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(71) Applicant (for all designated States except US): **SCA HYGIENE PRODUCTS AB** [SE/SE]; S-405 03 Göteborg (SE).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **FLOBERG, Per** [SE/SE]; Kalkstensvägen 13, S-437 32 Lindome (SE). **KINDERDAL, Mats** [SE/SE]; Åsvägen 3, S-Mölnlycke 435 41 (SE). **WÄSTLUND-KARLSSON, Jan** [SE/SE]; Eklanda Skog 155, S-431 49 Mölndal (SE). **BÄCK, Lucas** [SE/SE]; Åsbacken 2, S-427 36 Billdal (SE).

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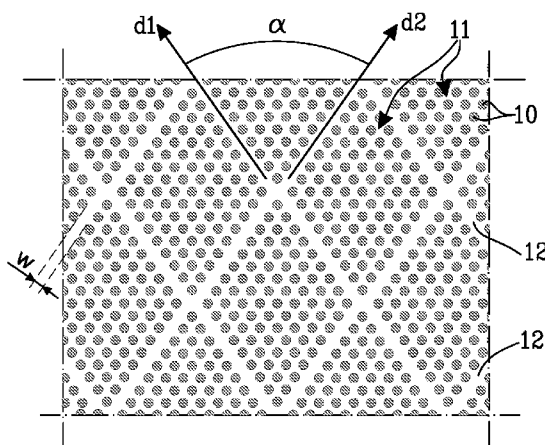


FIG. 1

(57) Abstract: An elastic laminate material comprising at least one elastic film layer and at least one nonwoven layer, said elastic film layer and said nonwoven layer being bonded together in a bonding pattern comprising a plurality of bonding elements (10), in which said elastic film and said nonwoven layer are fused together. The bonding pattern comprises bonding areas (11) spaced apart, each bonding area (11) comprising a plurality of bonding elements (10), wherein each bonding area in at least a part of the elastic laminate is separated from adjacent bonding areas by unbonded areas, said unbonded areas forming bands (12). Each band extends in at least one main direction (d1) and at least a main part of the bonding areas is each adjacent to at least two bands of unbonded areas, said at least two bands extending in at least two different main directions (d1, d2).



ELASTIC LAMINATE MATERIAL AND AN ABSORBENT ARTICLE CONTAINING THE ELASTIC LAMINATE

TECHNICAL FIELD

- 5 The present invention refers to an elastic laminate material comprising at least one elastic film layer and at least one nonwoven layer, wherein the elastic film layer and the nonwoven layer are bonded together in a bonding pattern comprising a plurality of bonding elements, in which said elastic film and said nonwoven layer are fused together. The invention further refers to an absorbent article containing the elastic laminate.

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BACKGROUND OF THE INVENTION

- Elastic laminate materials are commonly incorporated in absorbent articles, especially pant-like absorbent articles such as pant diapers, sanitary pants, incontinence pants, and the like. Such articles comprise an absorbent unit arranged in a pant-shaped chassis and
15 are worn in the manner of a pair of underpants. Elastic laminate materials may be incorporated as part of front and/or rear body panels and/or as elastic side panels in a pant-like absorbent article.

- It is known to bond the elastic laminate in a bonding pattern comprising a plurality of
20 bonding elements arranged to form a pattern of bonded and unbonded areas. Such patterns may be for aesthetical and/or functional reasons.

- US 2002/0068150 discloses a bulky laminate material having elastomeric properties and which is bonded in a bonding pattern comprising a square pattern of bonding elements
25 surrounding unbonded areas. This pattern provides a cushioning effect to the bulky laminate material.

- US 2002/0036062 discloses a nonwoven material having high elongation in a first direction and low elongation in a second direction normal to the first direction. The
30 nonwoven material is bonded in a bonding pattern comprising a plurality of bonding elements having a common orientation defining a total bonding area along the second direction greater than in the first direction.

US patent 6,093,665 discloses pattern bonded nonwoven fabric and laminates thereof. It is not stated that the nonwoven would be elastic. The bond pattern comprises a series of
5 unbonded regions in a geometric pattern of regularly bonded regions, wherein each unbonded region forms a visually recognizable pattern.

There is still a need for elastic laminate materials that provide comfort, fit and elasticity especially when incorporated as a component in an absorbent article. It is an object of the
10 present invention to provide such an elastic laminate provided by bonding of an elastic film to a nonwoven layer, wherein the bonding pattern is adapted to provide an elastic laminate that adapts to the contours of the wearer and is capable of following the movements of the wearer.

15 SUMMARY OF THE INVENTION

The invention refers to an elastic laminate material comprising at least one elastic film layer and at least one nonwoven layer, said elastic film layer and said nonwoven layer being bonded together in a bonding pattern comprising a plurality of bonding elements, in which said elastic film and said nonwoven layer are fused together, said elastic laminate
20 having a machine direction (MD) and a cross direction (CD) and is elastic in at least one of the machine direction (MD) and cross direction (CD). The bonding pattern comprises bonding areas spaced apart, each bonding area comprising a plurality of bonding elements, wherein each bonding area in at least a part of the elastic laminate is separated from adjacent bonding areas by unbonded areas, said unbonded areas forming bands,
25 each band extending in at least one main direction and wherein at least a main part of the bonding areas each is adjacent to at least two bands of unbonded areas, said at least two bands extending in at least two different main directions.

Said bands may have a minimum width of at least 2 mm. Said bands may further have a
30 minimum width of not more than 10 mm.

The laminate comprises bands having one main direction, wherein a first group of bands extend in a first main direction and a second group of bands extend in a second main direction may form an angle of between 45° and 135° to the first main direction.

Said first and second group of bands may cross each other.

The laminate may comprise bands having at least two main directions forming an angle of between 45° and 135° to each other.

5

Said bands may have a zigzag shape or wavy shape.

Said bands may extend substantially in parallel.

10 Each of said bonding areas may have an area of at least 1 cm².

The effective bonded area within each bonding area may be between 5 and 40%, preferably between 5 and 30% and more preferably between 10 and 20%.

15 The effective bonded area of the elastic laminate may be between 3 and 18%.

A plurality of bonding areas separated by bands of unbonded areas may form a visually recognizable pattern.

20 The bonding pattern may comprise at least two different types of bonding elements, wherein apertures are formed in the elastic film in close vicinity of at least some of the first type of bonding elements, said apertures being caused by rupture of the elastic film as a result by stretching during bonding and extend from the perimeter of the respective first type of bonding element and are located outside the area of the respective bonding
25 element, wherein only second type of bonding elements are located along the periphery of each bonding area.

The invention further refers to an absorbent article comprising an inner bodyside liner and an absorbent core located between the outer cover and the inner bodyside liner, wherein
30 the absorbent article includes an elastic laminate as described above.

The absorbent article may be a pant-type article comprising front and back body panels, wherein at least a part of said front and/or back body panels comprises said elastic laminate as a sole component. The elastic laminate extends the entire width, as seen in
35 the transverse direction (x), of at least one of the front and back body panels.

The absorbent article may be a pant-type article comprising elastic side panels, wherein at least a part of said elastic side panels comprises said elastic laminate as a sole
5 component.

The pant type absorbent article has a longitudinal and a transverse direction, wherein said elastic laminate is elastic in at least the transverse direction of the article and wherein said bands may extend in at least two different main directions forming an angle of between 0
10 and 50°, preferably between 10 and 50° to the longitudinal direction of the article..

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will below be described with reference to some embodiments shown in the accompanying drawings.

15 Fig. 1 is a top view of one embodiment of a bonding pattern for a bonded elastic laminate according to the invention.

Fig. 2 is a top view of a second embodiment of a bonding pattern for a bonded elastic laminate according to the invention.

Fig. 3 is a top view of a part of the bonding pattern shown in Fig. 1 wherein the bonding
20 area comprises first and second type of bonding elements.

Fig. 4 is a top view of a part of the bonding pattern shown in Fig. 2 wherein the bonding area comprises first and second type of bonding elements.

Fig. 5 illustrates on a larger scale the first and second type of bonding elements.

Fig. 6 illustrates the angle referred to that is formed between the perimeter of the bonding
25 elements and the machine direction of the elastic laminate.

Fig. 7 is a view of a pant-type absorbent article.

Fig. 8 is a further view of a pant-type absorbent article having elastic side panels.

