of nut 33.

The embodiment of Fig. 2 comprises an elevating member or elevating plate 6 on the upper side of placing member 2. Plate 2 is in this case a flat plate and elevating plate 6 has an elevation along a slope 9, wherein the two plates are attached to each other between slope 9 and

edge 8 of elevating plate 6 by means of a series of spots welds 12.

Fig. 2 shows in the elevation 3 insulating material 20 which can be arranged between the two plates. Insulating material 22 is further shown on the upper side of the plates. Bitumen is provided here with a white covering layer.

Shown in Fig. 3 is a form of crumple zone 40 by means of concentric waves arranged in the plate. In the middle is the opening for bolt 34. In the case of a sudden tug on the bolt the material pulled as a result of the tug will deform in the line of the pull cord, whereby the protrusions or waves become less high or are even smoothed out. In addition, a plastic tensile deformation of the material is possible in the case of an even greater pulling force.

Shown in Fig. 4 is a form of crumple zone 40 by means of a large number of drilled holes 14 arranged round the bolt 34. In the case of a sudden tug on the bolt the plate material round the holes will deform, whereby the energy of the tug is absorbed uniformly and the shock will be perceived as less abrupt.

Fig. 5 shows a variant with a single plate with a large number of openings. Two layers of bitumen are arranged respectively above the plate and under the plate and connected to each other through the openings. Alternatively, a further adhesive is provided for this purpose. The bolt is restrained on the underside by a disc with a passage opening for the bolt. This disc absorbs forces and, in the case an aluminium plate is applied, provides for a desirable reinforcement. An annular pressed-in groove serves to provide a hard contact of the force of the bolt and/or the upper side nut of the bolt relative to

the plate, whereby the softness of bitumen material is circumvented.

This annular groove co-acts with a similar groove in a similar disc just below the upper nut.

The bitumen material seals the screw thread of the bolt watertightly, for which purpose the grooves drive bitumen material inward in the direction of the bolt. The groove preferably has for this purpose on the outer side a substantially vertical wall and on the inner side a wall with a much smaller angle. Bitumen material is hereby separated by the top of the substantially vertical wall and, when pressed in, driven inward in the direction of the bolt by the relatively flat wall. This driving persists for the lifespan of the device.

An example of a bitumen which is applied has for instance properties as follows:

	Test description	Method	Unit	Min	Max
Consistency at moderate temp. of use	Penetration at 25 °C	EN 1426	mm/10	160	220
Consistency at high temp. of use	Softening point, R&B	EN 1427	°C	35	43
Resistance to hardening EN 12607-1	Change in mass	EN 12607-1	%	-	1.00
	Residual penetration	EN 1426	%	37	-
	Softening point, R&B	EN 1427	°C	37	-
	Rise Softening point R&B	EN 1427	°C	-	11.0
	Test description	Method	Unit	Min	Max
Safety and treatment	Min. pumping temperature	-	°C	95	-
	Processing temperature	-	°C	130	150
	Max. Processing temperature	-	°C	-	190
	Flash point	EN ISO 2592	°C	220	-
Technical properties	Density at 25°C	EN ISO3838	g/cm3	1.016	
	Fraass breaking point	EN 12593	°C	-	15
	Kinematic viscosity at 135 °C	EN 12595	mm²/s	135	-
	Solubility	EN 12592	%	99.0	-

Fig. 6 and Fig. 7 relate to a preferred embodiment with an annular plate with openings 62 inside which a circular plate with openings 61 is arranged. Both these plates are worked into a layer of bitumen, plastic, rubber or other suitable mouldable material in for instance a mould as according to Fig. 10. This creates a device to be fixed to a roof wherein forces on the central point 10, such as pressure forces, are absorbed due to the stretch-

ing of the material at the position of the open space between the annular plate and the circular plate. The attachment to the roof is provided by means of an adhesion or glueing or vulcanization of the material, wherein the openings as described in the foregoing provide for an excellent attachment.

Fig. 8 and 9 show further alternatives of simple plates which can be cast into the material. These simpler variants of placing openings and the central attachment point are highly suitable for a function as an anchoring on a roof, for instance for an object for placing thereon such as a solar collector.

