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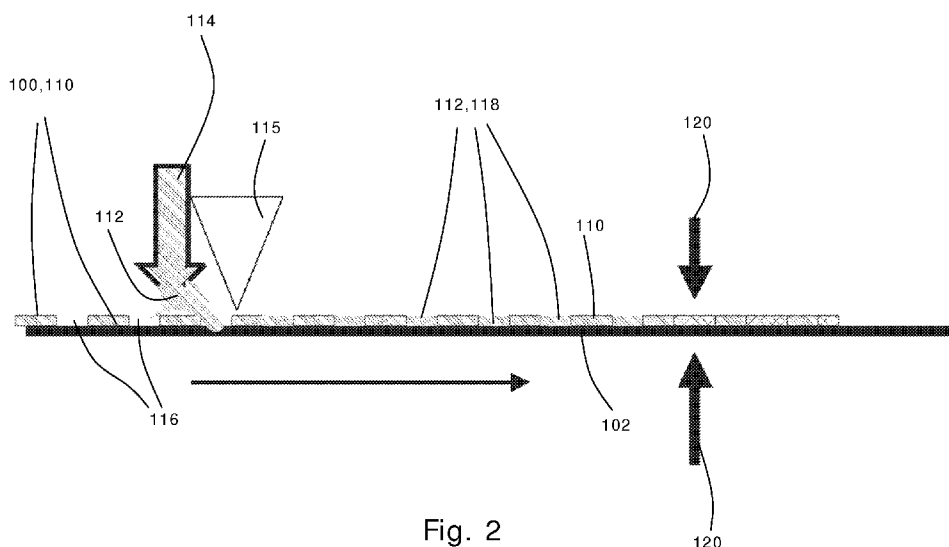


Fig. 2

(57) Abstract: The present invention relates to a method for producing a patterned adhesive layer, and a wound dressing comprising a patterned adhesive layer.

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A METHOD FOR MANUFACTURING A PATTERNED ADHESIVE LAYER

FIELD OF THE INVENTION

This invention relates to medical adhesive tapes for use in adhering medical appliances, dressings, etc., to the skin. More specifically, the present invention is directed to a method of manufacturing a medical adhesive tape or dressing comprising a patterned adhesive layer.

BACKGROUND OF THE INVENTION

In medical fields, medical adhesive tapes such as surgical tapes, plasters (first-aid plasters), etc., are applied to adhere medical appliances, rolled bandages, wound dressings, transdermal absorbents, etc., to the skin.

The adhesive tape is composed of an adhesive which is coated on a backing layer. Such an adhesive tape should have adhesion suitable for firmly adhering the medical appliances or dressing materials to the skin and subsequently easily removing them from the skin. Furthermore, the tape should have high water vapour permeability to avoid normal skin damage because it is directly attached to the skin, in which high water vapour permeability can promote wound healing.

Conventionally, the adhesive tape has the pressure-sensitive adhesive (PSA) coated onto an entire surface of the backing layer. Thus, conventional tapes are disadvantageous in terms of low water vapour permeability, due to the coated adhesive per se, regardless of the water vapour permeability of the backing layer. That is, even though a backing layer having high water vapour permeability is used, the adhesive coated on the entire surface of the backing layer may prevent water vapour permeation, whereby the water vapour permeability of the tape is reduced.

The user of the adhesive tape may come into contact with water. Hence, water or liquid resistance is required to protect the wound or medical appliance.

Dot-shaped patterns of pressure sensitive adhesives (PSA) coated on backing film allow increased vapour permeability at the areas which are not coated. However water infiltration or leakage is possible via the interconnected uncoated areas or channels, which are defined between the non-interconnected dots of dot-shaped adhesive pattern.

Specifically, dots of the dot-shaped adhesive pattern are discontinuously formed, that is, the dots are not interconnected. As a consequence such designs allow water to be trapped in the space defined between the non-interconnected dots.. Such trapped water may contact the skin of the user over longer periods, which leads to maceration of the skin. This is harmful to the wound.

US 6171648 discloses a backing material with a partial self-adhesive coating.

WO 2005/028581 discloses a medical adhesive tape, having high water vapour permeability and water resistance, characterized in that a pressure-sensitive adhesive is coated on a base sheet to form a net-shaped structure. As such, the net-shaped structure includes a continuous rectilinear form having square pores, a continuous curvilinear form having slanted square pores, a continuous form having circular pores, or combinations thereof. The adhesive tape includes surgical tape and plasters serving to adhere medical appliances, rolled bandages, wound dressings, transdermal absorbents, etc., to the skin, and can permit the passage of a gas through a plurality of non-coating parts to have high water vapour permeability, and simultaneously have water resistance and sufficient adhesion through a continuous net type coating part.

The adhesives used in the known methods of manufacturing are often solvent based. Furthermore, a drying or curing step usually follows the pattern formation.

According to most of the known methods the pattern is formed first, thereafter cured or dried, and finally followed by laying on a release liner.

WO 2006/002634 describes laser cut holes in a first material and subsequently filling these holes with a second material, where adhesion, absorption, and permeability are controlled and balanced with the second material.

GB 951468 describes an adhesive tape comprising a backing film with a
5 multiplicity of small perforations, each surrounded by a raised bead, and a coating of pressure-sensitive adhesive on one surface of the film. The process of making perforations with raised bead and then coating of adhesive is laborious. Perforations in the film is less preferred in certain applications, e.g. where occlusion is required.

- 10 A permeating but non absorbing adhesive, does not change in hardness, and the mechanical and rheological properties of the adhesive are fixed at manufacture.

A dressing normally contains a central part comprising an absorbent core. An exposed absorbent core on a backing film requires good anchorage to the backing film, especially when wet and heavy as it is soaked with exudate. By
15 good anchorage is meant that absorption of moisture does not cause the absorbent core and the backing film to delaminate.

An exposed absorbent core surface facing the wound side maximises the exudate absorption when in place. However, longer term placement (such as for a period longer than 3-5 days) on the wound may lead to in growth of tissue of
20 the healing wound onto the core surface or more difficult removal, which in turn irritates the wound.

To overcome the removal problem, contact layers of less adhering nature are known. These contact layers are often thin films or gel layers having perforations to expose the absorbent core.

