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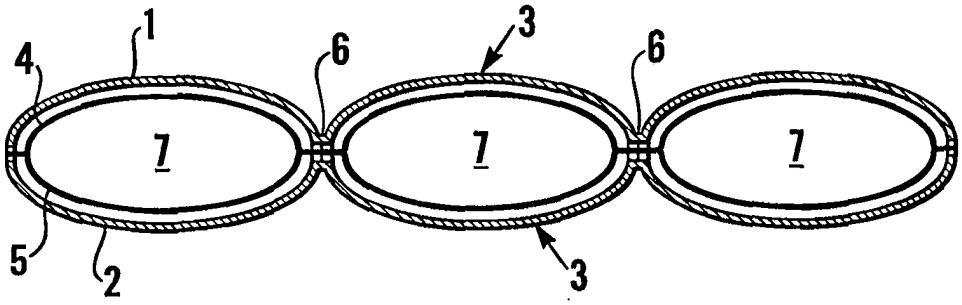
(54) Title: A LIQUID-ABSORBENT ARTICLE



(57) Abstract

A liquid-absorbent article comprises, in one embodiment, a multi-layered fabric comprising a liquid-permeable outer layer (1) and a liquid-permeable or impermeable outer layer (2), both formed into a plurality of small hollow protuberances (3) and joined together at areas (6) between the protuberances, so as to form a plurality of small, hollow enclosures. Two liquid-absorbent layers (4, 5) are formed around the inner surfaces of the protuberances (3) and the internal space (7) formed by the protuberances (3) is left empty. The article may be used, for example, as a disposable towel. In other embodiments, the protuberances may be formed on one surface only and stiffer layers may be provided to make it suitable for use, for example, as a disposable floor mat.

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A LIQUID-ABSORBENT ARTICLE

This invention relates to a liquid-absorbent article, in particular of the type such as disposable towels, nappies, panties, floor mats, etc.

In the field of hairdressing, although disposable towels are known, it is still common practice to employ re-usable towels made of conventional cotton terry towelling material. This is because, in hairdressing, the towel is used to blot wet hair of excess water and to drape around the person's neck and shoulders in order to prevent their clothes and skin from becoming wet, covered in hair clippings and irritated by any chemicals used, and most known disposable towels tend to be thin and do not have the soft, pliable feeling of a conventional re-usable towel. However, the conventional re-usable cotton terry towel also has disadvantages which include remaining damp or wet on its surface; being a trap for hair clippings; becoming quickly stained, torn and shoddy; and needing to be boil washed to ensure that fungi, bacteria and residue chemicals are not transmitted from one user to another.

It is therefore an object of the present invention to provide a liquid-absorbent article which may form, inter alia, an efficiently absorbent, disposable towel having a similar thick and soft feeling as a conventional re-usable towel.

Accordingly, the present invention consists in a liquid-absorbent article characterised in that at least one surface of said article comprises a plurality of hollow, liquid-permeable protuberances each containing a liquid-absorbent material.

The liquid-absorbent article may comprise at least two layers of material with at least one of the layers being a liquid-permeable outer layer, the or each liquid-permeable layer being shaped to form said protuberances.

In one example, the article may comprise two outer layers both forming said protuberances and arranged so that the protuberances of the layers are aligned with each other and face outwardly away from each other, aligned protuberances of the layers forming hollow enclosures containing said liquid-absorbent material. Both layers may be liquid-permeable, or alternatively one layer may be liquid-permeable and the other layer may be liquid-impermeable. This example is well-suited to forming a towel, as the materials used for the layers can be selected so as to give the towel a soft feel and make it sufficiently flexible to enable it to be draped around a person's neck in the manner of a conventional re-usable towel.

In another example, the liquid-absorbent article may comprise a liquid-permeable outer layer forming said protuberances, a liquid-impermeable outer layer, and at least one intermediate layer which is less flexible than the liquid-permeable outer layer and made, for example, from a sponge-like or fibrous material. This example thus provides a stiffer article having one absorbent surface and is suitable for use as a floor mat, such as the type used in bathrooms.

The liquid-absorbent material contained within each protuberance may comprise at least one layer of said material, which may be provided over an inner surface of each protuberance, whilst the remaining internal volume of each protuberance is left empty. Alternatively, the liquid-absorbent material may comprise a plurality of absorbent micro-pellets contained within each protuberance.