Fig. 9 is a photo of an elastic laminate illustrating measurement of the bonded area of the elastic laminate.

30 Fig. 10 is a graph showing force vs. elongation for an elastic laminate.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

An elastic laminate material 20 according to the invention comprises at least one elastic film layer and at least one fibrous nonwoven layer. In one embodiment the elastic

laminate comprises two nonwoven layers having an elastic film layer there between. Suitable nonwoven materials and elastic films are selected depending on the intended use of the elastic laminate. For use in an absorbent article suitable materials are given below.

5

The layers are bonded together in a bonding pattern comprising a plurality of bonding elements 10 in which said elastic film and said nonwoven are fused together. The bonding technique can be thermal point bonding, ultrasonic bonding or the like. Thermal point bonding employs a nip formed between two rolls, at least one being patterned. One or
10 both rolls are heated. Ultrasonic bonding employs a nip formed between an ultrasonic horn and a patterned roll. In both techniques, which per se are well-known in the art, the patterned roll comprises a plurality of raised bonding elements to bond the film to the nonwoven layer(s) in a bonding pattern formed by the raised bonding elements.

15 The elastic film is preferably in a stretched condition during bonding, said stretching is in a machine direction (MD) of the laminate. The term "machine direction" (MD) generally refers to the direction in which the laminate is produced. The term "cross-machine direction" (CD) generally refers to a direction perpendicular to the machine direction. The degree of stretching is usually at least 100%, preferably in the range 300 to 500%.

20

After relaxation of the film the nonwoven layer(s) can gather between the bonding sites and thus make the laminate material elastically stretchable in said machine direction.

The bonding pattern comprises a plurality of discrete bonding areas 11, wherein each
25 bonding area 11 comprises a plurality of bonding elements 10. Each bonding area 11 is separated from neighbouring bonding areas by unbonded areas, said unbonded areas forming bands 12. Each band 12 extends in at least one main direction d1. Each band may also extend in two main directions d1 and d2, which is the case for the zigzag-extending bands 12 in Fig. 2. Each bonding area 11 in at least a part of the elastic
30 laminate is adjacent to at least two bands 12 of unbonded areas, which separate the respective bonding area from the neighbouring bonding areas. The at least two bands 12 which are adjacent each bonding area extend in at least two different main directions d1 and d2. These two main directions may typically make an angle α to each other that is between 30 and 150°, preferably between 45 and 135°. Bands 12 may also extend in
35 three or more main directions.

In some cases the elastic laminate may in other parts thereof comprise other configurations of bonding areas and unbonded areas than described above. It is however desired that at least 50% of the surface areas, preferably at least 75% of the surface area
5 of the elastic laminate comprises a bonding pattern having the above described configuration of bonding areas 11 and unbonded areas in the form of bands 12.

The bands may have a minimum width w of at least 2 mm. The minimum width is herein defined as the shortest distance between two neighbouring bonding areas 11. Preferably
10 they have a minimum width w of not more than 10 mm.

In the embodiment shown in Fig. 1 the bands 12 formed between neighbouring bonding areas 11 have one main direction. A first group of bands extend in a first main direction d_1 and a second group of bands extend in a second main direction d_2 . The first and second
15 group of bands 12 cross each other.

In the embodiment shown in Fig. 2 each band 12 has at least two main directions and have a zigzag shape or wavy shape. Neighbouring bands 12 extend substantially in parallel with each other.

20

Each bonding area 11 in the embodiment shown in Fig. 1 has the shape of a rhombus or rhomboid. It may also have the shape of a rectangle or square or other suitable polygon shape. Each of said bonding areas preferably has a surface area of at least 1 cm².

25 In the embodiment of Fig. 2 the bonding areas 11 form bands of zigzag-shape extending in parallel.

In all embodiments a plurality of bonding areas 11 separated by bands 12 of unbonded areas form a visually recognizable geometric pattern, wherein a series of bonding areas
30 11 surrounded by unbonded areas form said recognizable pattern.

The effective bonded area within each bonding area 13 is typically between 5 and 40%, preferably between 5 and 30% and more preferably between 10 and 20%. The effective bonded area of the elastic laminate is typically between 3 and 18%. The effective bonded

area herein relates to the bonding equipment used for bonding the laminate and is thus measured on the bonding equipment, for example a patterning roll.

In order to measure the effective bonded area the total area of interest A_{tot} must be
5 determined. This is illustrated in Fig. 9 showing an elastic laminate stretched to the “knee point” (see Tensile strength test below and Fig. 10). For an elastic laminate comprising an elastic film and two or more nonwoven layers, the elastic film may be laminated to the nonwoven layers in a stretched condition. The “knee point” of the elastic laminate will in such case approximately correspond to the stretched condition of the laminate during
10 bonding, and thus the effective bonded area of the bonding pattern on the laminate stretched to the “knee point” will approximately correspond to that on the bonding equipment.

For measuring the effective bonded area within each bonding area, A_{tot} is the area
15 circumscribed by the tangents to the outermost bonding elements of the respective bonding area 13.

For measuring the effective bonded area of the laminate, A_{tot} is the area of one repeating unit of the bonding pattern also including unbonded areas 14 between bonding areas 13
20 in a repeating unit of bonding pattern. For unbonded areas 14 between groups of repeating units, half of said unbonded area 14 is considered to belong to each repeating unit of the bonding pattern. This is illustrated in Fig. 9.

The bonded area A_{bond} is measured relating to the bonding equipment used. The bonded
25 area percentage = $100 * A_{\text{bond}} / A_{\text{tot}}$

The combination of bonding areas 11 separated by unbonded areas in the form of bands extending in at least two main directions provide an elastic laminate with improved comfort, fit, elastic properties and aesthetical impression, especially for elastic pant
30 diapers. The laminate will adapt to the contours of the wearer and follow the movements of the wearer, since the unbonded areas extending in at least two main directions have an elasticity that are not restricted by bonding elements. The laminate is especially adapted for use in an elastic pant diaper or pant like incontinence garment having an elastic laminate extending over the belly area and/or the hip area, in which the movements of the

wearer need to be followed by expansion and retraction of the elastic laminate in different directions.

In one embodiment the bonding pattern comprises at least two different types of bonding
5 elements, a first type of bonding elements 10a and a second type of bonding elements 10b. This is illustrated in Fig. 3.

The first type of bonding elements 10a has a length L1 defined as the largest extension in the CD or at an angle $\pm 10^\circ$ to the CD, when applicable. The width W1 of the first type of
10 bonding elements 10a is defined as the largest dimension in a direction perpendicular to the length direction L1. The first type of bonding elements preferably has an elongated shape with a length/width-relationship L1/W1 of at least 2:1.

The length L1 of the first type of bonding elements 10a is preferably not more than 7 mm,
15 preferably not more than 4 mm.

The first type of bonding elements 10a has a perimeter p1, and the second type of bonding elements 10b has a perimeter p2.

20 Part of the perimeter p1 of the first type of bonding elements 10a forms an angle of between 80 and 100° to the MD direction. If one interconnects the end points of such a part of the perimeter p1 forming an angle of between 80 and 100° to the MD direction, by a connection line a1 extending perpendicular to the MD direction, said connection line a1 should have a length of at least 1.25 mm. Preferably it should have a length between 1.5
25 and 2 mm. The angle of a curved surface is measured as the tangent to the surface.

The part of the perimeter forming an angle of between 80 and 100° to the MD direction is either continuous, or exhibits discontinuities. In the case of a bonding element having a "micro-prickled" or "micro-rough" the "perimeter" may be considered as an imaginary line
30 which is a tangent to the tips of the "micro-prickles" or "micro-roughness". The perimeter may also have a "stepped" configuration comprising a plurality of parts forming an angle of between 80 and 100° to the MD direction and which are interrupted by parts of the perimeter forming a different angle to the MD direction. The length a1 is then measured as the sum of the lengths of said parts forming an angle of between 80 and 100° to the
35 MD direction, provided that they are located along the same side of the bonding element

10a with respect to a longitudinal centreline of the respective bonding element. Each bonding element 10a may have parts of the perimeter p1 forming an angle of between 80 and 100° to the MD direction on both sides of the longitudinal centreline. The length a1 is however only measured on one of the sides of the respective bonding element 10a.

