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(54) Title: A PANT-TYPE ABSORBENT ARTICLE AND A METHOD FOR ITS MANUFACTURE

(57) Abstract: A pant-type absorbent article having a core region (3) and a front (5) and a back panel (6) comprising an elastic laminate material (10) constituting the sole component of at least part of the front and/or back panels, said article further having an elastic waistband (7) joined to the elastic laminate material (10). The elastic laminate material (10) comprises at least one elastic component (13) and at least one non-elastic component (12). A portion (12a) of the non-elastic component (12) of the elastic laminate material (10) extends beyond said elastic component (13) of the elastic laminate material at the waist edge (5a, 6a) of the front and/or back panel (5; 6). The elastic waistband (7) is joined to the front and/or back panel in said portion (12a) of the non-elastic component (12) that extends beyond said elastic component (13) to form a waistband seam (16) that is located entirely in the area of said portion (12a) of the non-elastic component (12).

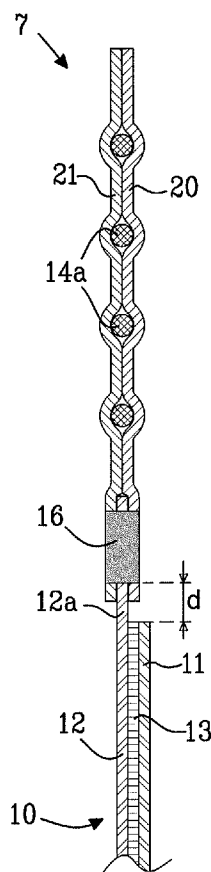


**Fig. 4**



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## **A pant-type absorbent article and a method for its manufacture**

### ***Technical field***

5 The present invention refers to a pant-type absorbent article such as a pant diaper, a sanitary pant or incontinence garment, said article comprising an elastic web material and an elastic waistband. The invention further refers to a method for producing the pant-type absorbent article.

### ***Background of the invention***

10 Pant-type absorbent articles, like pant diapers, sanitary pants and incontinence pants, are supposed to have a comfortable fit about the wearer. It is also desirable that the articles are capable of being pulled up and down over the hips of the wearer to allow the wearer or caregiver to easily put on and remove the article when it has been soiled. It is known to  
15 make such absorbent pants with elasticized stretchable side panels and waist portions, usually comprising elastic members, such as elastic threads, contractably affixed between the backsheet and the topsheet.

It is further known to make portions of the chassis of the pant article, such as the front  
20 and/or back panel, of an elastic material, for example an elastic laminate material. Such laminates may include an elastic film sandwiched between two layers of non-elastic fibrous material, especially nonwoven materials. In order to make the laminate elastically stretchable, it is subjected to an activation treatment.

25 WO 03/047488 discloses an elastic laminate comprising an elastic film which on opposite sides is bonded to first and second non-elastic fibrous layers. The laminate is made by bonding the non-elastic fibrous layers to the elastic film layer and subsequently incrementally stretching the laminate between intermeshing gear rollers. The elastic film material may be of a breathable material. The laminate may be incorporated in an  
30 absorbent article.

Activation of elastic laminates by incremental stretching is also disclosed in U.S. Patents Nos. 5,143,679; 5,156,793; 5,167,897; 5,422,172; 5,592,690; 5,634,216 and 5,681,074. The non-elastic fibrous layers are fully or partially broken or torn during the activation  
35 process so that the elasticity of the laminate after activation is governed mainly by the

elasticity of the elastic film layer. In WO 03/047488 the non-elastic fibrous layers are completely broken so that the elasticity of the activated laminate is substantially the same as the elasticity of the elastic film layer.