- 25 EP 633758 discloses an absorbent wound dressing having a layer of hydrophobic silicone gel which is intended to lie against the wound surface when the dressing is worn. A layer of carrier material carries the gel layer and affords the requisite strength thereto. An absorbent body is placed on that side of the carrier material

and gel layer which lie distal from the wound surface in use. The carrier material and the gel layer have mutually coinciding penetrating perforations at least within the region of the absorbent body. A fluid barrier layer is provided on that side of the dressing which lies distal from the wound surface in use.

- 5 EP 0 437 916 discloses a method for producing an air-permeable adhesive tape by forming a layer of a solution on a substrate, the solution comprising an adhesive in an organic solution; applying water drops on said layer and evaporation the organic solvent contained so as to form an adhesive that contain water drops and finally evaporating the water. However, it will be appreciated,
10 that the size and distribution of the water droplets are difficult to control.

US 5 787 787 A discloses making discreet particles of a wound contact surface, e.g.adhesive, made on an absorbing foam.

Another function of the contact layer may be to support and hold the absorbent core in position.

- 15 There is a need to simplify the processes of making patterned adhesive layer.

The present invention is based on the use of preformed 3D dots which simplifies the manufacture of the patterned adhesive sheet. The dots can help further control permeability and absorption. The dots may also be used to adjust flexibility of the layer, harder for handling, but softer and more comfortable
20 when on the skin.

SUMMARY OF THE INVENTION

The present invention relates to a method for producing a patterned adhesive layer, and a wound dressing comprising a patterned adhesive layer.

BRIEF DESCRIPTION OF THE FIGURES

Figure 1 illustrates the first step of a continuous manufacturing method of the invention,

Figure 2 illustrates the second step of a continuous manufacturing method of the invention,

5 Figure 3 illustrates a resultant adhesive layer with dot patterns.

Figure 4 illustrates a top view of a net adhesive layer manufactured according to the invention,

Figure 5 illustrates a top view of another net adhesive layer manufactured according to the invention, and

10 Figure 6 illustrates a sectional view of an embodiment of the invention,

Figure 7 illustrates a sectional view of another embodiment.

DETAILED DESCRIPTION OF THE INVENTION

In a FIRST aspect the present invention relates to a method for manufacturing an adhesive layer defining a predetermined pattern, the method comprising the
15 steps of:

- providing on a backing layer (such as a backing film or material) a pattern-defining material, the pattern-defining material being provided in an inverse pattern which is inverse relative to the predetermined pattern;
- coating an adhesive in liquid form onto the backing layer such that an upper
20 surface each of the adhesive material and the pattern-defining material are at the same level; and
- rendering the adhesive to a form-stable state.

In one embodiment the step of providing the pattern-defining material on the backing layer precedes the step of coating the adhesive. In another embodiment the order of the two steps are reversed. In yet another embodiment, the two steps are performed simultaneously.

- 5 The current invention details a method of making a patterned adhesive layer i.e. an adhesive layer defining a predetermined pattern. The patterned adhesive is a connected layer i.e. a layer with a plurality of spaces which during manufacture are filled with a pattern-defining material. The spaces/ pattern-defining material defines an inverse pattern which is inverse relative to the predetermined
- 10 pattern. The pattern-defining material may be adapted to absorb a fluid contacting the material. Alternatively, or as a supplement the pattern-defining material may be soluble or evaporable. The pattern-defining material may contain substantially no adhesive.

- In one embodiment, the method further comprises the step of removing at least
- 15 a part of the pattern-defining material. It will be appreciated that the inverse pattern may define a three-dimensional pattern and when this is the case, the adhesive will additionally define a three-dimensional pattern.

- Moreover, the pattern-defining material may in one embodiment be dissolvable by heat and/or moisture. In one embodiment the pattern-defining material
- 20 dissolves when subjected to a temperature above 30 degrees, such as above 37 degrees, such as above 50 degrees, such as above 75 degrees, such as above 100 degrees. In one embodiment the pattern-defining material is adapted to dissolve when subjected to a temperature corresponding to the skin temperature of a living being, typically in the range of 28-35 degrees Celsius, such as in the
- 25 range 31-33 degrees Celsius.

Additionally, the method may comprise the step of evaporating the pattern-defining material, whereby spaces in the adhesive are defined in the areas of the evaporated pattern-defining material. The latter step may be carried out during manufacture of the adhesive.

Alternatively, the method may comprise the step of partially evaporating the pattern-defining material whereby a hollow matrix is defined in the areas of the partially evaporated pattern-defining material. Again the step of partially evaporating may be carried out during manufacture of the adhesive.

- 5 In yet another embodiment, the pattern-defining material is an absorbent material (i.e. a material adapted to absorb fluids such as bodily fluids) which is absorbent at skin temperature or upon contact with moisture.

In one embodiment, the predetermined pattern in two different areas relatively is not uniform in terms of at least one of:

- 10 – the distance between adhesive zones,
– the thickness of adhesive zones,
– the width of adhesive zones,
– the density of adhesive zones and
– the cross-sectional shape of adhesive zones.
- 15 In another embodiment of the invention the net pattern adhesive layer is less dense in the middle than in a rim portion thereof.

In one embodiment the backing film is vapour permeable.

- The shape and dimensions of the predetermined patterns may be uniform, or may vary at different areas of the film. In one embodiment, the geometry of the
20 adhesive material with the predetermined pattern are not identical in two different areas, in terms of at least one of:

- the distance between two neighbouring spaces (which during manufacture is filled with the pattern-defining material),
– the thickness of the adhesive defining the predetermined pattern,
25 – the density of the adhesive, and

- the cross-sectional shape of the adhesive in a section extending between two neighbouring spaces.

The adhesive layer may be a so called transfer coating in which the adhesive is provided between two release liners such that the coating (the adhesive) is suitable for being transferred onto a surface of the final product. This may be done by removing one of the two release liners and applying the uncovered surface to the final product, while leaving the release liner provided on the other surface untouched so as to allow it to protect the surface to which it is attached.

In another embodiment, the backing film is a permanent film suitable as backing material for the adhesive in a dressing. By permanent film is meant a film which is used in a final product e.g. a wound dressing this is contrary to a transfer film/coating which is adapted to be removed prior to application of the adhesive to a surface of the final product and/or prior to use of the final product by a user. It will be appreciated that in the case of a permanent backing film which is provided to one surface of the adhesive, a release liner may be provided on the opposite de surface of the adhesive. The release liner may be removed prior to application of the final product (including the permanent backing film and the adhesive).