Fig. 10 and 11 show a mould 81, preferably a disposable mould comprising a base plate 82 for arranging therearound a vertical wall 85 attachable by means of tongues 86. Vertical wall 85 is clamped during use between base plate 82 of the mould and a surrounding plate 83 which provides for reinforcement and the inner edge 84 of which clamps the wall 85 against the base plate. The base plate is coated by means of a coating arranged to the casting material with good release properties for the casting material.

The present invention has been described in the foregoing on the basis of several preferred embodiments. Different aspects of different embodiments are deemed described in combination with each other, wherein all combinations which can be deemed by a skilled person in the field as falling within the scope of the invention on the basis of reading of this document are included. These preferred embodiments are not limitative for the scope of protection of this document. The rights sought are defined in the appended claims.

CLAIMS

1. Roof anchoring for attachment to a roof, such as a flat roof, wherein the roof anchoring comprises:

- a placing member for placing the roof anchoring on a surface of the roof, which placing member preferably comprises a flat plate material,
- a fixing member for fixing an element for anchoring to the roof anchoring, wherein
- the placing member is provided with a plurality of openings for receiving therein or feeding therethrough a deformable material, such as a glue material or a roof covering material such as bitumen, for the purpose of providing by means of the roof covering material an adhesive effect between the roof covering material and the placing member.

2. Roof anchoring as claimed in claim 1, comprising an elevating member arranged or arrangeable above the placing member for providing an elevation above the placing member, wherein the elevating member is preferably manufacturable from a plate material.

3. Roof anchoring as claimed in claim 1 or 2, comprising a crumple zone for absorbing forces, such as pulling forces and/or pushing forces, on the fixing member, wherein the fixing member is preferably arranged in the vicinity of, in the area of or substantially in the middle of the crumple zone.

4. Roof anchoring as claimed in claim 1, 2 or 3, wherein the crumple zone is provided in the placing member or in the elevating member.

5. Roof anchoring as claimed in one or more of the foregoing claims, wherein the crumple zone is formed by plate material forming the placing member or the elevating member.

6. Roof anchoring as claimed in one or more of the foregoing claims, wherein the crumple zone is formed by a weakening material forming the placing member and/or the elevating member, such as by means of a large number of openings such as drilled holes or punched holes or by means of a wave pattern arranged in plate material.

7. Roof anchoring as claimed in one or more of the foregoing claims, wherein the crumple zone, the placing member and/or the elevating member are covered by means of an insulating material such as white bitumen, sand, foam material or the like.

8. Roof anchoring as claimed in one or more of the foregoing claims, wherein a space formed by the placing member and/or the elevating member is filled by means of insulating material.

9. Roof anchoring as claimed in one or more of the foregoing claims, provided with a fixation material, such as bitumen or a glue material arranged in prefabricated manner.

10. Roof anchoring as claimed in one or more of the foregoing claims, wherein the openings have a size of between 0.1 mm and 3 cm, preferably between 0.5 cm and 2 cm, more preferably between 0.5 cm and 1.5 cm, more pref-

erably between 0.5 cm and 1 cm, more preferably between 1 cm and 1.5 cm.

11. Roof anchoring as claimed in one or more of the foregoing claims, wherein the fixing member comprises an opening, preferably provided with a vertically arranged bolt with more preferably an engaging member such as a fixing eye pivotally placed or placeable therearound.

12. Roof anchoring as claimed in one or more of the foregoing claims, wherein the fixing member comprises a support element for placing thereon an element for placing on the roof, such as a solar panel or an antenna.

13. Roof anchoring as claimed in one or more of the foregoing claims, comprising at least one reinforcing disc for absorbing pulling forces exerted on the fixing member, which disc preferably comprises fixation grooves or bitumen driving grooves.

14. Fall restraint for safeguarding a person against a fall from a roof, comprising a roof anchoring as claimed in one or more of the foregoing claims.

15. Method for safeguarding a person against a fall by means of a fall restraint as claimed in claim 14, comprising steps for:

- making placing preparations for the purpose of manufacturing and/or placing the device according to one or more of the foregoing claims, and/or
- manufacturing and/or placing a part of a device according to one or more of the foregoing claims.