- 5 International applications WO 2005/122984, WO 2005/122985 and WO 2006/038837 refer to absorbent articles comprising an outer coversheet in the form of an elastic laminate having improved properties such as cloth-like feel and appearance. An elastic waistband is secured to the waist edge of the outer coversheet.
- 10 US 2004/0243086 discloses a disposable pant-like undergarment having stretchable front and back panels, for example made of an elastic laminate. An elastic waistband is secured to the distal edge of at least one of the front and back panels, said elastic waistband having a retracted length which is less than the retracted length of the panel to which it is attached.
- 15 WO 2006/093440 also discloses a pant-type absorbent article comprising an elastic laminate and an elastic waistband joined to the distal edge of at least one of the front and back panels.
- 20 WO 2007/133146 discloses a pant-type absorbent article comprising an elastic laminate made by laminating a second nonwoven layer to an activated two-layer laminate. The activated two-layer laminate comprises an elastic film and a first non-elastic nonwoven material. The second nonwoven layer is laminated to the elastic film of the activated two-layer laminate while this is in a stretched position. The elastic laminate formed has improved tensile strength and puncture resistance. An elastic waistband is joined to the chassis as a separate component, or alternatively is formed by folding a portion of one of the nonwoven webs.
- 25

There is however still need for improvement of the properties of absorbent articles comprising an elastic web material, such as an elastic laminate, as an outer coversheet, and having an elastic waistband joined thereto along a waistband seam. The strength of the waistband seam, the comfort and feel of absorbent articles of the above mentioned type are important as well as the cost aspect including manufacturing costs for disposable articles, which are discarded after one single use.

***Object and most important features of the invention***

An object of the present invention is to provide a pant-type absorbent article having a chassis comprising a core region holding an absorbent core, said chassis further comprising a front panel, a back panel and an elastic waistband, each of the front and back panels having a waist edge, a crotch edge and a pair of side edges, wherein the front and back panels being joined to each other along two opposite side edges to define a waist-opening and a pair of leg-openings, at least one of the front and back panels comprises an elastic laminate material constituting the sole component of at least part of the front and/or back panels, said article further having an elastic waistband feature being joined to the elastic web material in such a way so as to provide an improved waistband seam as well as an excellent fit and appearance around the waist opening. According to the invention the elastic laminate material comprises at least one elastic component and at least one non-elastic component, said non-elastic component of the elastic laminate material extends beyond said elastic component of the elastic laminate material at the waist edge of the front and/or back panel. The elastic waistband feature is joined to the front and/or back panel in said non-elastic component that extends beyond said elastic component to form a waistband seam that is located entirely in the area of said non-elastic component of the elastic laminate material.

The elastic waist feature may be a separate waistband component comprising a first and a second ply of non-elastic web material enclosing between them at least one elongate elastic member, said separate waistband component being joined to the portion of said at least one non-elastic component of the elastic laminate material that extends beyond said elastic component of the elastic laminate material.

Said elastic waistband may be formed from a folded non-elastic web material so as to form said first and second plies enclosing said at least one elongate elastic member.

Said elastic waist feature may be an integral part of the portion of the non-elastic component of the elastic laminate web material that extends beyond said elastic component of the elastic laminate material and, said portion of the non-elastic component may be folded and joined to itself to form a first and second ply of non-elastic material enclosing between them at least one elongate elastic member.

Said portion of the non-elastic component of the elastic laminate material may extend at least 5 mm, preferably at least 10 mm, beyond said elastic component of the elastic laminate material at the waist edge of the front and/or back panel.

- 5 The distance (d) between the waistband seam and said elastic component of the elastic laminate material in the waist edge area of the front and/or back panel may be not more than 50mm, preferably not more than 25mm and more preferably not more than 10mm.
- 10 Said elastic web material may constitute the sole component of the chassis in at least 20% of the total surface area of the article.

- 15 The elastic web material may constitute the sole component of the chassis in at least 25%, preferably at least 30%, more preferably at least 40%, of the total surface area of the article.

- 20 Said elastic web material may have an elasticity in the transverse direction of the article of at least 30%, preferably at least 50%, more preferably 70%, when measured according to the elasticity test specified in the description.

- 25 The elastic web material may have an elasticity in the longitudinal direction of the article of at least 20% when measured according to the elasticity test specified in the description.

- 30 The elastic laminate material may be composed of first and second layers of fibrous material and an elastic film layer located between said first and second fibrous layers.

- 35 Said elastic film layer may be breathable and have a Water Vapour Transmission Rate according to ASTM E96-00 Procedure D of at least 1500 g/m<sup>2</sup> 24h, preferably at least 3000 g/m<sup>2</sup> 24h.

- 40 The first and/or second layer of fibrous materials may constitute said non-elastic component having a portion that extends beyond the elastic film, constituting said elastic

component of the elastic laminate, in the waist edge area of the first and/or second body panel.