The invention will now be described by way of examples with reference to the accompanying drawings, in which:-

Figure 1 shows a plan view of a first embodiment of the invention;

Figure 2 shows a side view of the first embodiment;

Figure 3 shows an enlarged sectional view of the first embodiment, with the layers thereof separate;

Figure 4 shows an enlarged sectional view of the first embodiment, with the layers thereof together;

Figure 5 shows a sectional view of a second embodiment;

Figures 6 and 7 show sectional and plan views, respectively, of a third embodiment;

Figures 8 and 9 show sectional and plan views, respectively, of a fourth embodiment;

Figures 10 and 11 show sectional and plan views, respectively, of a fifth embodiment;

Figures 12 and 13 show an enlarged sectional view and plan view, respectively, of a sixth embodiment; and

Figure 14 shows a plan view of a seventh embodiment of the invention.

Referring firstly to the embodiment shown in Figures 1 to 4, there is provided a multi-layered fabric comprising two flexible, thin outer layers 1, 2 with the layer 1 being liquid-permeable and the layer 2 being either liquid-permeable or liquid-impermeable. Both layers 1,2 are shaped so as to form a plurality of small, hollow protuberances 3 and the layers 1,2 are arranged relative to each other such that the protuberances of the layers are in alignment with each other and face outwardly away from each other. Two thin inner layers 4,5 of a liquid-absorbent material are also shaped so as to cover and conform to the inner

surfaces of the outer layers 1,2. The four layers are joined together, such as by bonding, gluing, welding or compressing, in areas 6 between the protuberances 3 so as to form small bubble-like enclosures which are hollow in their central interiors 7.

The protuberances of each layer 1,2 may be formed in any suitable two-dimensional pattern as shown in Figure 1, and the bubble-like enclosures formed are preferably approximately the size shown in Figure 2, i.e. having a diameter of approximately 7mm and a maximum height of approximately 2-3mm, and are preferably no greater than a diameter of approximately 14mm and a maximum height of approximately 4-6mm.

In use of the multi-layered fabric of Figures 1 to 4, liquid will pass through the or each liquid-permeable outer layer 1,2 and will be absorbed by the absorbent layers 4,5 which can expand within the hollow space 7 inside each enclosure. The hollow spaces can also retain any liquid which may pass out of the absorbent layers 4,5 once they have been saturated. The multi-layered fabric is therefore highly absorbent with the protuberances providing a greater absorbent surface area than a flat absorbent area of the same size. Furthermore, the protuberances provide a soft feeling and make the fabric very flexible, and the fabric can also be easily cut to any required size or shape.

The outer liquid-permeable layer or layers 1,2 may comprise a micro-thin layer of a plastics material, which itself is non-porous, smooth and slightly elastic, having micro-sized holes laser cut or pressed out to make the material liquid-permeable. The holes are preferably conical or frusto-conical in shape, which allows less, if any, water to pass back out of the layer.

The liquid-absorbent layers 4,5 may be made from any suitable super-absorbent material.

The liquid-impermeable outer layer 2 is preferably also made of plastics material and has at least one of the properties of softness, flexibility, slight non-slip resistance, and water-proofing.

In all of the following alternative embodiments, like features are labelled with like reference numerals with respect to Figures 1 to 4.

Figure 5 shows a second embodiment of the fabric comprising a liquid-permeable layer 1 and a liquid-impermeable layer 2 with the protuberances 3, of a bubble-or blister-like shape, being formed by the liquid-permeable layer only. The hollow interior 7 of each protuberance 3 contains a plurality of highly-absorbent micro pellets 8 slightly larger in size than the holes in the liquid-permeable layer 1. The hollow interiors of the protuberances 3 are not completely filled with the micro-pellets 8, so that there is space for the micro-pellets to expand as they absorb liquid and to accommodate excess liquid when the micro-pellets are saturated. The looseness of the micro-pellets in the protuberances 3 also adds to the flexibility of the fabric. The micro-pellets may be made of hydrolysed algae, charcoal, sawdust, wood pulp, crystals, or a combination of any of these materials.