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The second type of bonding elements 10b has a length L2 defined as the largest extension in the CD or at an angle $\pm 10^\circ$ to the CD, when applicable. The width W2 of the second type of bonding elements 11 is defined as the largest dimension in a direction perpendicular to the length direction L2. The second type of bonding elements preferably
10 has a length/width-relationship L2/W2 of not more than 1.5:1, preferably 1:1. A preferred shape of the second type of bonding elements 11 is circular, but other shapes like rhomboid, star-shaped etc. may be feasible.

The part of the perimeter p2 of the second type of bonding elements 10b extending in a
15 direction forming an angle of between 80 and 100° to the machine direction MD is less than of the first type of bonding elements 10a. If one interconnects the end points of such a part of the perimeter p2 forming an angle of between 80 and 100° to the MD direction, by a connection line a2 extending perpendicular to the CD direction, said connection line a2 should have a length of not more than 1 mm, preferably not more than 0.5 mm. This
20 length a2 is measured in a corresponding manner as for the first type of bonding elements.

The length L1 of the first type of bonding elements 10a is preferably at least 30% larger than the length L2 of the second type of bonding elements 10b. The length L1 of the first
25 type of bonding elements 10a is preferably not more than 7mm, preferably not more than 4mm. The length L2 of the second type of bonding elements is preferably not more than 3 mm.

Apertures 13 are formed in the elastic film in close vicinity of at least some of the first type
30 of bonding elements 10a. These apertures 13 are formed by rupture of the elastic film as a result by stretching and extend from the part a1 of the perimeter p1 of the respective bonding element 10a that has a length of at least 1.25 mm and that forms an angle of between 80 and 100° to the MD direction, as referred to above. The apertures 13 are located outside the area of the respective bonding element 10a and are formed due to
35 tensions in the film in the area in close vicinity to the bonding elements. "In close vicinity"

to means that the apertures extend from the perimeter p1 of the respective element. The apertures extend substantially in the MD. No apertures are formed in the area of the bonding elements 10a. The apertures render the elastic laminate 20 breathable.

- 5 In order to cause apertures 13 to be formed in the described manner as a result by stretching in the MD, the first type of bonding elements 10a has to have a perimeter p1 that has a certain minimum extension in a direction that forms an angle of between 80 and 100° to the stretching direction, i.e. to the MD. This minimum extension is referred to as the length a1.

10

One positive aspect of the second type of bonding elements 10b is that they should limit the extension in the MD of the apertures 13 and thus act as barriers for further rupture of the elastic film. As referred to above the perimeter p2 of the second type of bonding elements 10b should have a length a2 of not more than 1mm, preferably not more than

- 15 0.5 mm extending in a direction forming an angle of between 80 and 100° to the machine direction MD. This will minimize or prevent ruptures of the film adjacent the second type of bonding elements 10b and make them act as barriers for further extension of the apertures 13 formed adjacent the first type of bonding elements 10a.

- 20 In order to provide an efficient barrier for undesired further rupture of the film at least one second bonding element 10b is located at a distance d of between 1 and 7mm from the perimeter p1 of a respective first bonding element 10a having a length a1 of at least 1.25 mm. This distance d is measured in the machine direction MD of the laminate and between the respective perimeters p1 and p2 of the first 10a and second bonding
25 elements 10b facing each other.

- The total number of the second type of bonding elements 11 may be at least 10% larger than the total number of the first type of bonding elements 10, preferably at least 50% and more preferably at least 100% larger than the total number of the first type of bonding
30 elements.

- Each bonding area 11 has a periphery p3, wherein only the second type of bonding elements 10b are located along the periphery p3 of each bonding area 11. The second type of bonding elements 10b will, as described above, act as barriers preventing the
35 apertures 13 formed in the film to extend into the unbonded areas 12.

The invention also refers to an absorbent article comprising the elastic laminate 20. The term "absorbent article" refers to products that are placed against the skin of the wearer to absorb and contain body exudates, like urine, faeces and menstrual fluid. The invention
5 mainly refers to disposable absorbent articles, which means articles that are not intended to be laundered or otherwise restored or reused as an absorbent article after use.

The absorbent article comprising the elastic laminate 20 is preferably a pant-type absorbent article such as a pant diaper, sanitary pant or incontinence pant.

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Fig. 7 shows an embodiment of a pant-type absorbent article 1 for an infant or an incontinent adult or a sanitary pant. Said pant article typically comprises a chassis 4 including a front panel 5, a back panel 6, a crotch portion 19 and an elastic waistband 7. A core region 3 comprising an absorbent core 2 is located at least in the crotch portion 19 of
15 the article and extends a certain distance into the front 5 and back panels 6. The crotch portion 19 is herewith defined as the narrow part of the article intended to be worn in the wearer's crotch between the legs. In a further embodiment (not shown) the front and back panels are separated from each other and the core region, comprising the absorbent core, bridges the gap between the front and back panels.

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The article has a longitudinal direction y and a transverse direction x.

According to one embodiment of the invention the surface area of the absorbent core 2 amounts to no more than 30% of the total surface area of the article, preferably no more
25 than 20%, as measured in a flat state of the article. The term "flat state" herein means in an opened untensioned state in which the side seams are opened and in which any tensioned elastic members have been deactivated.

The elastic laminate 20 may cover the entire article, including the core region 3 and the
30 entire chassis region 4. However according to a preferred embodiment a substantial part of the crotch portion 19 of the article is free from the elastic web material 11. A "substantial part" used herein refers to at least 50%, preferably at least 75%. Also the waist region 7 of the chassis region may be free from the elastic laminate 20. The waist region 7 comprises a nonwoven material that is elasticized by elastic members 14, such
35 as elastic threads, contractably affixed between material layers, such as nonwoven

materials. Such elastic members 14 may also be arranged around the leg openings of the article. Ultrasonic welds 16, glue strings or the like, join the elastic laminate 11 to the elasticized nonwoven in the waist region 7.

- 5 A nonwoven material 18 may be arranged on the garment-facing side of the liquid-impervious backsheet 9 in the crotch portion of the article. The nonwoven material 18 is joined to the elastic laminate 20 by means of ultrasonic welds 17, glue strings or the like.

The elastic laminate 20 is preferably arranged as an outside coversheet material as well
10 as inner coversheet material over at least a substantial part of the front region 5 of the chassis 4, which during use is intended to be applied against the stomach of the wearer, except for the waist region 7. A "substantial part" used herein means at least 50% of the surface area, preferably at least 75%, of the surface area of the front region 5 of the chassis 4. It is further preferred that the elastic laminate 20 is arranged as an outside
15 coversheet material as well as inner coversheet material over both the front 5 and back regions 6 of the chassis 4. Thus no additional backsheet or topsheet materials are required and the elastic web material constitutes the sole component of in these parts of the chassis 4. In at least 20%, preferably at least 25%, more preferably at least 30% and most preferably at least 40% of the total surface area of the article, as seen in a flat state,
20 as referred to above, the elastic laminate 20 constitutes the sole component of the chassis.

The outer coversheet covering the front and back panels 5 and 6 of the chassis 4 comprises an elastic laminate material 20, which is elastic at least in the transverse x-
25 direction of the article. The elasticity in the x-direction should be at least 30%, preferably at least 50%, more preferably at least 70%, as measured by the Elasticity test specified below. The transverse x-direction of the article herewith corresponds to the MD of the elastic laminate described above.

- 30 For an elastic laminate used as a front 5 and/or back panel 6 in a pant-type absorbent article it is an advantage that the laminate comprises at least three layers, viz. first and second outer fibrous layers, which are chosen so that they, in combination with the inner elastic film layer, give the material high resistance to puncture, in order to prevent penetration by finger nails for example. They also provide a soft and cloth-like feel to the
35 laminate. Examples of suitable materials are carded webs and spunbond materials. The

basis weight of the fibrous material layers should be between 10 and 35 g/m², preferably between 12 and 30 g/m², more preferably between 13 and 25 g/m². Examples of suitable polymers used in the fibrous materials are polyethylene, polyesters, polypropylene and other polyolefin homopolymers and copolymers. Natural fibres, for example cotton, may also be used as long as they provide the required properties. A mixture of polymers can contribute to a higher flexibility of the nonwoven layer, and through this, give the nonwoven material a higher elongation at maximum load. A mixture of polyethylene and polypropylene polymers has proved to provide good results in this respect. A mixture of fibers of different polymers is also possible.