The backing film may be pre-treated, chemically or by corona treatment etc, to improve anchoring properties. Examples are silicone and titanate adhesion promoters.

The adhesive is between 25 to 2000 μm , preferably 50 to 1000 μm thick.

The adhesive pattern formed may cover between 25 to 90% of the backing area, or the adhesive area may be 25 to 90% of the total coated surface.

The adhesive is in a liquid form during coating and becomes a form-stable mass upon coating. The adhesive may be a two component system. Preferably, the adhesive contains no solvent. Preferred adhesives include PU, acrylic, silicone (e.g. Silbione RTgel 4512 (Rhodia) , Dow Corning 7-9800), or polyethylene or

polypropylene oxide based crosslinking types as described in patent WO2005/032401. The adhesive may be a hotmelt type, which is initially heated to flow and cooled to gel or crosslink. Instead of curing upon cooling the adhesive may in some embodiments cure upon application of thermal energy.

- 5 The peel force of the adhesive may be below 10 N/cm, such as below 8 N/cm, such as below 6 N/cm, such as below 2 N/cm. It is preferred that the peel force of the adhesive face is max. 4N/cm

In one embodiment, the adhesive layer forms part of a wound dressing which also comprises an absorbent core for absorbing wound exudate. The absorbent
10 core and/or the adhesive gel may contain active ingredients, such as ibuprofen, paracetamol, silver or other medically active ingredients adapted to kill pain or to improve the healing of a wound.

Initial viscosity is preferably 0.1 to 1000 Pa·s, more preferably 0.5 to 100 Pa·s, such as 0.5 to 50 Pa·s.

- 15 Gelation is between 0 and 60 min., more preferably between 0.5 and 30 min at 25 to 130°C, to allow good coating processing (i.e. within less than a few minutes) and shape forming.

During manufacture the adhesive material may reach a form-stable state without being fully reacted.

- 20 In the context of the present invention the term "Form-stable" means that the material retains its shape under normal conditions, i.e. in the temperature range 25-130°C.

Full reaction or gelation may occur at a subsequent step of post-curing at which thermal energy may be provided to accelerate full reaction.

- 25 In one embodiment, the pattern-defining material is coated by means of a high moisture or evaporable mass containing material e.g. an tacky gel, sponge,

foam particles on the backing film/material just before coating the adhesive onto the backing film/material. Such a process is a so called in-line process. The particles of the pattern-defining material may suitably be hydrophilic or water soluble, e.g. Pluronic, CMC (carboxy methoxylated cellulose) gels. Alternatively, the particles of the pattern-defining material may be hydrophobic and contain evaporable solvents, e.g. VMS (volatile methylsiloxane fluid).

In another embodiment, the pattern-defining material is a temperature or pH sensitive material, which changes size, shape or even decompose under trigger conditions. Examples of this material are polyacrylamide and Expancel.

10 Examples of trigger conditions are change in temperature or change in pH.

In yet another embodiment, the pattern-defining material is a material which dissolves or partly dissolves when brought into contact with moist, such as moist from a wound or from the skin. An example of such a material is PEG, e.g. PEG 1500 or PVOH. These materials are preferably in solid form. Molecular weights of PEG suitable are those above 600 a.m.u.

The material used in the manufacture of the dots is suitably chosen such that they are soft and skin friendly.

The dots need to have a suitable height, a 3D structure such that the shortest dimension is at least 25, suitably 50 μm but less than 2000 μm and has a backing film facing or opposing surface area at least several times larger in any direction than the height, suitably more than 100 μm , so that coating of the subsequent adhesive mixture e.g. by a knife, does not hit or move or deform the structures in any way, and the adhesive layer has a height which is equal or less than the height of the dots. Suitably the adhesive is between 25 to 2000 μm , preferably 50 to 1000 μm in height.

The dots may be of any form such as discs, flakes, tubes, spheres etc.

The invention according to the first aspect may also be described in the following manner:

Embodiment 1: A method for producing a patterned adhesive layer, comprising the steps of:

- (1) Placing dots or other discontinuous patterns on a backing material;
- (2) Coating a liquid adhesive up to the height of the dots made in step;
- 5 (3) Making the adhesive form stable;
- (4) Optionally at least partially removal of the dot structure.

Embodiment 2: The method according to embodiment 1 wherein the pattern is made from 3D dot structures.

Embodiment 3: The method according to any of the embodiments 1-2 wherein
10 the dot structure or the discontinuous patterns is dissolved by heat or moisture.

Embodiment 4: The method according to any of the embodiments 1-2 wherein the dot structure or the discontinuous patterns evaporates during manufacture leaving spaces where the dot mass had been.

Embodiment 5: The method according to any of the embodiments 1-2 wherein
15 the dot structure or the discontinuous patterns partially evaporates during manufacture leaving a hollow matrix where the dot mass had been.

Embodiment 6: The method according to any of the embodiments 1-2 wherein the dot structure or the discontinuous patterns dissolve or melt at skin temperature or upon contact with moisture.

20 Embodiment 7: The method according to any of the embodiments 1-2 wherein the dot structure or the discontinuous patterns is absorbable at skin temperature or upon contact with moisture.

Embodiment 8: An adhesive sheet with patterned adhesive wherein the patterned adhesive is made according to any of the embodiments 1-7.

Embodiment 9: An adhesive sheet with patterned adhesive where the discontinuous patterns are empty spaces, surfaces without adhesive wherein
5 these spaces resulted from evaporation or removal of dot masses during manufacture.

Embodiment 10: A wound dressing comprising an adhesive sheet according to any of the embodiments 8-9.

Embodiment 11: The wound dressing according to embodiment 10 wherein the
10 dressing comprising an absorbent core and that the patterned adhesive layer extends beyond the borders of the absorbent core.

It will be appreciated that the invention according to the first aspect may comprise any combination of features and/or elements from the second and/or third aspect of the invention.

15 In a SECOND aspect the present invention relates to an adhesive sheet with patterned adhesive, wherein the adhesive defining a predetermined pattern is manufactured by means of the method according to the first aspect of the invention.

It will be appreciated that the invention according to the second aspect may
20 comprise any combination of features and/or elements from the first and/or third aspect of the invention.

In a THIRD aspect, the present invention relates to a wound dressing comprising an adhesive sheet according to the first and/or second aspect of the invention. The adhesive sheet according to the third aspect defines a predetermined
25 pattern as is described under the first aspect.