Three further embodiments shown in Figures 6 to 11 illustrate alternative shapes of protuberances other than the dome-shaped protuberances shown in Figures 1 to 5, and also different patterns of the two-dimensional array of hollow enclosures formed by the protuberances. More specifically, Figures 6 and 7 show conical protuberances and Figures 8 and 9 show frusto-conical protuberances, both arranged in a honeycomb pattern, and Figures 10 and 11 show hemispherical protuberances arranged in a staggered pattern. All three of these embodiments comprise the liquid-permeable layer 1, the liquid-permeable or impermeable layer 2 and the micro-pellets 8, and the protuberances 3 are formed by both layers 1 and 2. However, the protuberances may only be formed in the

liquid-permeable layer 1, and/or they may contain one or more absorbent layers 3, 4 or other absorbent material instead of the micro-pellets.

The embodiment shown in Figures 12 and 13 may comprise an absorbent mat which is stiffer than the fabric of the above-described embodiments. The mat comprises an upper liquid-permeable outer layer 1 formed into hollow protuberances 3 containing a loose filling of absorbent micro-pellets 8, two intermediate layers 9, 10, and a lower outer liquid-impermeable layer 2. The intermediate layer 9 is preferably made of a sponge-like or fibrous material to add more absorbency to the mat, and the other intermediate layer 10 is preferably made of a thicker sponge-like or fibrous material to add more strength to the mat.

The embodiment shown in Figure 14 schematically illustrates the multi-layered fabric of any of the embodiments shown in Figures 1 to 11, and the fabric has been cut to form a slot 11 and a central aperture 12 so as to make it suitable for use as a hairdressing towel or cape to be arranged around the neck of a person. A strip 13 of a water-proof film, such as polyvinyl, preferably about 3 cm wide, is attached around the periphery of the aperture 12 so as to create a substantially water-tight seal around the person's neck, and the towel is secured by any suitable fastener 14, such as Velcro or adhesive, along the slot 11. The towel advantageously stays dry to the touch whilst in use; does not disintegrate when wet; is more absorbent than a conventional cotton terry towel; does not become impregnated with hair clippings; can provide a water-tight seal around a person's neck; and, because of its disposability, does not transmit fungi, bacteria or residue chemicals from person to person.

The present invention thus provides a highly absorbent, preferably disposable article which can be used in many different applications, including bath or hand towels, bathroom floor mats, nappies, panties, sanitary towels, panty liners, animal cage liners or pet litter liners. The term "article" is intended to

encompass a multi-layered fabric as described hereinabove, any item made of the fabric, and any other liquid-absorbent item including the features of the following claims. The protuberances on one or more surfaces of the article can be formed in many other ways, such as by quilting.

CLAIMS

1. A liquid-absorbent article, characterised in that at least one surface (1) of said article comprises a plurality of hollow, liquid-permeable protuberances (3) each containing a liquid-absorbent material (4, 5; 8).

2. A liquid-absorbent article as claimed in claim 1, comprising at least two layers of material (1, 2) with at least one of said layers (1, 2) being a liquid-permeable outer layer (1), said protuberances (3) being formed by the or each liquid-permeable outer layer (1).

3. A liquid-absorbent article as claimed in claim 2, comprising two outer layers (1, 2) both formed with said protuberances (3) and arranged so that the protuberances (3) of the layers (1, 2) are aligned with each other and face outwardly away from each other, aligned protuberances (3) of the layers (1, 2) forming hollow enclosures containing said liquid-absorbent material (4, 5; 8).

4. A liquid-absorbent article as claimed in claim 3, wherein both layers (1, 2) are liquid-permeable.

5. A liquid-absorbent article as claimed in claim 3, wherein one layer (1) is liquid-permeable and the other layer (2) is liquid-impermeable.

6. A liquid-absorbent article as claimed in claim 2, comprising a liquid-permeable outer layer (1) formed with said protuberances (3), a liquid-impermeable outer layer (2), and at least one intermediate layer (9, 10) which is less flexible than said liquid-permeable outer layer (1).

7. A liquid-absorbent article as claimed in claim 6, wherein said intermediate layer (9, 10) is made of a sponge-like or fibrous material.

8. A liquid-absorbent article as claimed in any preceding claim, wherein said liquid-absorbent material (4, 5; 8) comprises at least one layer (4, 5) of said material.

9. A liquid-absorbent article as claimed in claim 8, wherein said at least one layer (4, 5) of said liquid-absorbent material is provided over an inner surface of each of said protuberances (3), the remaining internal volume (7) of each protuberance (3) being left empty.