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The middle film layer preferably has a basis weight between 20 and 80 g/m², preferably between 20 and 60 g/m². The film may be of any suitable elastic polymer, natural or synthetic. Some examples of suitable materials for the elastic film are low crystallinity polyethylenes, metallocene-catalyzed low crystallinity polyethylene, ethylene vinyl acetate copolymers (EVA), polyurethane, polyisoprene, butadiene-styrene copolymers, styrene block copolymers, such as styrene/isoprene/styrene (SIS), styrene/butadiene/styrene (SBS), or styrene/ethylene-butadiene/styrene block copolymer. Blends of these polymers may also be used as well as other modifying elastomeric or non-elastomeric materials. One example of a suitable film is a three-layer elastomeric film of PE-SEBS-PE.

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The total basis weight of the laminate is preferably 100 g/m² or less, more preferably not more than 90 g/m².

The article comprises a liquid permeable topsheet 8 and a liquid impermeable backsheet 9 covering at least the core region 3. The absorbent core 2 is enclosed between the topsheet 8 and the backsheet 9.

The liquid permeable topsheet 8 can consist of a nonwoven material, e.g. spunbond, meltblown, carded, hydroentangled, wetlaid etc. Suitable nonwoven materials can be composed of natural fibers, such as woodpulp or cotton fibres, manmade fibres, such as polyester, polyethylene, polypropylene, viscose etc. or from a mixture of natural and manmade fibres. The topsheet material may further be composed of tow fibres, which may be bonded to each other in a bonding pattern, as e.g. disclosed in EP-A-1 035 818. Further examples of topsheet materials are porous foams, apertured plastic films etc. The materials suited as topsheet materials should be soft and non-irritating to the skin and

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intended to be readily penetrated by body fluid, e.g. urine or menstrual fluid. The topsheet may be different in different parts of the absorbent article.

The liquid impervious backsheet 9 covering the core region 3 on the garment-facing side of the core is of a liquid impervious material, such as a thin plastic film, e.g. a polyethylene or polypropylene film, a nonwoven material coated with a liquid impervious material, a hydrophobic nonwoven material, which resists liquid penetration or a laminate comprising plastic films and nonwoven materials. The core region backsheet material 9 may be breathable so as to allow vapour to escape from the absorbent core, while still preventing liquids from passing therethrough. Examples of breathable backsheet materials are porous polymeric films, nonwoven laminates from spunbond and meltblown layers, laminates from porous polymeric films and nonwovens. The backsheet 9 is preferably inelastic.

The "absorbent core" is the absorbent structure disposed between the two covers of the absorbent article. The absorbent core 2 can be of any conventional kind. Examples of commonly occurring absorbent materials are cellulosic fluff pulp, tissue layers, highly absorbent polymers (so called superabsorbents), absorbent foam materials, absorbent nonwoven materials or the like. It is common to combine cellulosic fluff pulp with superabsorbent polymers in an absorbent core. Superabsorbent polymers are water-swallowable, water-insoluble organic or inorganic materials capable of absorbing at least about 20 times its weight and in an aqueous solution containing 0.9 weight percent of sodium chloride. Organic materials suitable for use as a superabsorbent material can include natural materials such as polysaccharides, polypeptides and the like, as well as synthetic materials such as synthetic hydrogel polymers. Such hydrogel polymers include, for example, alkali metal salts of polyacrylic acids, polyacrylamides, polyvinyl alcohol, polyacrylates, polyacrylamides, polyvinyl pyridines, and the like. Other suitable polymers include hydrolyzed acrylonitrile grafted starch, acrylic acid grafted starch, and isobutylene maleic anhydride copolymers and mixtures thereof. The hydrogel polymers are preferably lightly crosslinked to render the material substantially water insoluble. Preferred superabsorbent materials are further surface crosslinked so that the outer surface or shell of the superabsorbent particle, fiber, flake, sphere, etc. possesses a higher crosslink density than the inner portion of the superabsorbent. The superabsorbent materials may be in any form suitable for use in absorbent composites including particles, fibers, flakes, spheres, and the like.

A high absorption capacity is provided by the use of high amounts of superabsorbent material. For an absorbent core comprising a matrix of hydrophilic fibers, such as cellulosic fibers, and superabsorbent material, the proportion of superabsorbent material is preferably between 10 and 90% by weight, more preferably between 30 and 70% by weight.

It is conventional in absorbent articles to have absorbent cores comprising layers of different properties with respect to liquid receiving capacity, liquid distribution capacity and storage capacity. The thin absorbent bodies, which are common in for example baby diapers and incontinence guards, often comprise a compressed mixed or layered structure of cellulosic fluff pulp and superabsorbent polymers. The size and absorbent capacity of the absorbent core may be varied to be suited for different uses such as for infants or for adult incontinent persons.

15

The absorbent core 2 may further include an acquisition distribution layer placed on top of the primary absorbent body and which is adapted to quickly receive and temporarily store discharged liquid before it is absorbed by the primary absorbent core. Such acquisition distribution layers are well known in the art and may be composed of porous fibrous waddings or foam materials.

20

Although the elastic laminate according to the invention primarily is intended to be used in pant-type absorbent articles, in which the elastic laminate extends all the way between the side seams of the article, in at least one of the front and back panels, it may also be used to form for example elastic side panels in an absorbent article. Fig. 8 illustrates a pant-type absorbent article 1 comprising elastic side panels 21. The article further comprises a front body panel 22 and a back body panel 23 and a crotch portion 24. The front and back body panels as well as the crotch portion is generally comprised of a liquid impermeable backsheet 24, a liquid permeable topsheet 25 and an absorbent core 26 located between the backsheet 52 and the topsheet 25. The topsheet, backsheet and absorbent core may be of the same kind as referred to with respect to the embodiment of Fig. 7. The backsheet 24 may further comprise a layer of nonwoven material laminated to a film layer, in which case there is provided a more cloth-like and garment-like feel than is typically obtained with a film backsheet only.

35

The elastically extensible side panels 21 are provided to ensure more comfortable and contouring fit. The elastic side panels 21 or at least parts thereof may comprise the elastic laminate 20 according to the invention, and as described with reference to the embodiment of Fig. 7. Leg elastics and waist elastic region may also be provided to
5 enhance the fit around the legs and waist, respectively.

TEST METHODS

Elasticity test

The method measures how an elastic material behaves at repeated load and unload
10 cycles. The sample is stretched to a predetermined elongation and a cyclic movement between 0 and said predetermined elongation is performed. Desired load and unload forces are recorded. The permanent, i.e. remaining, elongation of the relaxed material is measured.

15 A tensile tester, Lloyd LRX, able to perform cyclic movements and equipped with a printer/plotter or software presentation is used. The sample is prepared by cutting it to a width of 25.4 mm and a length that is preferably 50 mm longer than the distance between the clamps in the tensile tester.

20 The tensile tester is calibrated according to the apparatus instructions. The parameters needed for the test (load and unload forces) are adjusted to:

- Crosshead speed: 500 mm/min
- Clamp distance: 50 mm
- Preload: 0.05 N

25

The sample is conditioned at least 4h in 50% RH $\pm$ 5% RH and 23°C $\pm$ 1 °C and is placed in the clamps according to the marks and it is made sure that the sample is centred and fastened perpendicularly in the clamps. The tensile tester is started and three cycles between 0 and the predetermined elongation, equal to the highest defined 1st load, are
30 performed. Before the last cycle, the sample is relaxed for 1 minute, then the permanent elongation is measured by stretching the sample until a force of 0.1 N is detected and the elongation is read.

An elastic material is defined as a material having a permanent elongation after relaxation of less than 10% after the material has been subjected to an elongation of 30%. An elongation of 30% means an elongation to a length that is 30% longer than the initial length of the sample. Thus a material having an elasticity of at least 30% is defined as

5 that the material should have a permanent relaxation after elongation of less than 10% after being exerted to an elongation of 30% in the tensile tester above. A material having an elasticity of at least 50% is defined as that the material should have a permanent relaxation after elongation of less than 10% after being exerted to an elongation of 50% in the tensile tester above, etc.

10

A non-elastic material has a permanent elongation after relaxation of more than 10% after having been subjected to an elongation of 30%.

Tensile strength (Reference: ASTM D 882)

15 The method measures tensile strength and elongation of different elastic materials. The tensile strength and elongation of a well-defined test piece is tested by means of a tensile tester.