16. Method as claimed in the foregoing claim, comprising steps for arranging the device on a roof.

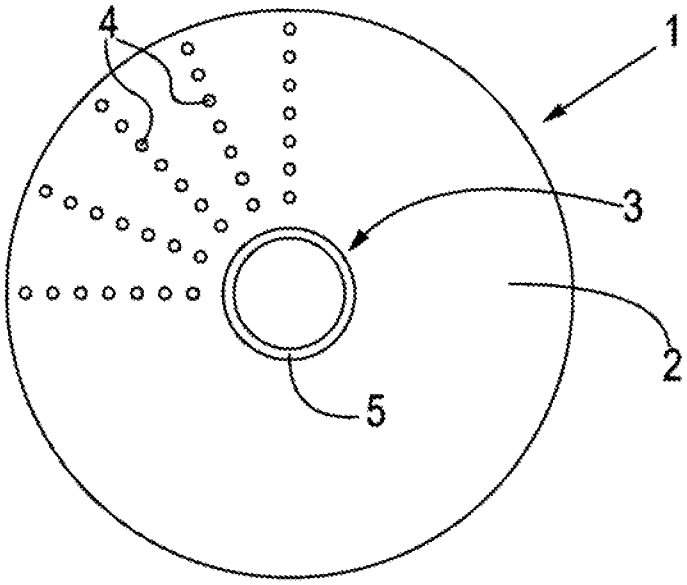
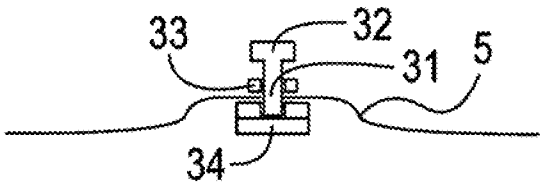


FIG. 1



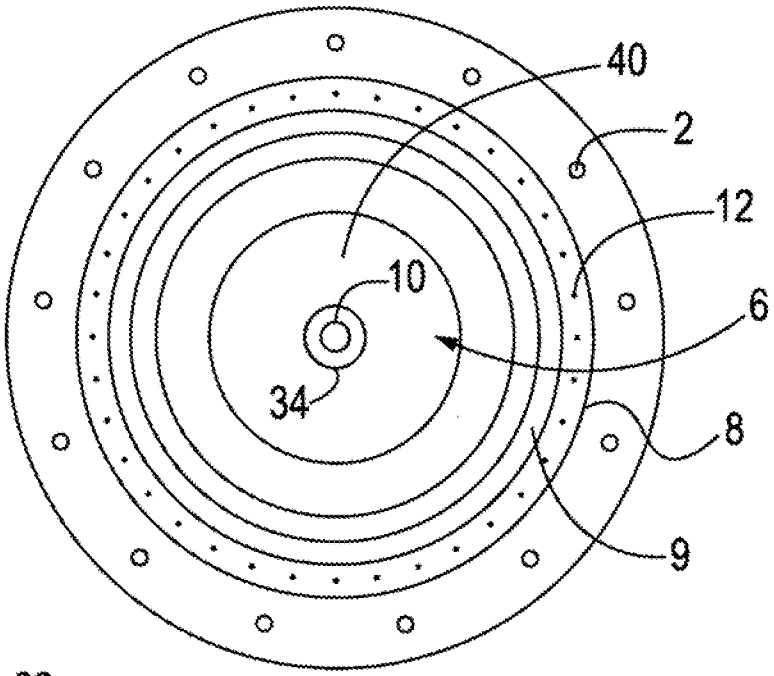
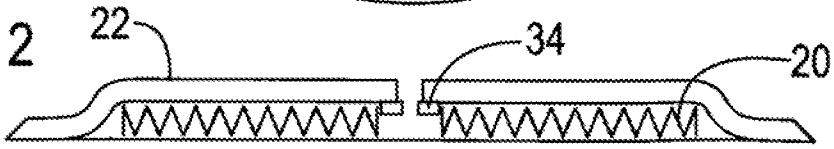