10. A liquid-absorbent article as claimed in any one of claims 1 to 7, wherein said liquid-absorbent material (4, 5; 8) comprises a plurality of absorbent micro-pellets (8) contained within each protuberance (3).

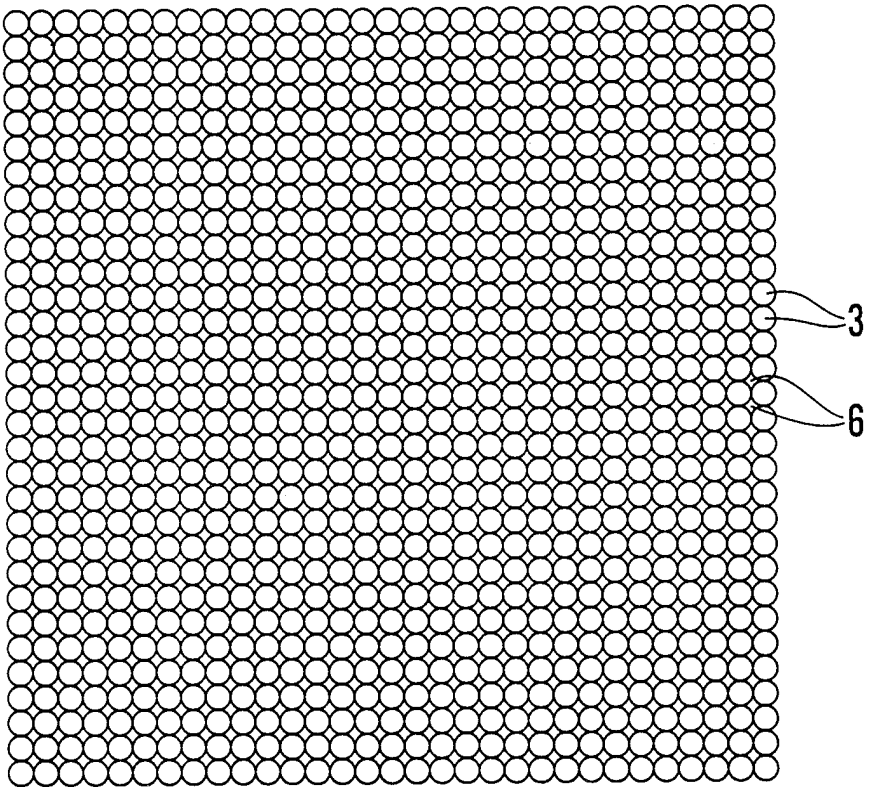

Fig.1

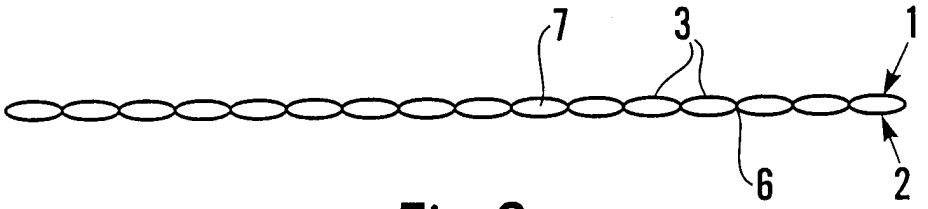

Fig.2

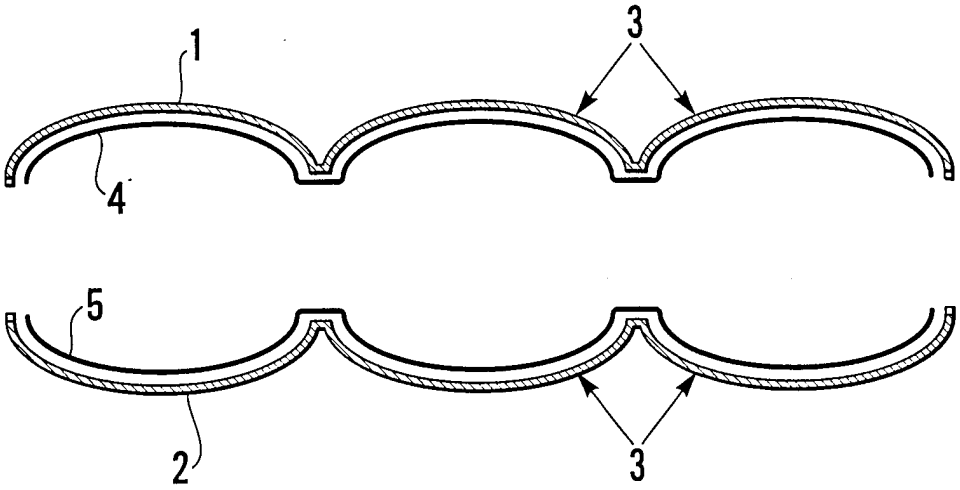

Fig.3

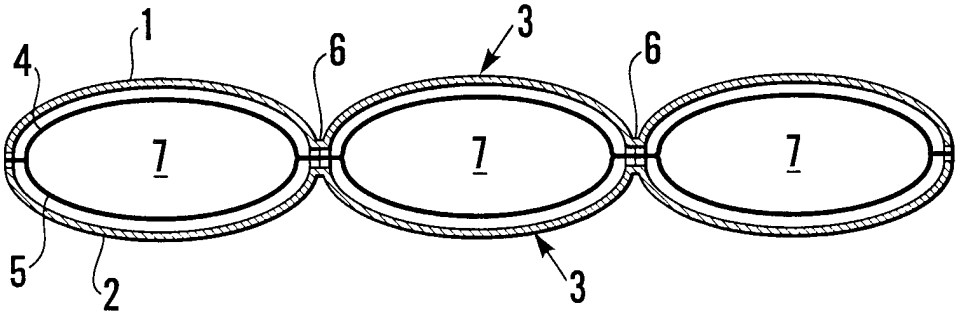

Fig.4

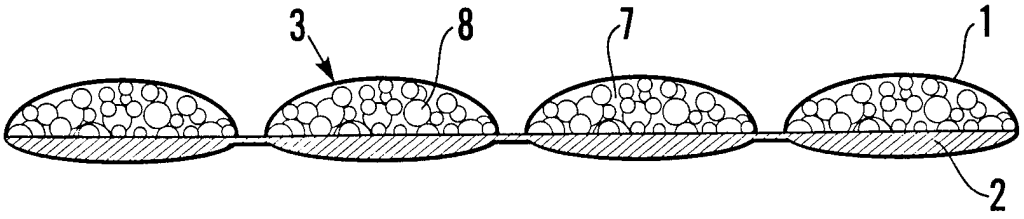