Apparatus: Instron 4301

- 20
- Tensile tester connected to a computer
 - Crosshead speed: 500 mm/min
 - Clamp distance: 50 mm

Sample preparation: Test samples are cut from the entire width of the material. The width

25 of the sample shall be 25.4 mm and the length at least 50 mm longer than the clamp distance if possible. It is of importance that the edges of the sample are even and without break notches. The samples are conditioned for at least 4h in 50%RH $\pm$ 5% RH and 23°C $\pm$ 2°C before testing.

30 Procedure: The tensile tester is calibrated according to the apparatus instructions and set to zero. The sample is mounted and it is ensured that it is not obliquely or unevenly fastened. The material is prevented from slipping by using clamps covered with galloon or similar material. The tensile tester is started, and stopped after the material has broken (if not automatically controlled). Measurements resulting from premature failures (*i.e.* the

35 sample breaks at the clamp, or is damaged during preparation) are ignored if possible.

The following results are expressed by the tensile tester/computer:

- Maximum force, N/25.4mm
- Elongation at maximum force, %
- 5 - Break force, N/25.4mm
- Elongation at break force, %
- Knee point, N/%

Fig. 10 shows the behaviour of a laminate according to the present invention under stretching at a constant strain. The laminate comprises a multilayer MD elastic film having a core layer of SEBS and skin layers of PP, basis weight 30 gsm, and a PP spunbond nonwoven layer on both sides of the film, each spunbond nonwoven layer having a basis weight of 16 gsm.

15 From zero elongation, the laminate exhibits elastic behaviour in a region up to around a "knee point", after which, the force increases rapidly. The knee point is defined as the first point on the curve at which the gradient becomes greater than 0.4N/%. The laminate shown in Fig. 10 is elastic up to about 71% elongation.

20 The applied force eventually reaches a maximum (the "maximum force"), at which point the gradient of the curve is zero. The force then drops as the material fails.

25

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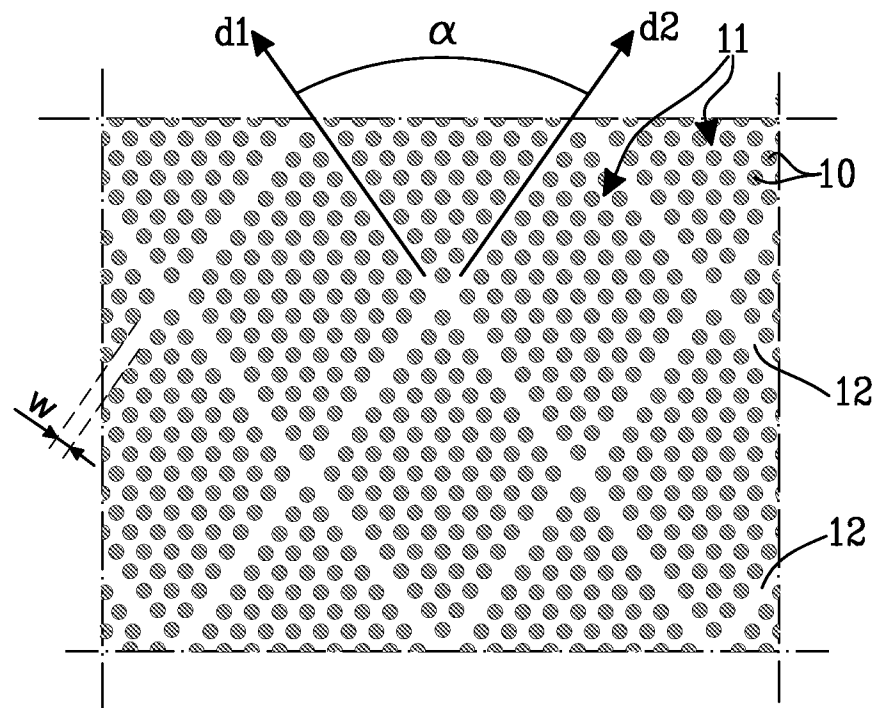
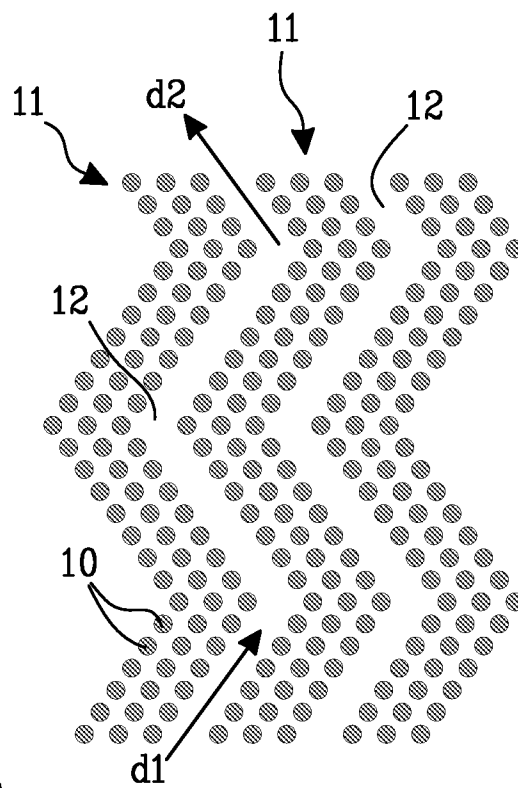
CLAIMS