In one embodiment, the invention comprises an absorbent core for absorbing bodily fluids such as exudates. The absorbent core may be provided centrally on the adhesive layer, such that the adhesive layer extends beyond a rim portion of the absorbent core. In one embodiment the width and/or the length of the absorbent core is in 20-80 percent of the width and/or length, respectively, of the adhesive layer, such as 40-60 of the width/length.

Again it will be appreciated that the invention according to the third aspect may comprise any combination of features and/or elements of the invention according to the first and/or second aspect.

10 DETAILED DESCRIPTION OF THE DRAWINGS

The invention will now be described with reference to the figures.

The first step of a continuous manufacturing method of the invention may have a set up as illustrated in Figure 1.

The pattern-defining material may be applied to the backing film/material by means of a screen printing or hot melt gravure technique where dots of a given size are coated onto the backing material/film.

However, in the embodiment of in Fig. 1, the pattern-defining material 100 (dots or other discontinuous patterns) is provided on a backing material/film 102 as a uniform layer 103 by means of a coating unit 104. Downstream the coating unit 104, a pattern-defining tool 106 (dot forming unit) may be provided. The outer surface 108 of the pattern-defining tool 106 defines the predetermined pattern (i.e. a pattern identical to the pattern of the adhesive layer in the final product). When the outer surface 108 is forced into contact with the backing material/film 102, a part of the pattern-defining material is displaced whereby the inverse pattern 110 is defined.

The second step involves coating on a liquid adhesive up to the upper surface of the dots. And further render it form stable.

The second step of a continuous manufacturing method of the invention may have a set up as illustrated in Figure 2.

Downstream pattern-defining tool 106, the adhesive 112 in liquid form and of initially low viscosity (e.g. less than 100 Pa·s) is added, e.g. by being poured out
5 through a slit-shaped opening of an adhesive supply unit 114. Pumps and static mixers (not shown) may be provided for feeding the adhesive 112 out through the slit-shaped opening.

In order to create a smooth coating with a predetermined thickness a smoothening unit 115 (e.g. die slot, doctors knife) is provided. A press may also
10 be used to produce the right spread and coating thickness. It will be appreciated that by pouring the adhesive 112 on to the backing surface 102 which carries the inverse pattern 110 of pattern-defining material 102, the spaces 116 between the pattern defining material will be filled with the adhesive 112, which thus defines the predetermined pattern 118.

15 The gelation, or increase in viscosity of the adhesive material to form stable state should be fast i.e. within minutes or even seconds.

In order to cure the adhesive 112, an energy source 120 may be provided. The energy source may be a microwave unit and/or a heating unit and/or an UV unit, and the unit may be arranged to emit the energy from any direction, e.g. a
20 position above or below the backing film/material 102 and the adhesive 112 as is illustrated in Fig. 2.

Post-curing of the form stable adhesive material is also a possibility. By post curing is meant at a position and/or point time different from the position/point in time at which the adhesive is subjected to the energy source 120.

25 A result of the process, i.e. an adhesive layer with dot patterns is illustrated in Figure 3.

Fig. 3 discloses the backing film/material 102 on which the pattern-defining material 100 is provided in the inverse pattern 110. In the embodiment of Fig. 3, the inverse pattern 110 comprises a plurality of separate dot structures each of which define the edges 122 of the patterns of the adhesive coating 112.

- 5 It will be appreciated that the lines 124 are only provided for illustrative purposes in order to enhance the three-dimensional perception of figure.

The dot structures (the inverse pattern) may cover perforations (not shown) provided in the backing film 102. This will increase the permeability of the final product, i.e. when the dot structures have been removed. During manufacture,
10 the latter perforations are blocked by the dot structures so that during adhesive coating, the adhesive is prevented from flowing into the perforations.

Figures 4-5 illustrate top view of two alternative net-shaped adhesive layers 102-108 manufactured according to the invention. In the embodiment of Fig. 4, the pattern-defining material 116 is applied in rows of circular units (dot
15 structures), whereas the cross-section of the pattern-defining material 116 is quadrangular in the embodiment of Fig. 5.

The discontinuous pattern or adhesive free surfaces may be of any shape or size and distributed in any way desirable. The edges of the shapes define the edges of the adhesive patterns.

- 20 One advantage of the present invention is that contrary to conventional methods, the method of the present invention does not generate waste in adhesive form, as the adhesive is only applied to the area of the predetermined pattern.

By contrast, conventional methods typically rely on punching holes/indentations
25 in a sheet of adhesive. Accordingly, conventional methods generate adhesive waste, which both contributes to the cost of the product and process problems due to possible residues in the holes/perforations.

Alternatively, the dot structures 110 (the pattern-defining material of the inverse pattern) may be added to the adhesive layer 112 after coating and before it becomes form-stable.

5 The dots 110 (the pattern-defining material of the inverse pattern) may be added in a pre-defined way or randomly via a dropping device, shot onto the surface with a gas or air jet.

The dot structures 110 (the pattern-defining material of the inverse pattern) may be hollow or filled with gas and/or liquid. Hollow dots could be expanded particles which are pre-expanded or expanded during manufacture.

10 In one embodiment, of the invention the pattern is made from 3D dot structures.

The dot structures 110 (the pattern-defining material of the inverse pattern) may be totally or partially removed by evaporation, decomposition, shrinkage during the manufacturing process, such that the backing layer is exposed at the
15 position at which the dots were provided prior to evaporation.

In one embodiment, the dot structure or the discontinuous patterns (the pattern-defining material of the inverse pattern) is dissolved by heat or moisture.

20 In another embodiment, the dot structure or the discontinuous patterns (the pattern-defining material of the inverse pattern) is evaporated during manufacture leaving spaces at the position at which the dots were provided prior to evaporation.

In yet another embodiment, the dot structure or the discontinuous patterns (the pattern-defining material of the inverse pattern) is evaporated during
25 manufacture leaving hollow matrixes, e.g. hollow foam, at the position at which the dots were provided prior to evaporation.

In an even further another embodiment, the dot structure or the discontinuous patterns (the pattern-defining material of the inverse pattern) is a hollow matrix.

- 5 In another embodiment, of the invention the dot structure or the discontinuous patterns (the pattern-defining material of the inverse pattern) is dissolvable or meltable at skin temperature or upon contact with moisture.