Fig.5

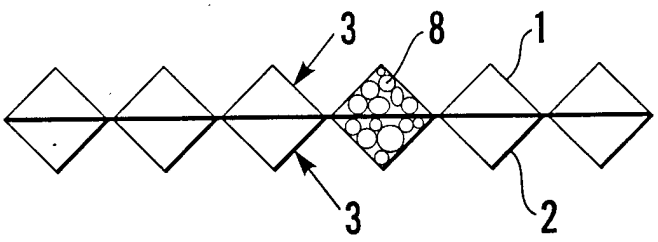

Fig.6

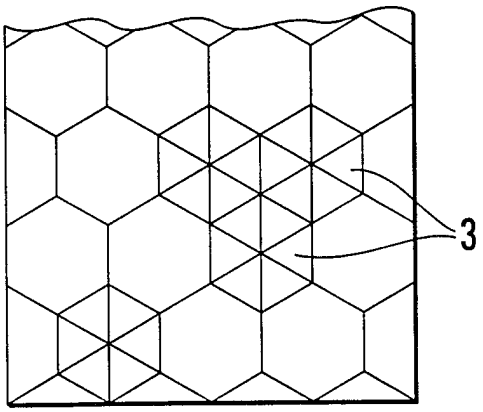

Fig.7

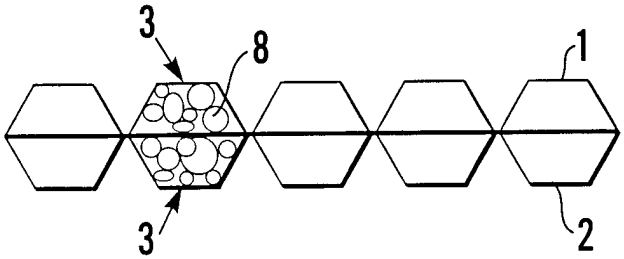

Fig.8

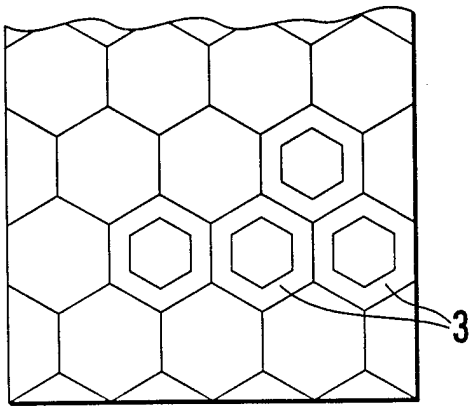

Fig.9

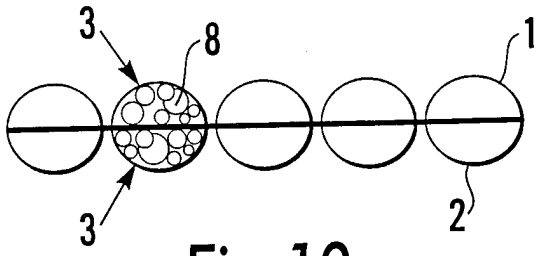

Fig.10

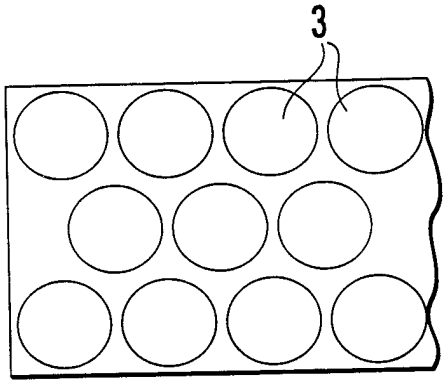

Fig.11

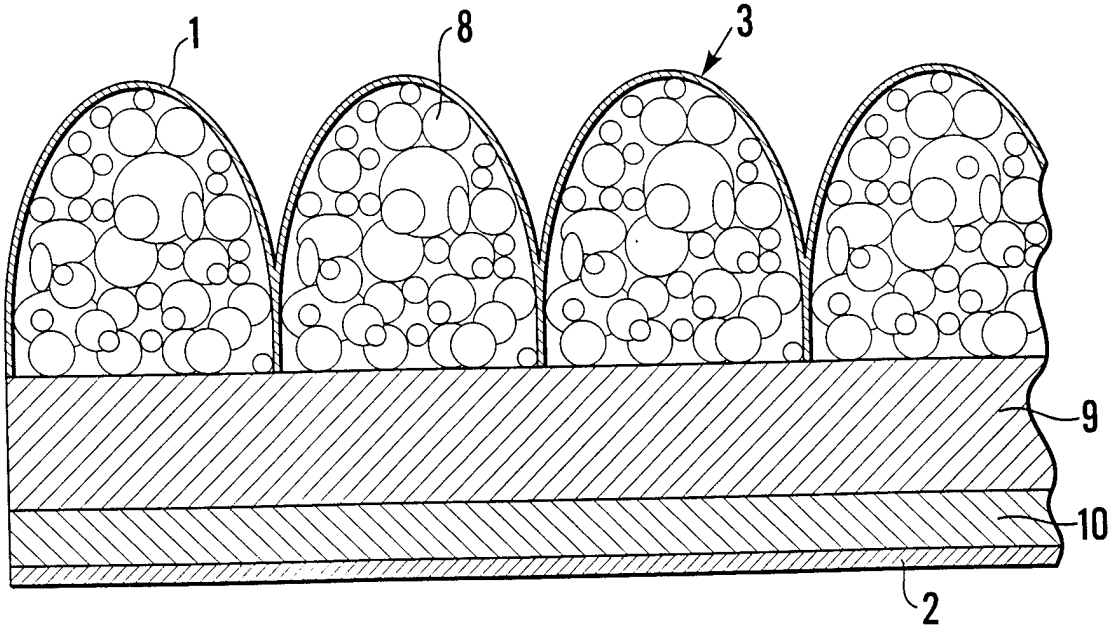

Fig.12

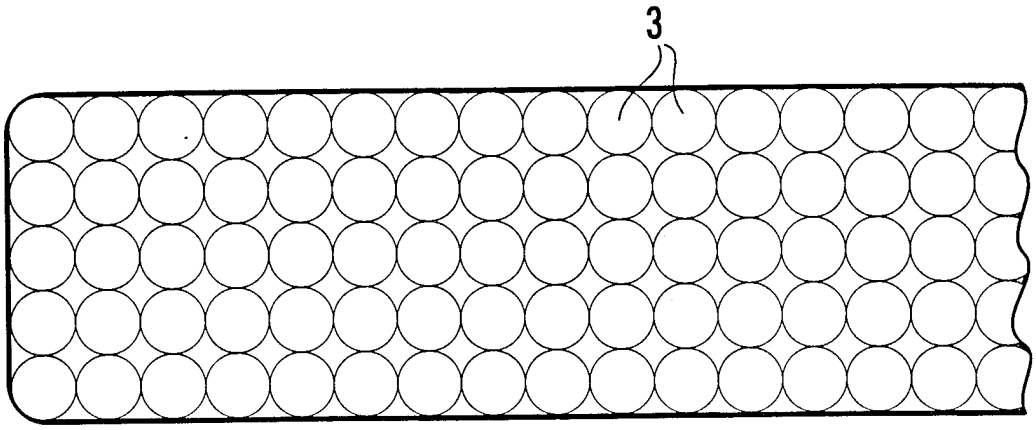

Fig. 13