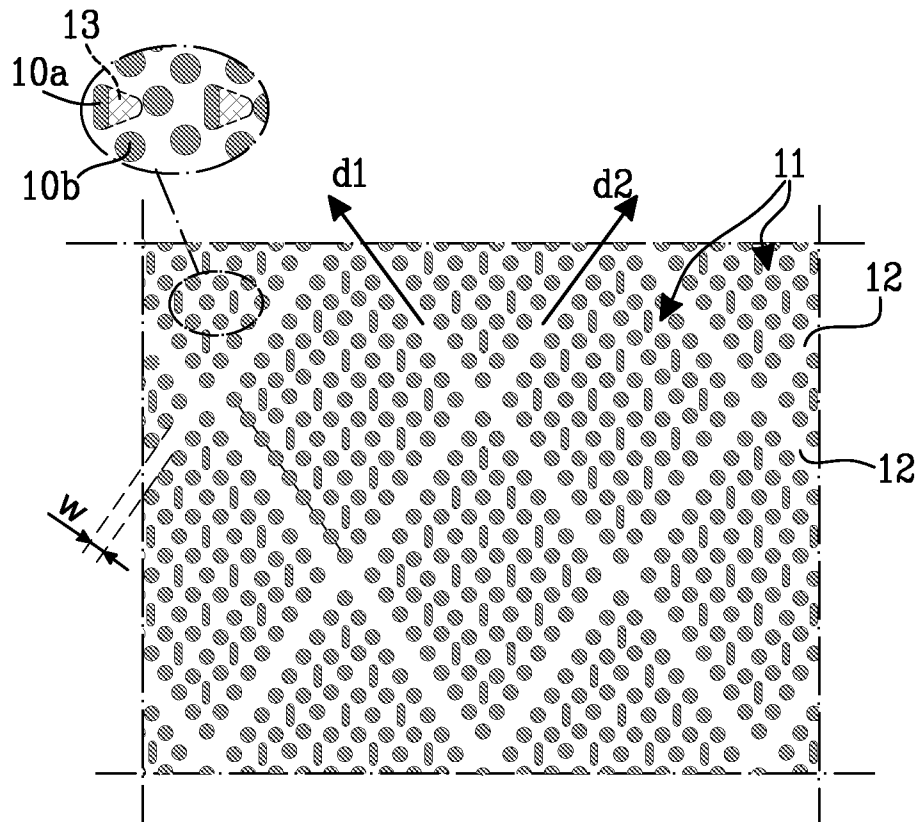
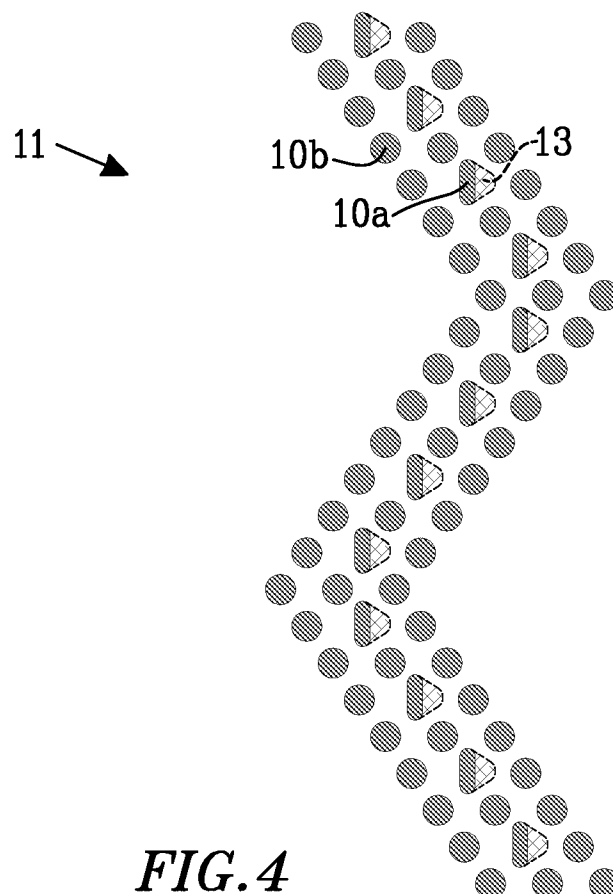
1. An elastic laminate material comprising at least one elastic film layer and at least one nonwoven layer, said elastic film layer and said nonwoven layer being bonded together in a bonding pattern comprising a plurality of bonding elements
5 (10), in which said elastic film and said nonwoven layer are fused together, said elastic laminate having a machine direction (MD) and a cross direction (CD) and is elastic in at least one of the machine direction (MD) and cross direction (CD), *characterized in* that said bonding pattern comprises bonding areas (11) spaced apart, each bonding area (11) comprising a plurality of bonding elements (10),
10 wherein each bonding area in at least a part of the elastic laminate is separated from adjacent bonding areas by unbonded areas, said unbonded areas forming bands (12), each band extending in at least one main direction (d1) and wherein at least a main part of the bonding areas each is adjacent to at least two bands of unbonded areas, said at least two bands extending in at least two different main
15 directions (d1, d2).
2. The elastic laminate as claimed in claim 1, *characterized in* that said bands have a minimum width (w) of at least 2 mm.
- 20 3. The elastic laminate as claimed in claim 2, *characterized in* that said bands have a minimum width (w) of not more than 10 mm.
4. The elastic laminate as claimed in any of claims 1-3, *characterized in* that the laminate comprises bands (12) having one main direction, wherein a first group of
25 bands extend in a first main direction (d1) and a second group of bands extend in a second main direction (d2) forming an angle (α) of between 45° and 135° (?) to the first main direction.
5. The elastic laminate as claimed in claim 4, *characterized in* that said first and
30 second group of bands (12) cross each other.
6. The elastic laminate as claimed in any of claims 1-5, *characterized in* that the laminate comprises bands (12) having at least two main directions.

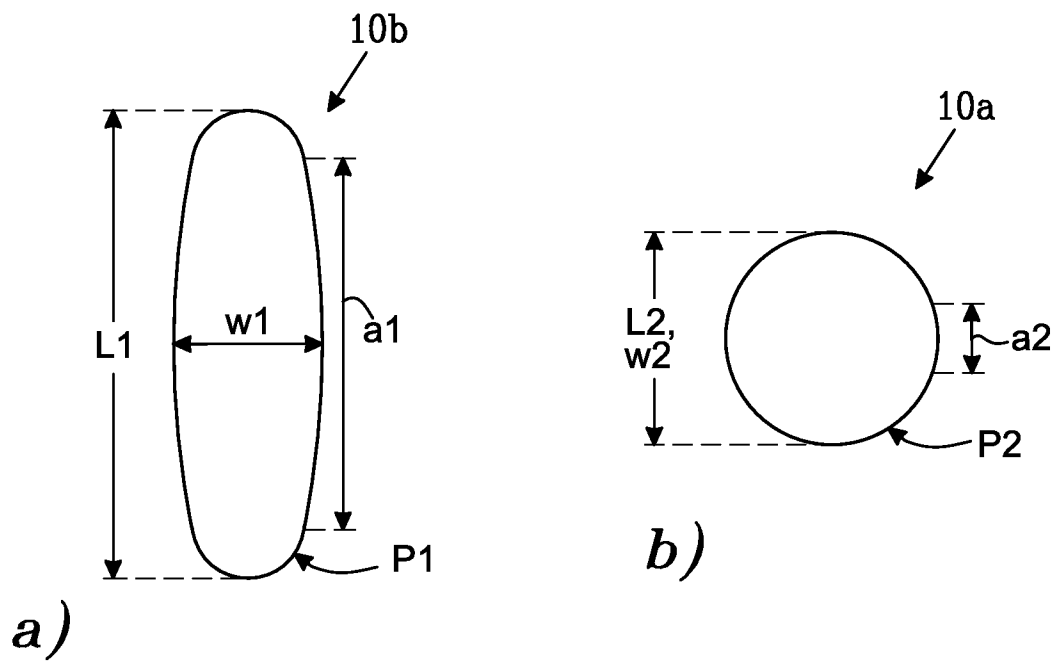
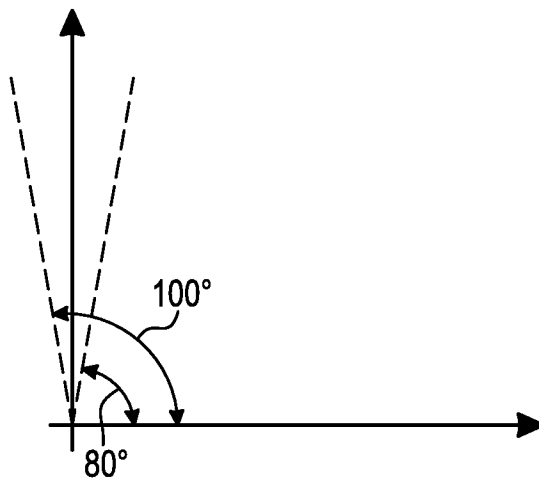
7. The elastic laminate as claimed in claim 6, *characterized in* that said bands (12) have a zigzag shape or wavy shape.
8. The elastic laminate as claimed in claim 6 or 7, *characterized in* that said bands
5 (12) extend substantially in parallel.
9. The elastic laminate as claimed in any of the preceding claims, *characterized in* that each of said bonding areas (11) have an area of at least 1 cm².
10. The elastic laminate as claimed in any of the preceding claims, *characterized in*
10 that the effective bonded area within each bonding area (11) is between 5 and 40%, preferably between 5 and 30% and more preferably between 10 and 20%.
11. The elastic laminate as claimed in any of the preceding claims, *characterized in*
15 that the effective bonded area of the elastic laminate is between 3 and 18%.
12. The elastic laminate as claimed in any of the preceding claims, *characterized in* that a plurality of bonding areas (11) separated by bands (12) of unbonded areas form a visually recognizable pattern.
20
13. The elastic laminate as claimed in any of the preceding claims, *characterized in* that at least some of the bonding areas (11) each comprises at least two different types of bonding elements, a first type of bonding elements (10a) and a second type of bonding elements (10b), wherein apertures (13) are formed in the elastic
25 film in close vicinity of at least some of the first type of bonding elements (10a), said apertures (13) being caused by rupture of the elastic film as a result by stretching during bonding and extend from the perimeter of the respective first type of bonding element (10a) and are located outside the area of the respective bonding element, wherein only second type of bonding elements (10b) are located
30 along the periphery of the respective bonding area (11).
14. An absorbent article comprising an outer cover, an inner bodyside liner and an absorbent core located between the outer cover and the inner bodyside liner, *characterized in* that the absorbent article includes an elastic laminate as claimed
35 in any of claims 1-13.