FIG. 2



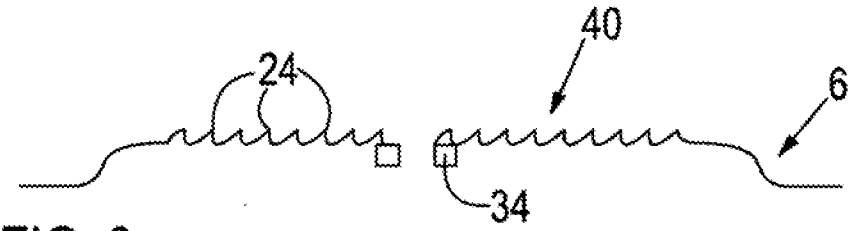


FIG. 3

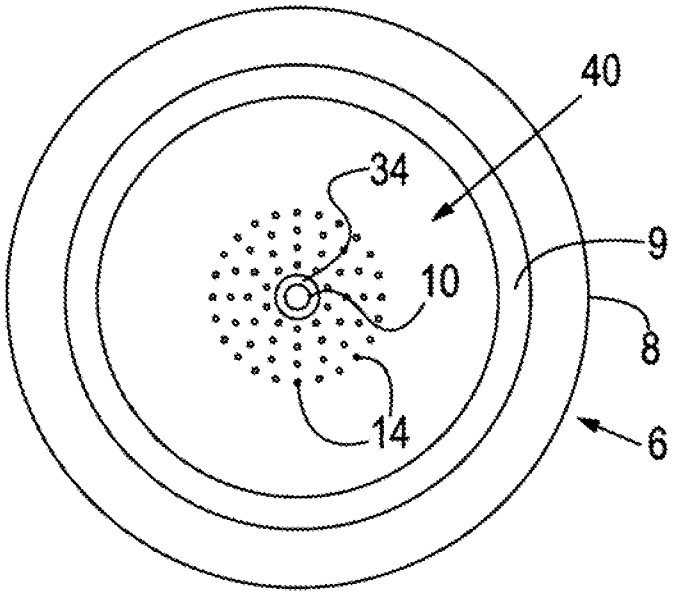


FIG. 4

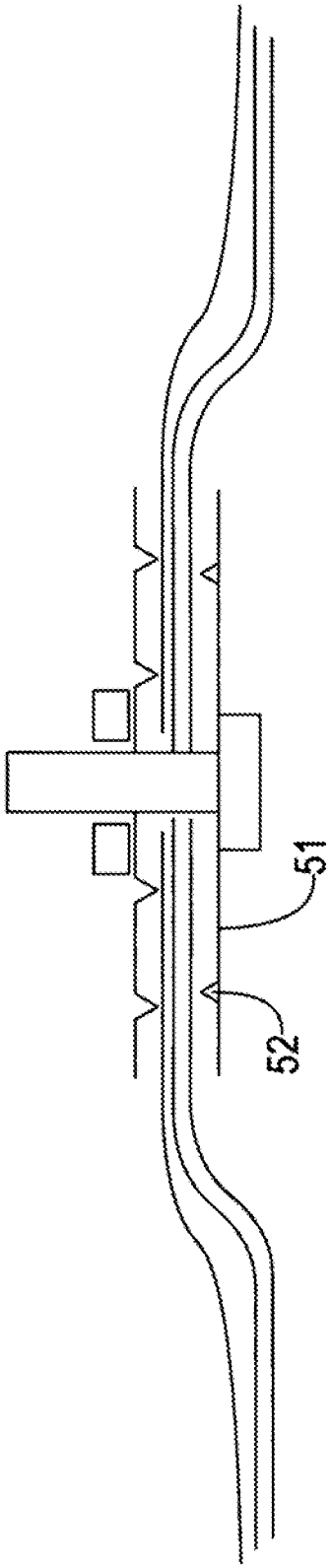


FIG. 5

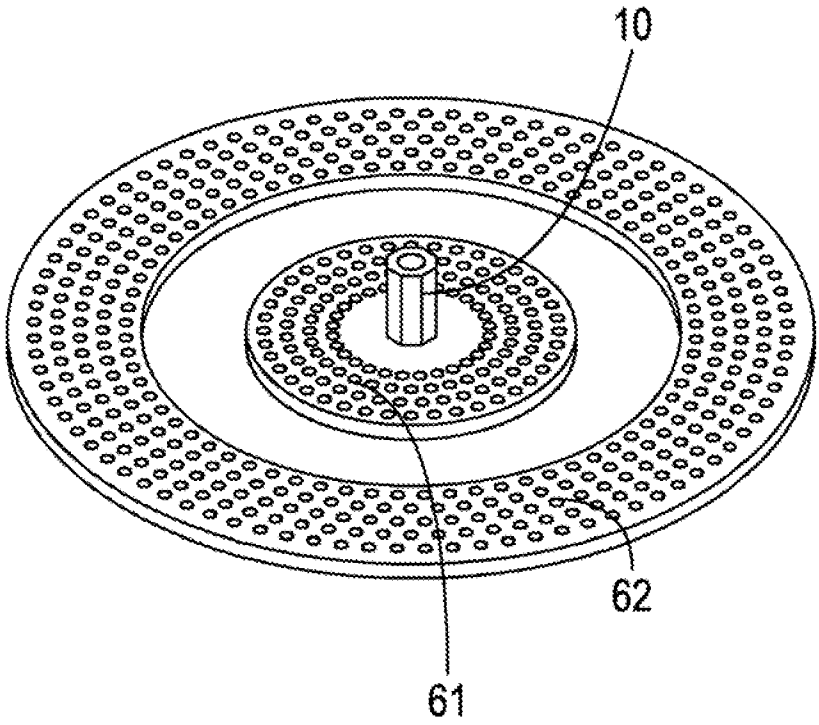


FIG. 6

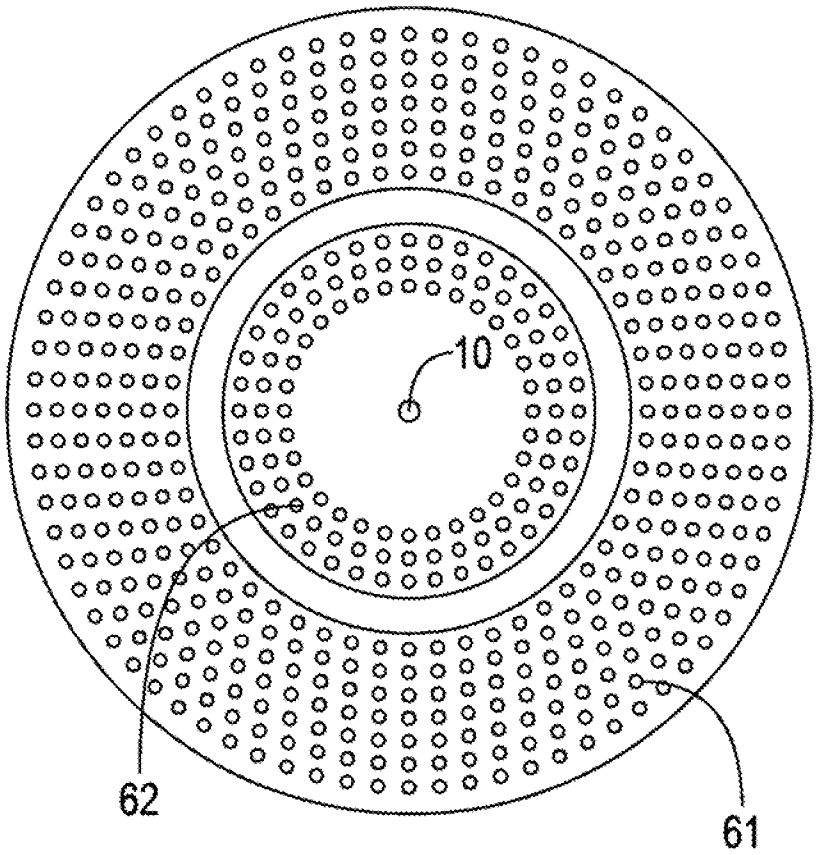


FIG. 7

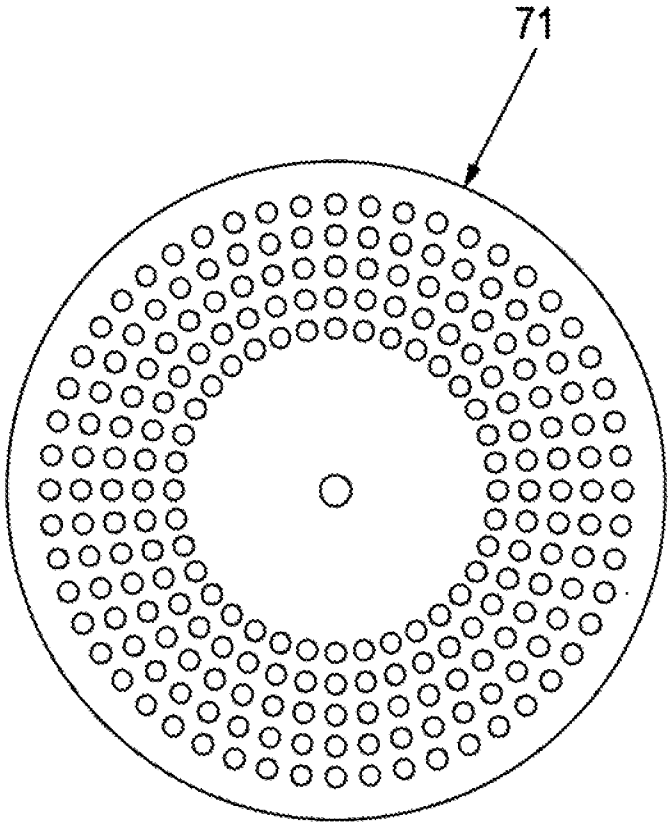


FIG. 8

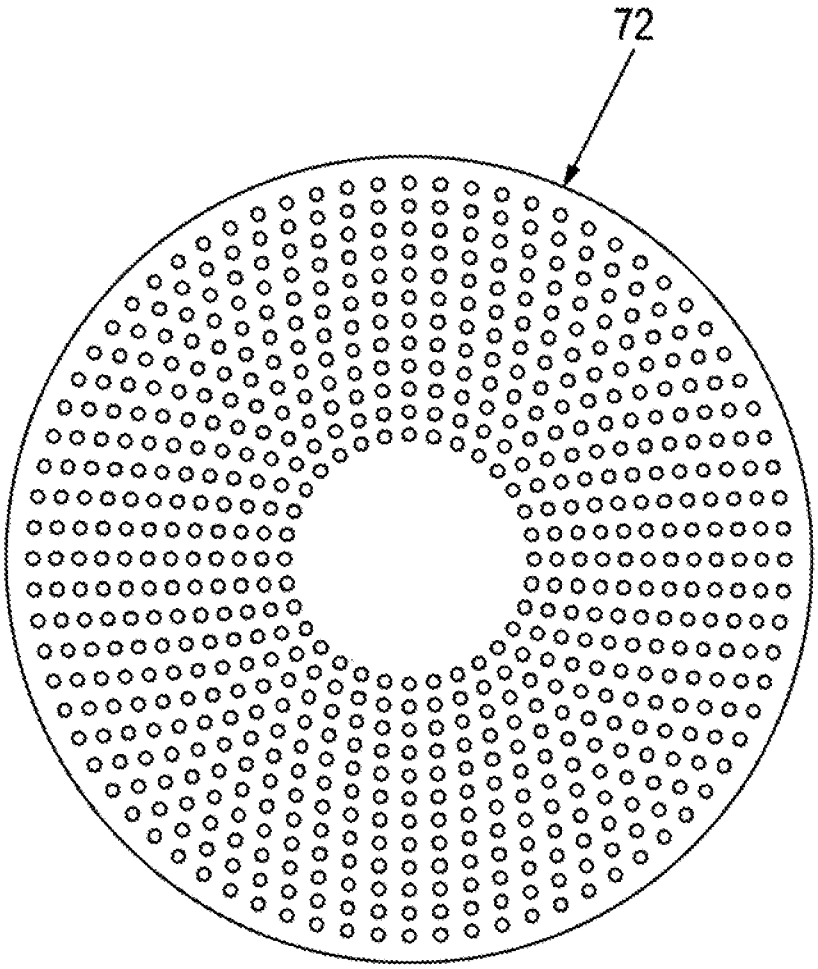


FIG. 9

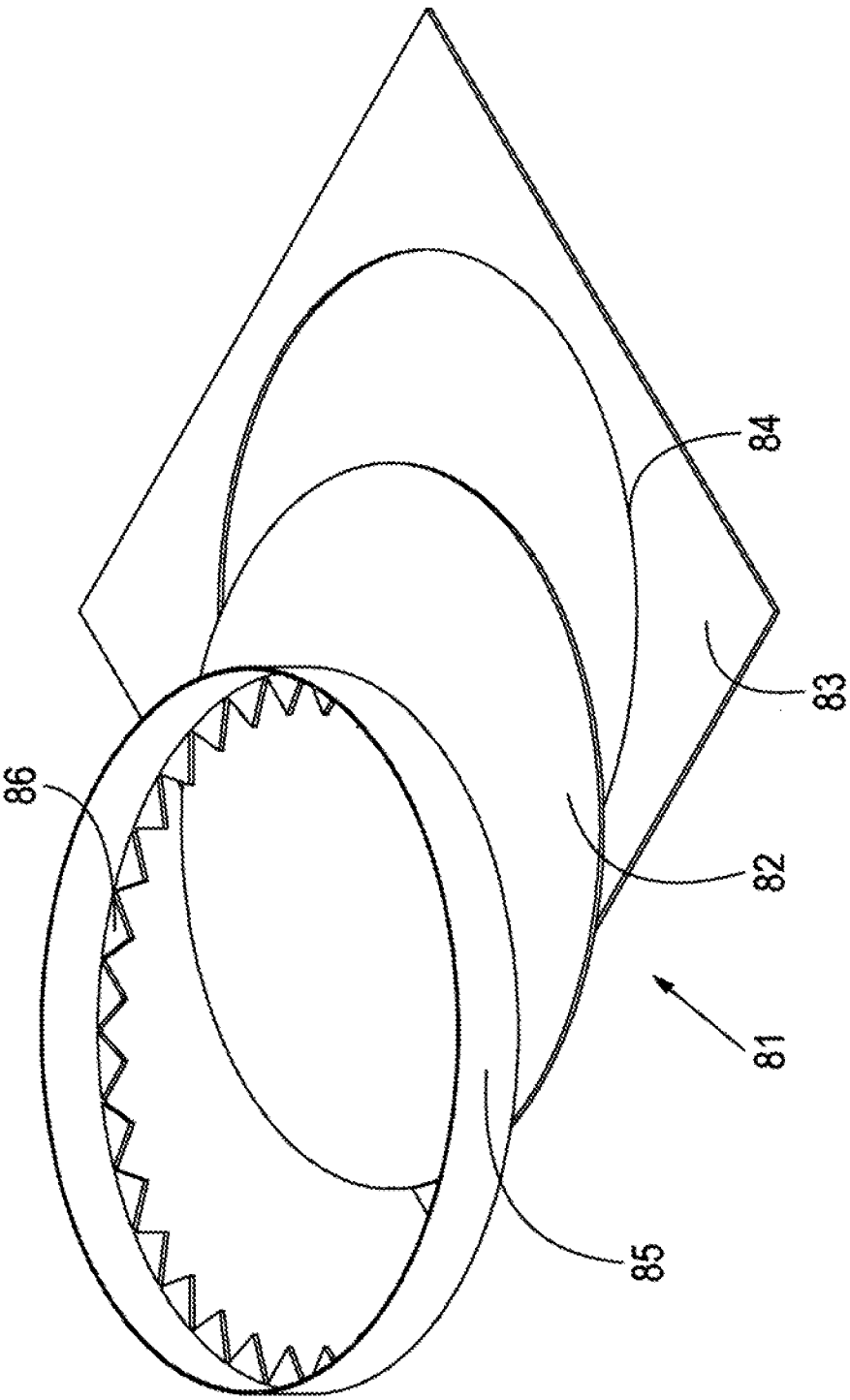