At least one of the front and back panels may comprise an activated two-layer elastic laminate comprising a first non-elastic fibrous nonwoven web and an elastic film and a second non-elastic nonwoven web that has been laminated to the elastic film of the two-layer laminate after activation and while the two-layer elastic laminate was stretched by 35-200% of its non-stretched extension, to form a three-layer elastic laminate material, wherein the second non-elastic nonwoven web constitutes said non-elastic component having a portion that extends beyond the elastic film, in the waist edge area of the first and/or second body panel.

The second non-elastic nonwoven web may have been laminated to the elastic film of two-layer laminate after activation while the two-layer elastic laminate was stretched by 35-180%, preferably 50-150% and more preferably 70-120% of its non-stretched extension to form said three-layer elastic laminate material.

The elastic web material may have a basis weight of no more than  $100\text{g/m}^2$ , preferably no more than  $90\text{g/m}^2$ .

Said non-elastic component may be a nonwoven material having a tensile strength in the longitudinal (y) direction of the article of at least  $10\text{N}/25\text{mm}$ , preferably at least  $20\text{N}/25\text{mm}$ , more preferably at least  $25\text{N}/25\text{mm}$  and most preferably at least  $30\text{N}/25\text{mm}$ , as measured according to the Tensile strength test referred to below.

A crotch panel of a substantially inelastic web material may be arranged in the crotch portion of the article, said crotch panel being joined to the front and back panels comprising said elastic web material.

The surface area of the absorbent core may amount to no more than 30%, preferably no more than 20%, of the total surface area of the article, as measured in a flat state of the article.

The invention further refers to a method for producing pant-type absorbent articles such as a pant diapers, sanitary pants or incontinence pants as described above, each article

having a chassis and a core component comprising an absorbent core, said chassis comprising a front panel, a back panel and an elastic waistband feature, at least one of the front and back panels comprises an elastic laminate material comprising at least one elastic component and at least one non-elastic component, the method including a continuous process comprising forming a chassis web, and joining the absorbent core component to the chassis web, said method comprising forming at least part of said chassis web from said elastic laminate material, said elastic laminate material being fed as a web in a direction of travel (A) and having a pair of opposite sides along said direction of travel, said web of elastic laminate material having a portion of said non-elastic component web that extends beyond said elastic component web along at least one side thereof, joining said elastic waistband feature to said portion of the non-elastic component web that extends beyond the elastic component web and forming a waistband seam that is located entirely in the area of said portion of the non-elastic component web.

A separate waistband web material of non-elastic material may be fed in said direction of travel (A) and joined it to said elastic laminate web material in said portion of said non-elastic component web that extends beyond said elastic component web, said separate waistband web material being combined with at least one elongate elastic member to form said elastic waistband feature.

Said portion of the non-elastic component web may extend at least 5 mm, preferably at least 10 mm, beyond the elastic component web.

At least one elongate elastic member may be introduced to said portion of said non-elastic component web that extends beyond said elastic component web, said portion is folded and joined it to itself to form a first and second ply of non-elastic material enclosing between said at least one elongate elastic member to form said elastic waistband feature.

### **Brief description of drawings**

The invention will be described in the following in greater detail by way of example and with reference to the accompanying drawings, in which:

Fig. 1 shows a perspective view of a pant diaper.

Fig. 2 shows is a plan view of the pant diaper in its flat, uncontracted state prior to formation as seen from the body facing side.

Fig. 3 is a cross section according to the line III-III in Fig. 2.

Fig. 4 is a cross section through the waistband section according to the line IV-IV in Fig. 2

5 according to a first embodiment of the invention.

Fig. 5 and 6 are corresponding cross sections through the waistband section according to a second and a third embodiment of the invention.

Fig. 7 is a plan view of a part of the waist area in flat, untensioned state, in which the waist elastic members have been deactivated and the elastic web material is in a relaxed, 10 untensioned condition.

Fig. 8 is a schematic perspective view of a length of a production line for producing a pant-type article according to the invention.

Fig. 9 shows on a larger scale a detail from the production line in Fig. 8 in which a waistband is joined to one of the body panels.

15 Fig. 10 is a view corresponding to Fig. 9 but showing a modified embodiment of the invention.

### ***Description of preferred embodiments***

The invention will in the following be closer described with reference to some 20 embodiments shown in the accompanying drawings.