In another embodiment, of the invention the dot structure or the discontinuous patterns (the pattern-defining material of the inverse pattern) is absorbent at skin temperature or upon contact with moisture.

- 10 For handling purposes, a release liner may be placed on the adhesive surface subsequent to forming the adhesive.

Release liner may suitably be coated with a release coating, e.g. silicone.

The backing films may be organic or synthetic, woven or non woven materials. They may be patterned or textured.

- 15 In one embodiment, an adhesive sheet comprises a predetermined pattern made according to the invention.

- 20 In another embodiment of the invention an adhesive sheet comprises patterned adhesive where the discontinuous patterns define empty spaces, surfaces without adhesive wherein these spaces resulted from evaporation or removal of dot masses during manufacture.

A dressing according to the invention can be made from the patterned adhesive sheet.

The dressing may be any shape, e.g. round or rectangular.

The backing layer may comprise the patterned adhesive on a wound facing side of the backing layer. In a centre area of the dressing an absorbent core may be provided, e.g. a hydrophilic PU foam.

5 In one embodiment, the dressing comprising an absorbent core and the adhesive layer may be shaped and arranged such that the patterned adhesive layer extends beyond the borders of the absorbent core.

The dressing may be characterised in that the adhesive layer extends beyond the edges of the core. The patterned adhesive on this layer eliminates leakage problems.

10 Figure 6 illustrates a sectional view taken along a line in the middle from one edge to the opposite edge of the dressing.

Figure 7 illustrates a sectional view of another embodiment in which a central zone of the backing layer 102 and the adhesive defines a cavity of accommodation of an absorbent core 126, thus creating a substantially flat the wound facing surface .

15

The absorbent core 126 may be attached to the backing layer 102 by adhesive or welding. In one embodiment, the absorbent core 126 is attached to the backing layer 102 by means of the adhesive 112,118 provided on the surface of the backing layer 102. Alternatively, or as a supplement, the absorbent core 126 may be attached to the backing layer 102 by means of another adhesive, whereby. The absorbent core 126 may be attached (by welding or adhesive) in spots or on the entire surface facing the backing layer 102.

20

The adhesive layer may be flat or pushed back so that the wound facing surface is flat. The sides of the core may also be sealed by adhesive or welding to the backing layer.

25

In one embodiment a contact layer (not shown) is provided on the wound facing surface of the absorbent core 126. The contact layer may be adapted to make

removal of the wound dressing easier, e.g. by preventing ingrowth between the wound surface and the absorbent core. In one embodiment, the contact layer defines a surface containing a hydrogel. The contact layer may be provided totally or partially on the surface of the absorbent core 126.

- 5 In one embodiment, the dot structures (the pattern-defining material of the inverse pattern) are not removed during manufacture, but remain in the adhesive. In the latter embodiment, the dot structures may be adapted to melt or dissolve when brought into contact with the skin of a user and thus exposed to moisture. It will be appreciated that upon dissolving or melting, the flexibility
10 of the adhesive 112 and the backing film 102 increases.

EXAMPLES

The invention will now be described with reference to the examples.

Example 1

Adhesive with porous pattern.

- 15 An sheet of adhesive defining circular perforations each of which had a diameter of 5 mm were provided. The total area of the perforations constituted 30% of the total area of the sheet of adhesive. The indentations were provided such that the distance between the centres of any two neighbouring indentations were 8.6 mm. The indentations were provided in parallel rows, and the adhesive
20 contained a polymer gel.

Procedure of making a pattern on a film surface.

- On top of a PU film (Scapa Bioflex, 25 μm in thickness) a 200 μm PVC film was provided. The 200 μm PVC film had the above characteristics, i.e. perforations: of 5 mm in diameter, being provided in parallel rows, the distance between the
25 centre of any two neighbouring perforations being 8.6 mm and the PVC film containing a polymer gel.

The PVC could advantageously be loosely fixated with an adhesive to the PU film i.e. fixated so as to be removable without leaving any adhesive on the surface of the PU film. A gel with high water content (such as more than 50%) e.g. CMC, was poured onto the PVC film and surplus of material was scraped off leaving only the holes filled. The PVC was then removed leaving the dots of gel material on the PU film surface. The gel used was Purilon (Coloplast)

Coating of pattern material.

The PU film with pattern of a gel was then coated with an adhesive. A silicone adhesive, 7-9800 from Dow Corning is made according to recommendation of Dow Corning and coated on top of the PU film with dot patterns. The coating blade (the doctors knife for removing excess material) was set to remove adhesive provided above the upper surface of the dots.

The silicone coated A4 size PU film with dots was placed in oven so as to cure the silicone.

During curing, water contained in the dots evaporated whereby the predetermined pattern of porous silicone adhesive emerged.

After cure a suitable release liner was placed on top of the adhesive.

Example 2

Adhesive with hydrophilic pattern.

Example 2 corresponds to Example 1 with the exception that the hydrophilic material of Example 2 is the material PEG 2000, and the polymer dots remain in place after curing. The adhesive layer had the same characteristics as in Example 1, i.e. perforations of 5 mm in diameter, perforations being provided in parallel rows, the distance between the centres of any two neighbouring perforations being 8.6 mm. The adhesive was a hydrophilic polymer.

On top of a PU film (Bioflex 25 µm from Scapa) was placed a 200 µm PVC film which had a pattern of holes/indentations. The PVC was loosely fixated with an adhesive to the PU film. Melted hydrophilic material PEG 2000 was poured onto the PVC film and surplus of material was scraped off leaving only the holes filled.

- 5 Upon cooling, the PVC was removed leaving the solidified dots on the PU film surface.

Coating of pattern material.

- The PU film with pattern coating of PEG dots was then coated with an adhesive. A silicone adhesive, 7-9800 from Dow Corning was made according to the
10 recommendations of Dow Corning, and coated on top of the PU film with dot patterns. The coating blade (the doctors knife for removing excess material) was set to remove adhesive provided at the level above the upper surface of the dots.

- The silicone coated A4 size PU film with dots was placed in oven to let the
15 silicone cure.

After curing a suitable release liner was placed on top of the adhesive.

Adhesive with porous pattern

Example 3

- The pattern of Example 3 was made in the same manner as in Example 2,
20 however with the difference that the diameter of the perforations were 3 mm holes. The total area of the perforations constituted 30% of the total area of the sheet of adhesive. The indentations were provided such that the distance between the centres of any two neighbouring indentations were 5 mm. The indentations were provided in parallel rows.