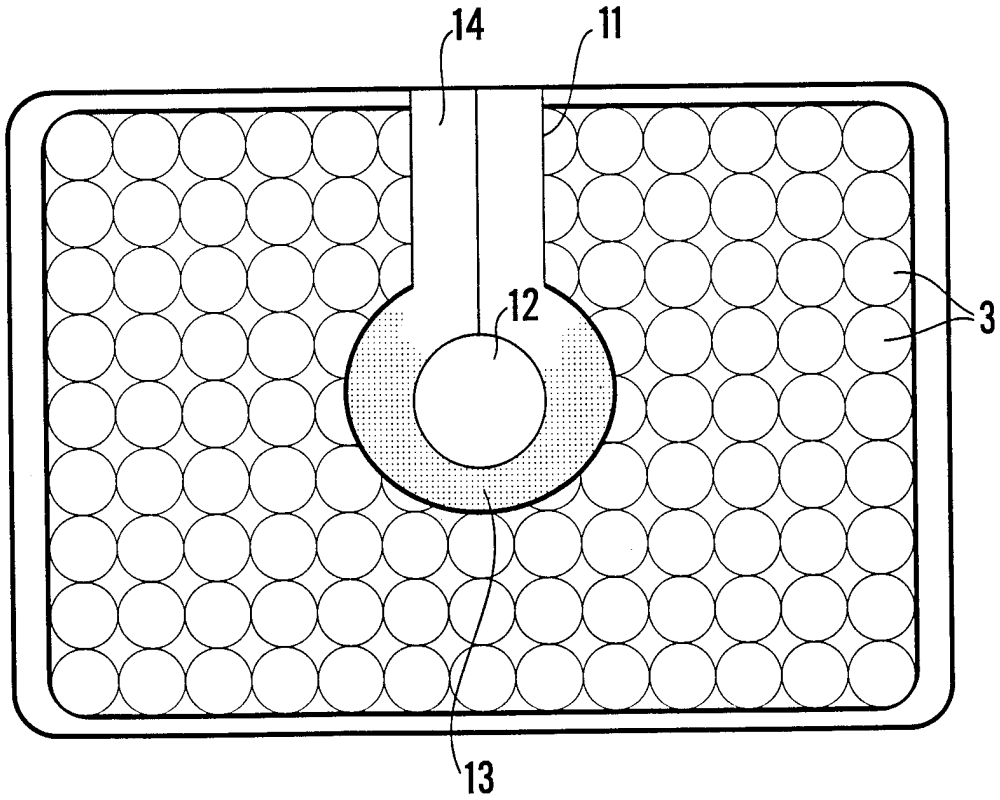

Fig. 14

INTERNATIONAL SEARCH REPORT

Inte. onal Application No
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A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 A61F13/15

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

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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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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X	DE 43 43 947 A (TEMCA CHEMISCHE UNION GMBH) 29 June 1995 see column 5, line 12 - column 7, line 63	1-3,5,9
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X	US 4 813 944 A (HANEY GLEN K ET AL) 21 March 1989 see column 3, line 11 - column 4, line 22; claims; figures	1-3,5,10

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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