#### ***Absorbent article***

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 25 invention 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. According to the invention pant-type absorbent articles are referred to having a core region and a chassis region surrounding the core region. Examples of such pant-type absorbent articles are pant diapers, sanitary pants and incontinence pants.

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Figs. 1 and 2 show an embodiment of a pant diaper 1 for an infant or an incontinent adult. Said pant diaper 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 the article and extends a certain 35 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.

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.

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#### *Topsheet*

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 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.

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#### *Backsheet*

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.

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*Absorbent core*

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-swellaable, 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.

The absorbent core 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.

*Elastic laminate material*

The outer coversheet covering the front and back panels 5 and 6 of the chassis 4 comprises an elastic laminate material 10, which is elastic at least in the transverse x-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.

Preferably the elastic laminate material is elastic also in the y-direction of the article. However the elasticity in the y-direction is preferably lower than in the x-direction.

The elastic laminate material comprises at least one elastic and at least one non-elastic component. The term "elastic" in this context refers to a component having a permanent elongation after relaxation of less than 10% after the component has been subjected to an elongation of 30% in the Elasticity test specified below. The term "non-elastic" refers to a component that does not fall within the definition of an elastic component. A "non-elastic" component may be stretchable or non-stretchable. In the case of stretchable the component has a permanent elongation after stretching and relaxation of more than 10% after the component has been subjected to an elongation of 30% in the Elasticity test specified below.

The term "component" may be a material layer, such as a nonwoven, a film or a laminate thereof, as well as elongate elastic members such as elastic threads.

The elastic laminate material in the embodiment shown and described below is composed of first and second outer layers of fibrous material 11 and 12 and a middle elastic film layer 13 located between said fibrous layers. However it is understood that other types of elastic laminate materials may be used, such as laminates of elastic and non-elastic nonwoven

materials, nonwoven materials which per se are inelastic, but which have been elastified by means of elastic threads, bands etc. In the latter case the elastic threads or bands constitute said elastic components of the elastic laminate.

5 In the elastic laminate shown and described below it is preferred that the outer fibrous layers 11 and 12 are chosen so that they, in combination with the inner elastic film layer 13, 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 laminate. Examples of suitable materials are carded webs and spunbond materials. The basis weight of the  
10 fibrous material layers should be between 10 and 35 g/m<sup>2</sup>, preferably between 12 and 30 g/m<sup>2</sup>, more preferably between 15 and 25 g/m<sup>2</sup>. 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  
15 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.

20 The middle layer 13 is according to one embodiment of the invention an apertured elastic film having a basis weight between 20 and 80 g/m<sup>2</sup>, preferably between 20 and 60 g/m<sup>2</sup>. 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),  
25 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 an apertured three-layer elastomeric film of PE-SEBS-PE.

30 The total basis weight of the laminate is preferably 100 g/m<sup>2</sup> or less, more preferably not more than 90 g/m<sup>2</sup>.

The elastic laminate 10 may be manufactured according to the method disclosed in WO  
35 03/047488, wherein one spunbond layer 11 is applied to the film 13 in a tacky state and

will thus bond to the film layer, while the other spunbond layer 12 is adhesively laminated to the film layer 13, using for example a pressure sensitive hot melt adhesive. Alternatively the laminate is manufactured according to a modified version of this known method, wherein the modification involves that the laminate is incrementally stretched (through intermeshing gears, IMG), to a point below the elongation at peak load of at least one of the non-elastic nonwoven layers to retain some strength for at least one of the nonwoven layers. The other layer may also be stretched to a point below its elongation at peak load, or to a point at which it will tear during stretching.

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- 10 The method disclosed in WO 03/047488 involves stretching of the laminate above the point of failure of the fibrous material, so that the non-elastic layers break completely. Therefore, as described in WO 03/047488, the elongation of the laminate is not limited by the stretch modulus of the non-elastic material.
- 15 In a preferred embodiment at least one, preferably both fibrous layers, which are bound to the elastic film, are not, in contrast to the method described in WO 03/047488, completely torn upon manufacture of a laminate according to the present invention. Selection of fibrous materials which have an elongation at maximum load greater than the elasticity of the elastic laminate allows the elastic film to stretch without being hindered by the fibrous
- 20 layers. Such a selection also ensures that the fibrous layers contribute to the puncture resistance of the laminate, as they are not completely torn or broken during manufacture. Preferably both fibrous layers or at least one of the fibrous layers have an elongation at maximum load that is at least 10% higher than the elasticity of the laminate. This is described in more detail in PCT/SE2004/001005, which is incorporated herein by
- 25 reference.