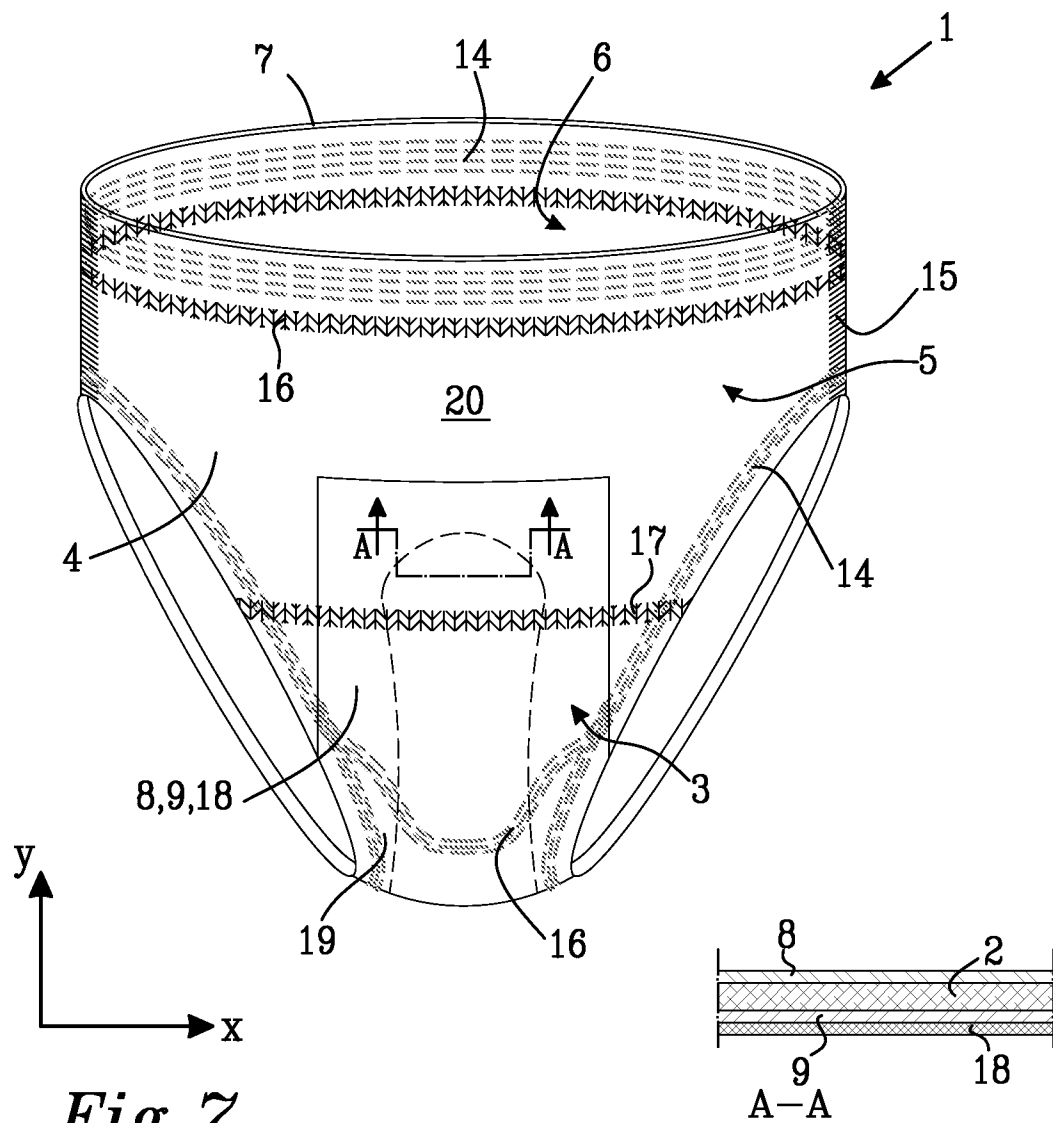
15. The absorbent article as claimed in claim 14, said absorbent article being a pant-type article comprising front and back body panels, said article having a longitudinal (y) and a transverse (x) direction, *characterized in* that at least a part
5 of said front and/or back body panels comprises said elastic laminate as a sole component.
16. The absorbent article as claimed in claim 15, *characterized in* that said elastic laminate extends the entire width, as seen in the transverse direction (x), of at
10 least one of the front and back body panels.
17. The absorbent article as claimed in claim 14, said absorbent article being a pant-type article comprising elastic side panels, *characterized in* that at least a part of
15 said elastic side panels comprises said elastic laminate as a sole component.
18. The pant type absorbent article as claimed in any of claims 15-17, wherein said elastic laminate is elastic in at least the transverse direction (x) of the article,
characterized in that said bands (12) extend in at least two different main
20 directions (d1, d2) forming an angle of between 0 and 50°, preferably between 10 and 50° to the longitudinal direction (y) of the article..

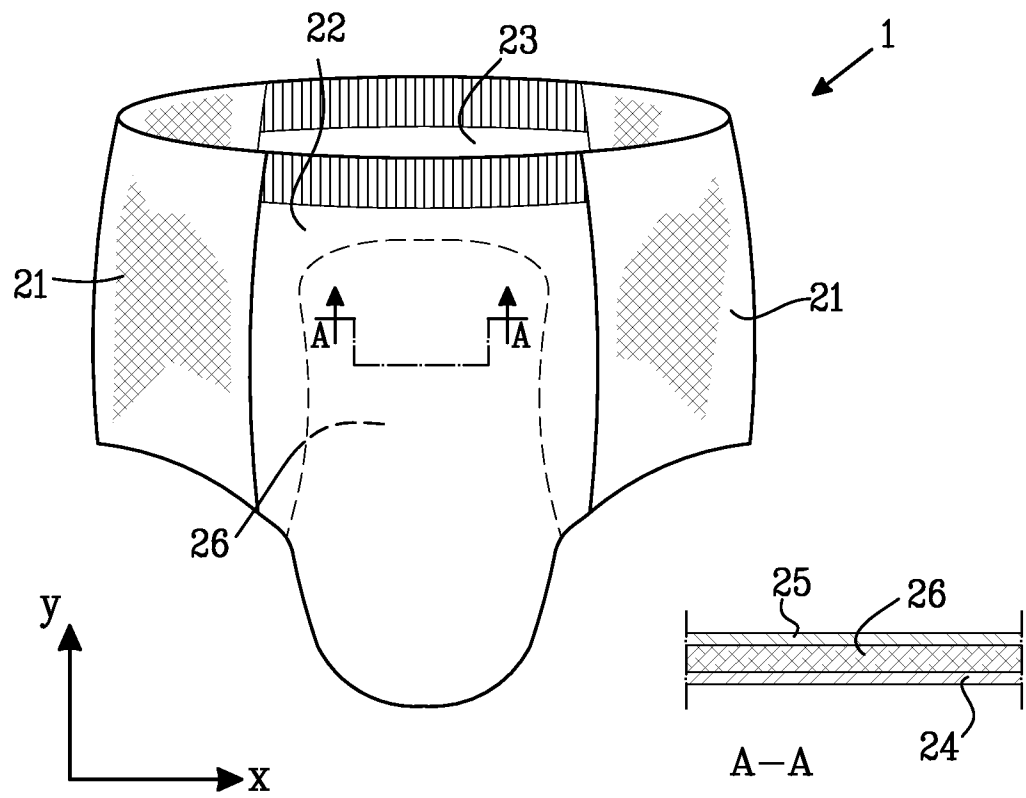
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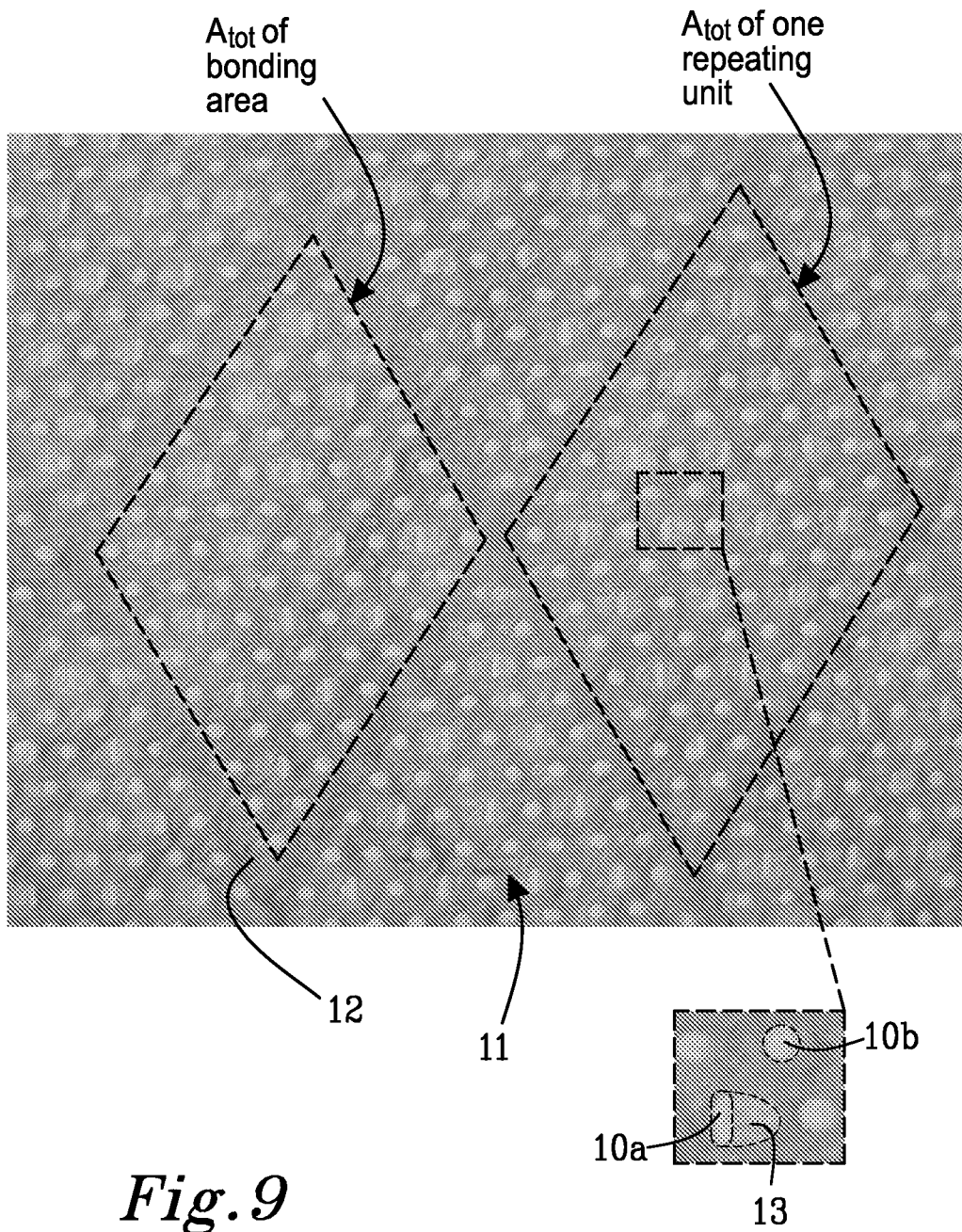
*FIG. 1**FIG. 2*