FIG. 10

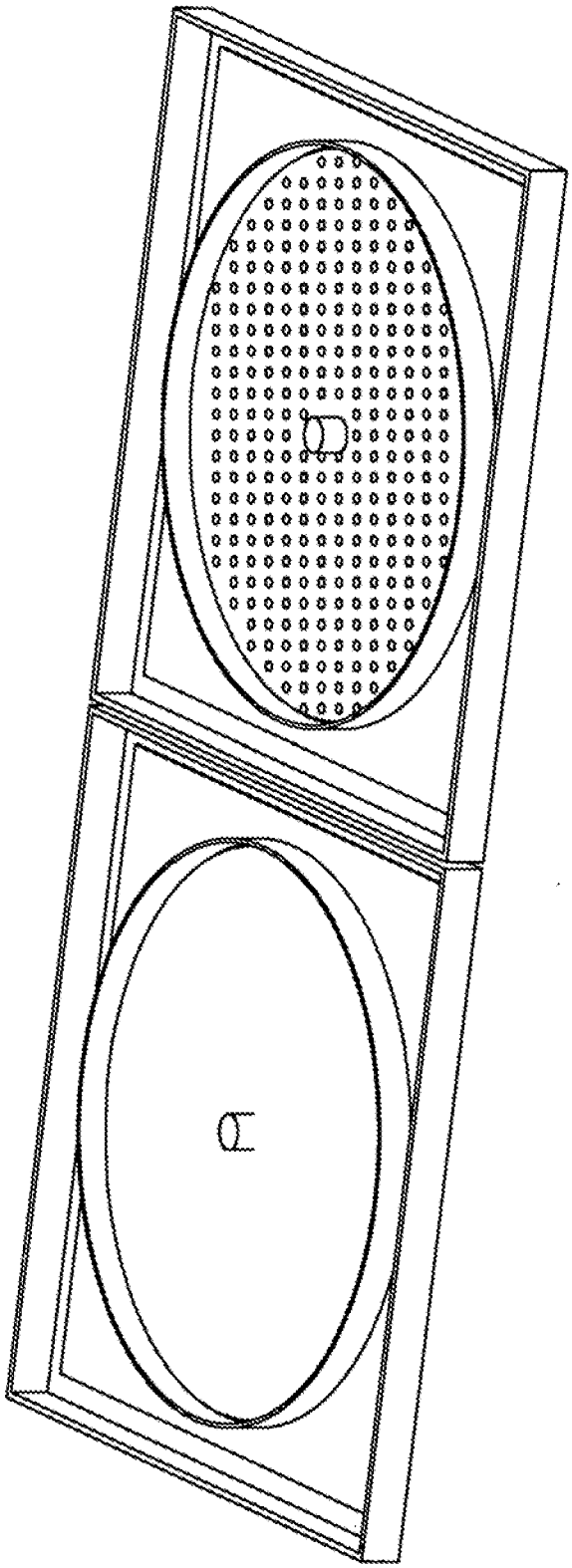


FIG. 11

INTERNATIONAL SEARCH REPORT

International application No
PCT/NL2014/050250

A. CLASSIFICATION OF SUBJECT MATTER
INV. E04G21/32
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
E04G E04D A62B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	EP 2 462 297 A1 (FLORED LTD [GB]) 13 June 2012 (2012-06-13) page 6, line 18 - page 11, line 2; claim 1; figures 1,2,7,8,5	1-12, 14-16 13
X A	EP 2 216 466 A1 (SCHUURMAN BEHEER BV [NL]) 11 August 2010 (2010-08-11) paragraph [0011] - paragraph [0014]; claim 1; figures 1,4,20,21,3	1-9, 11-14 10,15,16
X A	FR 2 949 145 A1 (JPB INVEST [BE]) 18 February 2011 (2011-02-18) claim 10; figures 6,2,7,1	1,2, 9-12, 14-16 3-8,13

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X Further documents are listed in the continuation of Box C.

X See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
1 August 2014	05/09/2014

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Baumgärtel, Tim

INTERNATIONAL SEARCH REPORT

International application No
PCT/NL2014/050250

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 1 698 747 A2 (MARZOUKI TAIEB [DE]; HAUPT BERTRAM [US]) 6 September 2006 (2006-09-06) the whole document	1-15
A	DE 20 2004 018587 U1 (MARZOUKI TAIEB [DE]; PANNEKOEK JAKOB GERRIT HENDRIK [NL]; HAUPT BERTRA) 17 March 2005 (2005-03-17) the whole document	1-15

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/NL2014/050250

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		WO 2010151114 A1	29-12-2010
EP 2216466 A1	11-08-2010	EP 2216466 A1	11-08-2010
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