The elastic laminate described above should for the purpose of the present invention be laminated to an additional nonwoven material, which will constitute the non-elastic component referred to above. Said additional nonwoven material is attached to the elastic

30 laminate while this is in a stretched condition.

A further example of an elastic laminate material suitable for the purpose of the present invention is disclosed in WO 2007/133146. Here a two-layer laminate is produced comprising a first non-elastic nonwoven and an elastic film, said two-layer laminate is

35 activated by incremental stretching in at least one direction to render it elastically

stretchable. A second non-elastic nonwoven is laminated to the elastic film of the two-layer laminate while this is in a stretched condition. Said second non-elastic nonwoven material may constitute said non-elastic component.

- 5 The activated two-layer laminate can be adhesively, thermally or ultrasonically bonded to the second nonwoven component.

In a further embodiment the elastic component is an elastic film, an elastic nonwoven material or elongate elastic members in the form of elastic threads for example.

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- The non-elastic component may be a nonwoven material and it should have a tensile strength in the longitudinal direction, y, of the article of at least 10N/25mm, preferably at least 20N/25mm, more preferably at least 25N/25mm and most preferably at least 30N/25mm according to the Tensile test method referred to below. For an article produced in crosswise direction these strength values corresponds to the strength in the cross direction of the nonwoven material. One example of a nonwoven material suitable as the non-elastic component is a spunbond nonwoven.
- 15

Some examples of suitable spunbond nonwoven materials are:

- 20 - Spunbond nonwoven from PGI (Polymer Group Inc.), with supplier code "B0252", basis weight 50gsm and a tensile strength in CD of about 40N/25mm;  
- Spunbond nonwoven from Tenotex S.p.A., supplier code "Spunten 40 phob", basis weight 40gsm and a tensile strength in CD of about 35N/25mm;  
- Spunbond nonwoven from Freudenberg, with supplier code "Lutrasil 0519 XF", basis weight 19gsm and a tensile strength in CD of about 20N/25mm;  
25 - Spunbond nonwoven from Avgol America Inc., basis weight 50gsm and a tensile strength in CD of about 40N/25mm.

- It is pointed out that the CD (cross direction) of the nonwoven corresponds to the longitudinal direction (y) of the absorbent article.
- 30

- The opacity of a material layer is the characteristic ability of the material layer to visually hide from view an underlying object or pattern. The opacity is measured in %, wherein 100% opacity means that nothing can be seen through the material layer and 0% means that the material layer is completely transparent. The opacity is measured by the Opacity
- 35

Test described below, which is based on luminous-reflectance-factor data.

Opacity of the laminate can be obtained by the incorporation of opacifying fillers into the laminate, particularly into the elastic film. Such pigments can be organic or inorganic dyes, colouring agents, or whitening agents. Inorganic materials such as titanium dioxide, inorganic carbonates, synthetic carbonates, talc, nepheline syenite, magnesium hydroxide, aluminium trihydrate, siliceous earth, mica, natural or synthetic silicas, calcinated clays and mixtures thereof are preferred examples of opacifying fillers.

- 10 The filler is preferably added as a master batch at the extrusion of the film. One example of an appropriate concentration is about 5% filler by weight of the film.

It is further preferred that the elastic laminate 10 has a breathability (Water Vapour Transmission Rate) according to ASTM E96-00 Procedure D of at least 1500 g/m<sup>2</sup> 24h, preferably at least 3000 g/m<sup>2</sup> 24h.

The open area of the elastic film layer is preferably at least 8%, more preferably at least 10%. The open area is measured by image analysis methods and is defined as the sum of the hole area divided by the total area of the film sample.