*FIG. 3**FIG. 4*

*FIG. 5**FIG. 6*

*Fig. 7*

*Fig. 8*

*Fig. 9*

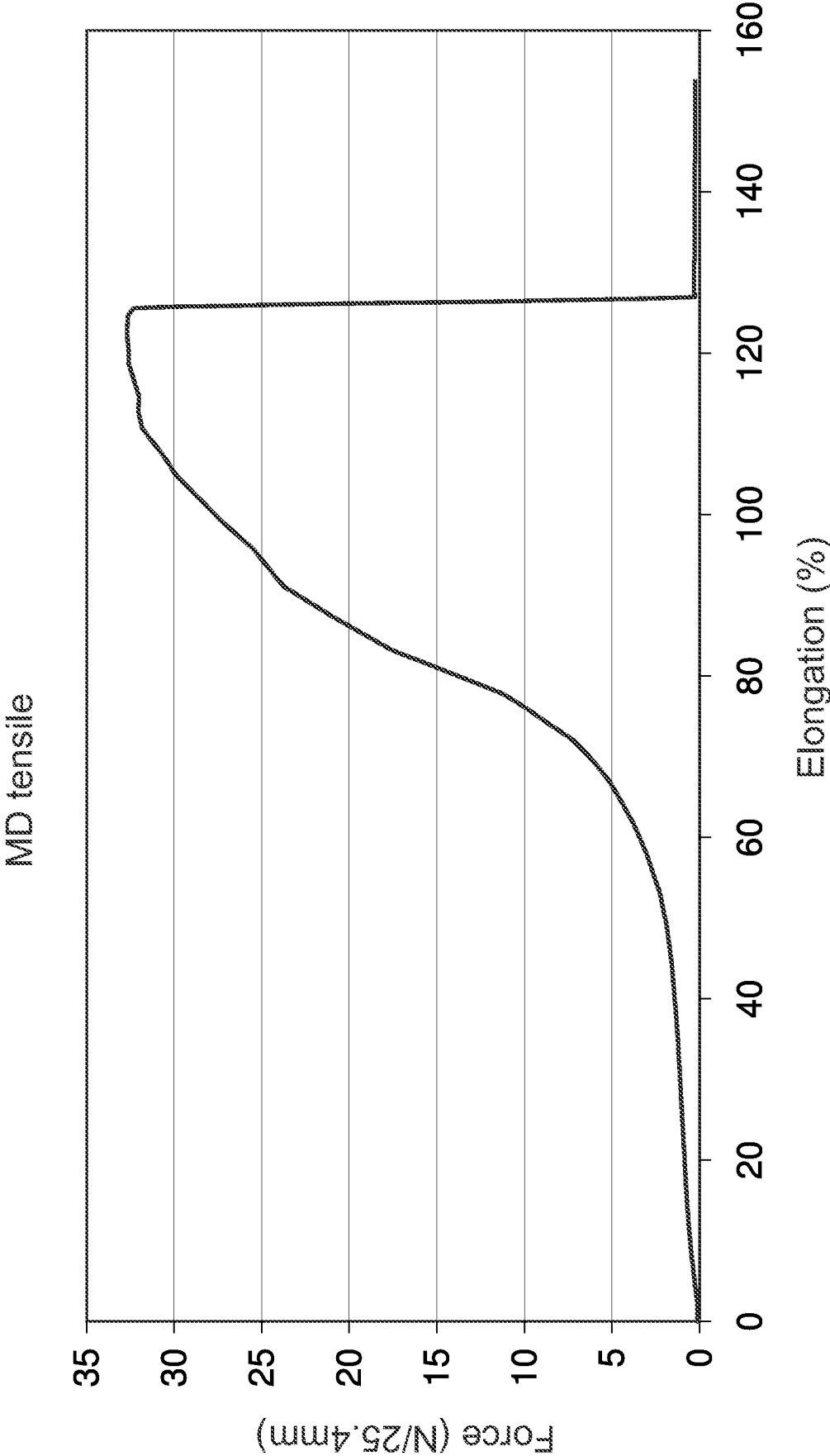


Fig. 10

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE2010/050987

A. CLASSIFICATION OF SUBJECT MATTER

IPC: see extra sheet

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)

IPC: A61F, B32B

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

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ, TXTE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 20070249253 A1 (ANGELI, PIERO ET AL), 25 October 2007 (25.10.2007), figure 3, paragraphs [0003], [0013], [0042]-[0044], [0054], [0056], [0062] --	1-18
A	US 20020193774 A1 (OTSUBO, TOSHIFUMI), 19 December 2002 (19.12.2002), figure 1, paragraph [0015] --	1-18
A	EP 0320991 A2 (KIMBERLY-CLARK CORPORATION), 21 June 1989 (21.06.1989), column 6, line 18 - line 19, figures 1, 9, 10 --	1-18

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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Date of the actual completion of the international search

10 May 2011

Date of mailing of the international search report

12-05-2011

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Box 5055, S-102 42 STOCKHOLM

Facsimile No. +46 8 666 02 86

Authorized officer

John Sjöberg / Eö

Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE2010/050987

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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A	WO 2007133128 A1 (SCA HYGIENE PRODUCTS AB), 22 November 2007 (22.11.2007), whole document --	1-18
A	US 20080095978 A1 (SIQUEIRA, JOSE ET AL), 24 April 2008 (24.04.2008), figure 4, paragraphs [0066]-[0067] -- -----	13

International patent classification (IPC)**A61F 13/51** (2006.01)**A61F 13/496** (2006.01)**B32B 3/24** (2006.01)

A61F 13/49 (2006.01)

B32B 27/12 (2006.01)

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INTERNATIONAL SEARCH REPORT
Information on patent family members

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PCT/SE2010/050987

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