- 25 The adhesive used was a polypropylene oxide adhesive (as described in patent WO2005/032401A2). The components (96.6% Allyl-terminated polyether

(polypropylene oxide), viscosity 16 Pa.s., 3.3% Poly-alkyl hydrogen siloxane curing agent, 0.1% catalyst, Pt-VTS, Pt-divinyl tetramethyl disiloxane, 3% Pt in IPA) of the adhesive are mixed well together before coating.

Example 4

- 5 The pattern of Example 4 was made in the same manner as in Example 2. The adhesive used was a polypropylene oxide adhesive (as described in patent WO2005/032401A2). The components (96.6% Allyl-terminated polyether (polypropylene oxide), viscosity 16 Pa.s., 3.3% Poly-alkyl hydrogen siloxane curing agent, 0.1% catalyst, Pt-VTS, Pt-divinyl tetramethyl disiloxane, 3% Pt in
10 IPA) of the adhesive were mixed well together before coating.

Reference 1

- A PU film without any dot patterns was coated with an adhesive. A silicone adhesive, 7-9800 from Dow Corning was made according to the recommendations of Dow Corning and coated on top of the PU film. The coating
15 blade was set such that the thickness of the final adhesive coat was 200 µm.

The silicone coated PU film was placed in oven to let the silicone cure.

After cure a release liner was placed on top of the adhesive.

Reference 2

- Procedure was identical to that of Reference 1, however with the difference that
20 the adhesive used was a polypropylene oxide adhesive (as described in patent WO2005/032401A2). The components (96.6% Allyl-terminated polyether (polypropylene oxide), viscosity 16 Pa.s., 3.3% Poly-alkyl hydrogen siloxane curing agent, 0.1% catalyst, Pt-VTS, Pt-divinyl tetramethyl disiloxane, 3% Pt in IPA) of the adhesive were mixed well together before coating.

The pattern coated adhesives were tested for permeability according to EN13726-2 section 3.3. Below Examples 1 and 2 are compared with reference 1. Examples 3 and 4 are compared with reference 2. Compared to the references, the invention examples show higher permeability.

Sample	Permeability g/m ² /24h]
Example 1	310
Example 2	304
Example 3	836
Example 4	716
Reference 1	260
Reference 2	593

CLAIMS

1. A method for manufacturing an adhesive layer defining a predetermined pattern, the method comprising the steps of:

- 5 – providing on a backing layer a pattern-defining material, the pattern-defining material being provided in an inverse pattern which is inverse relative to the predetermined pattern;
- coating an adhesive in liquid form onto the backing layer such that an upper surface each of the adhesive material and the pattern-defining material are at the same level; and
- 10 – rendering the adhesive to a form-stable state.

2. The method according to claim 1, further comprising the step of removing at least a part of the pattern-defining material.

3. The method according to claim 1, wherein the inverse pattern defines a three dimensional pattern.

- 15 4. The method according to any of the claims 1-3, wherein the pattern-defining material is dissolvable by heat and/or moisture.

5. The method according to any of the claims 1-3, further comprising the step of evaporating the pattern-defining material whereby spaces in the adhesive are defined in the areas of the evaporated pattern-defining material.

- 20 6. The method according to any of the claims 1-3, further comprising the step of partially evaporating the pattern-defining material whereby a hollow matrix is defined in the areas of the partially evaporated pattern-defining material.

7. The method according to any of the claims 1-6, wherein the pattern-defining material is adapted to dissolve when subjected to a temperature corresponding to the skin temperature of a living being.

5 8. The method according to any of the claims 1-3, wherein the pattern-defining material is an absorbent material, which is absorbent at skin temperature or upon contact with moisture.

9. An adhesive sheet with patterned adhesive, wherein the adhesive defining a predetermined pattern is manufactured by means of the method according to any of the claims 1-7.

10 10. A wound dressing comprising an adhesive sheet according to claims 9, which adhesive sheet defines a predetermined pattern.

11. The wound dressing according to claim 10, further comprising an absorbent core and wherein the absorbent core is provided centrally on the adhesive layer, such that the adhesive layer extends beyond a rim portion of the absorbent
15 core.

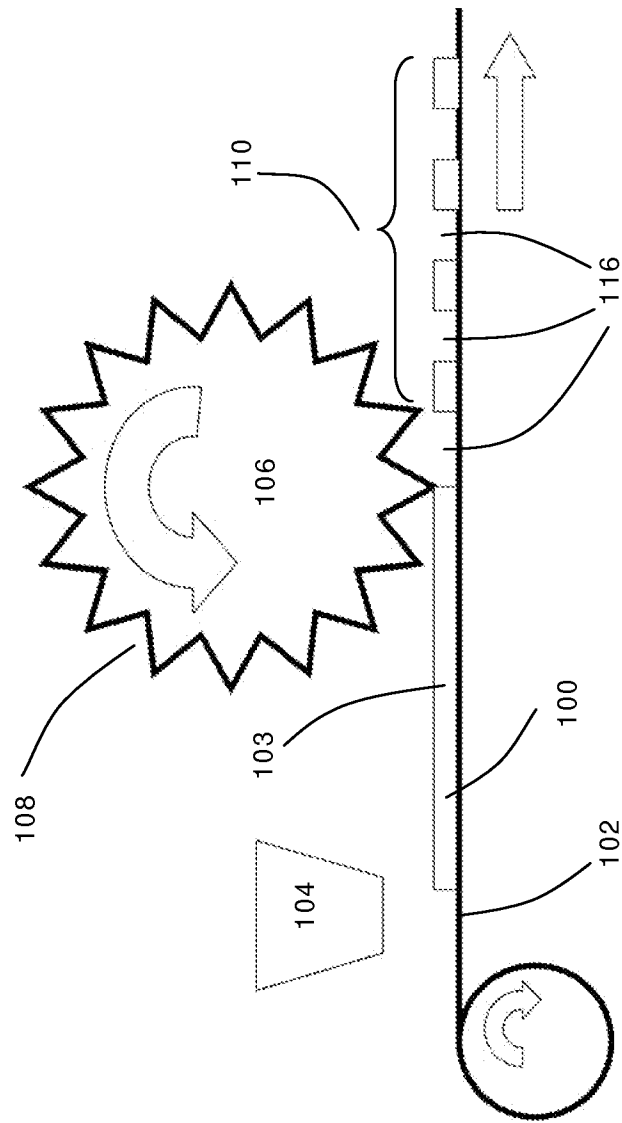


Fig. 1

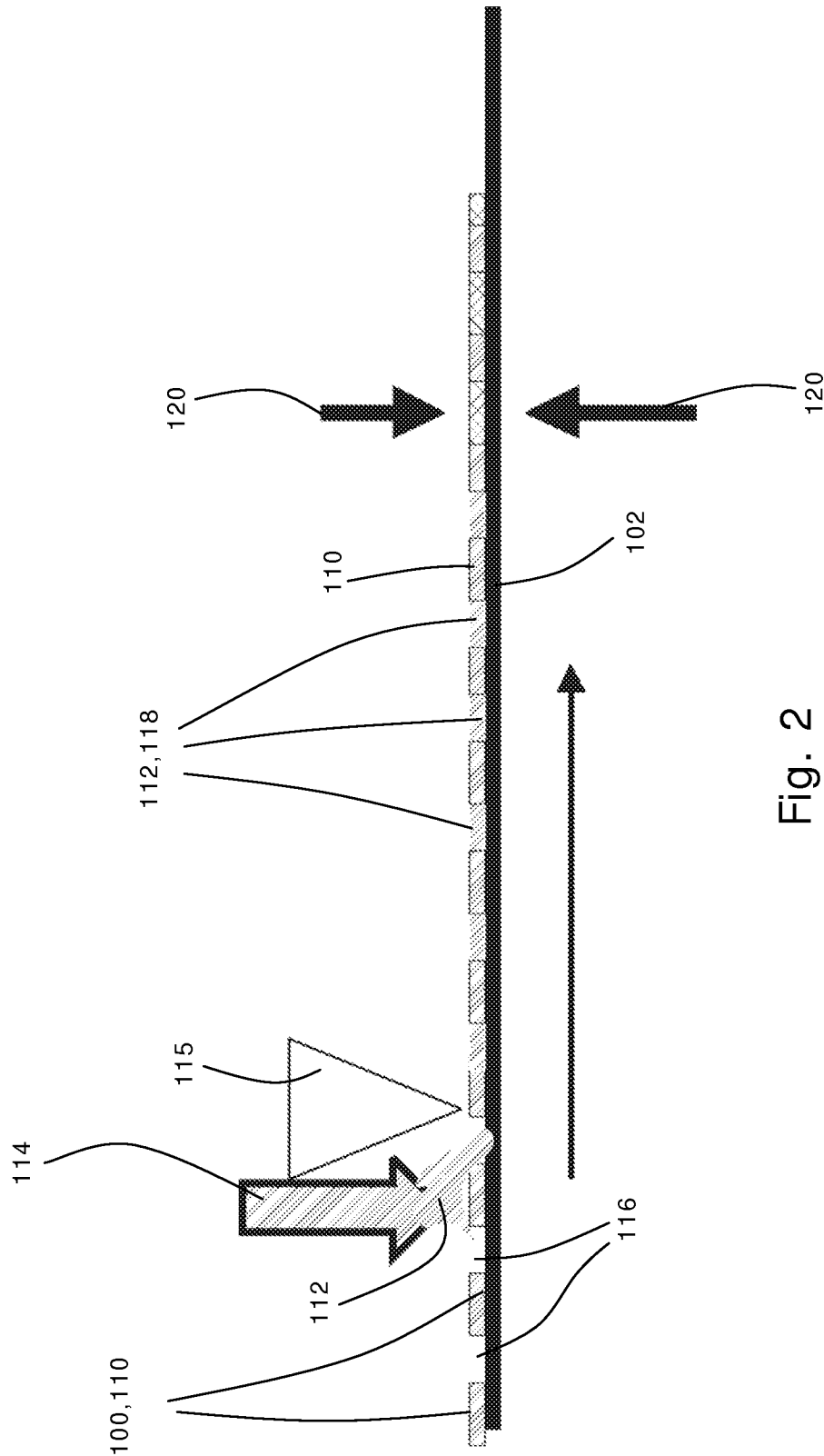


Fig. 2

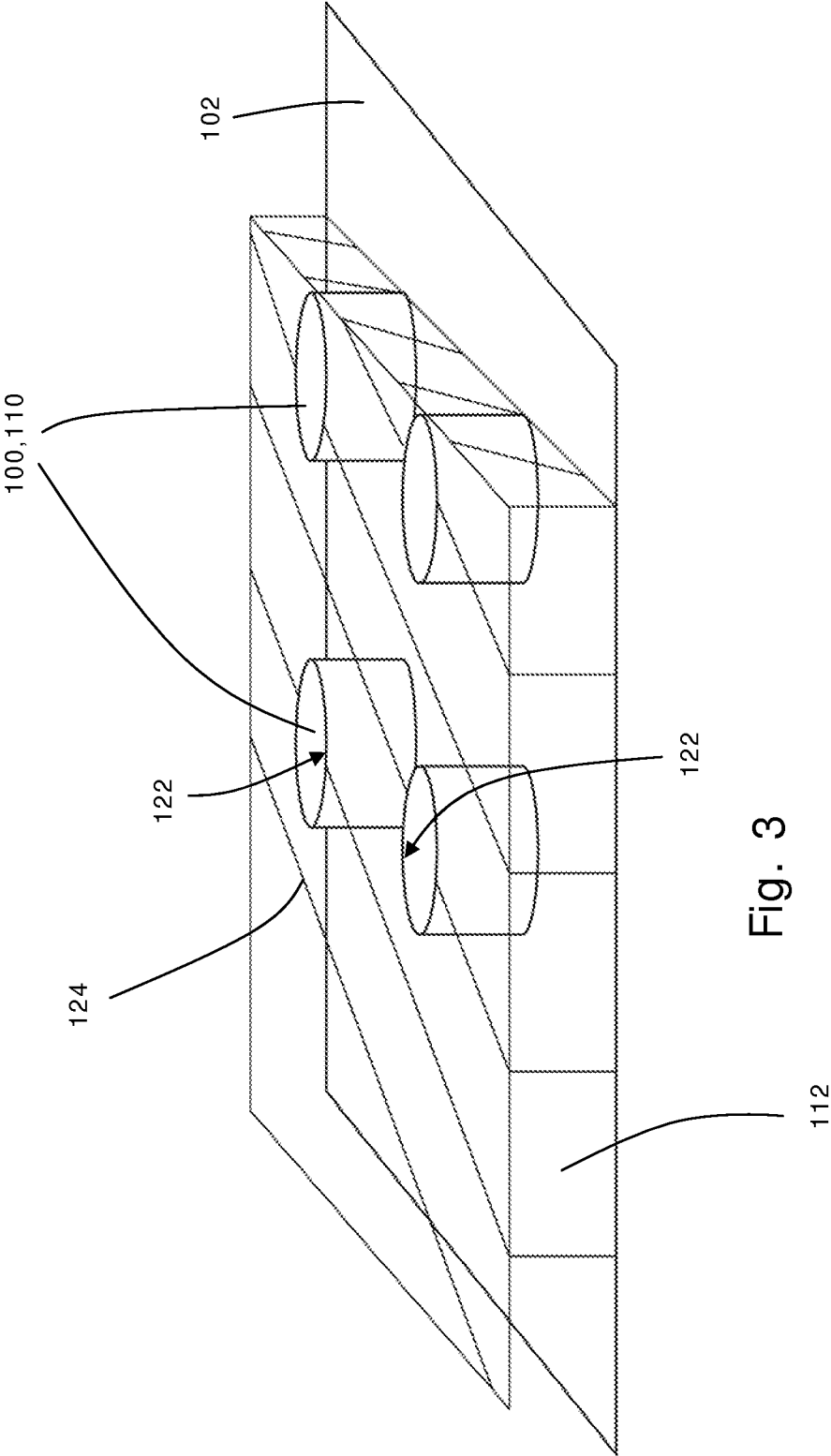


Fig. 3

4/5

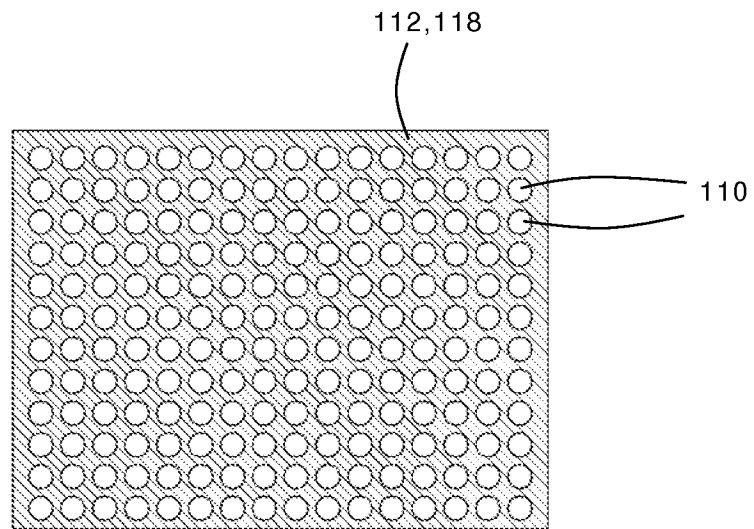


Fig. 4

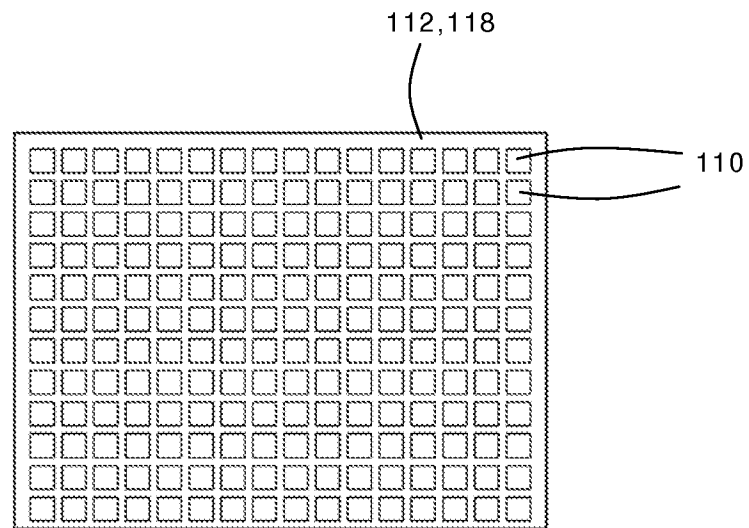
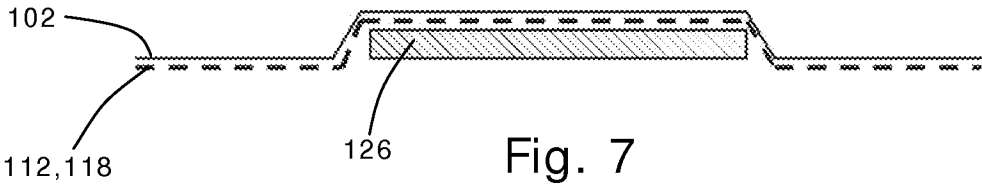
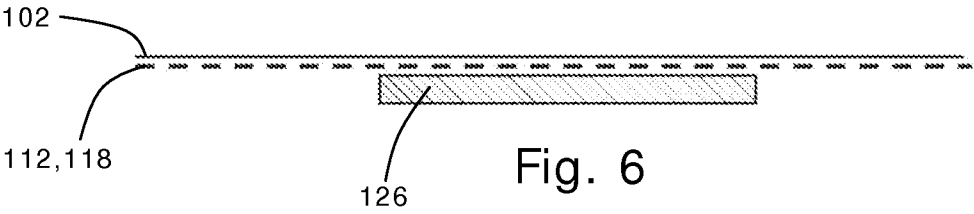


Fig. 5



INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2008/056891

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61F13/02 A61F13/00

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)
A61F

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 practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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X A	GB 2 425 487 A (DOW CORNING [US]; POLYMER SCIENCE INC [US]) 1 November 2006 (2006-11-01) paragraphs [0004] - [0006], [0010] - [0013] -----	9-11 1

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Further documents are listed in the continuation of Box C.

☒

See patent family annex.

* Special categories of cited documents:

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- *O* document referring to an oral disclosure, use, exhibition or other means
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- *&* document member of the same patent family

Date of the actual completion of the international search

23 July 2008

Date of mailing of the international search report

22/08/2008

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2008/056891

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