20

#### *Pant-type absorbent article*

The pant-type absorbent article disclosed in Fig. 1 is intended to enclose the lower part of the wearer's trunk like a pair of underwear pants. It comprises a chassis 4 including a front panel 5, a back panel 6, a crotch portion 19 and an elastic waistband 7 secured to the front and back panel. In an alternative embodiment only one of the front 5 and back panels 6 have an elastic waistband 7 secured thereto. A core region 3 comprising an absorbent core 2 is located at least in the crotch portion 19 of the article and extends a certain distance into the front 5 and back panels 6. The core region 3 is defined as the surface area of the article which is occupied by the absorbent core 2 and the areas outside the core, which are covered by the liquid-impervious backsheet 9.

30

In an alternative 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.

35

Each of the front and back panels 5 and 6 has a waist edge 5a and 6a, a crotch edge 5b and 6b, and a pair of side edges 5c, 6c and 5d and 6d respectively. The front 5 and back panels 6 are joined to each other along their side edges 5c, 6c and 5d, 6d by ultrasonic welds 15, glue strings or the like to form side seams. The elastic waistband portions 7  
5 secured to the front panel 5 and the back panel 6 are also joined to each other along said side seams. The joined front and back panels 5 and 7 and waistband portions 7 define the waist opening and a pair of leg openings of the pant diaper.

According to one embodiment of the invention the surface area of the absorbent core 2  
10 amounts to not more than 30% of the total surface area of the article, preferably not more than 20%, as measured in a flat state of the article. The term "flat state" herein means in an opened untensioned state, as seen in Figure 2, and in which any tensioned elastic members have been deactivated.

15 The elastic web material 10 may cover the entire article, including the core region 3. However according to a preferred embodiment a substantial part of the crotch portion 19 of the article is free from the elastic web material 10. A "substantial part" used herein refers to at least 50%, preferably at least 75%.

20 A crotch panel 18, which preferably is a non-elastic material, more preferably a non-elastic nonwoven material, is arranged in the crotch portion of the article and overlaps with the elastic front and back panels 5 and 6. The crotch panel 18 is along its transverse side edges 18a and b joined in an overlapping manner to the front and back panels 5 and 6 by means of ultrasonic welds 17, glue strings or the like.

25 As described above the elastic laminate material comprises at least one elastic component and at least one non-elastic component. Said non-elastic component of the elastic laminate material has a portion that extends beyond said elastic component of the at the waist edge 5a, 6a of the front 5 and/or back panel 6. This is illustrated in Fig. 4 and  
30 5 in which the second non-elastic nonwoven layers 12 extends beyond the elastic film 13 and the first nonwoven layer 11 at the waist edge area. The portion of the second nonwoven layer that extends beyond the elastic film 13 and the first nonwoven layer is designated with the numeral 12a.

35 In an alternative embodiment both the first and second nonwoven layers 11 and 12 extend

beyond the elastic film 13.

5 In the embodiments shown in Fig. 4 and 5 a separate elastic waistband 7 is joined to the front 5 and/or back panel 6 in the portion 12a of said non-elastic component 12 that extends beyond said elastic component 13 of the elastic laminate 10 to form a waistband seam 16 (Fig. 7). The waistband seam 16 is located entirely in the portion 12a of said non-elastic component 12 that extends beyond the elastic component 13 of the elastic laminate material 10 and does not overlap with the elastic component 13.

10 The waistband seam 16 formed by ultrasonic welding, thermal bonding, gluing or the like.

The elastic waistband 7 comprises a non-elastic web material that is elasticized by elongate elastic members 14a, such as elastic threads or bands, contractably affixed between the non-elastic web material layers. Elastic threads or bands 14b may also be  
15 arranged around the leg openings of the article.

The separate elastic waistband 7 shown in Fig. 4 and 5 comprises first and second plies 20 and 21 of non-elastic web material enclosing between them at least one elastic thread or band 14a and preferably two or more elastic threads or bands. The non-elastic web material is preferably a nonwoven. According to Fig. 4 the first ply 20 and second ply 21 of the waistband receives the portion 12a of the second non-elastic nonwoven component 12 between them, while according to Fig. 5 the first and second plies 20 and 21 of the waistband are secured to the same side of the second non-elastic nonwoven component 12 at the portion 12a thereof.

25 The separate elastic waistband 7 is either formed from a double folded non-elastic web material or from two separate plies which are joined together to enclose therebetween the elastic threads 14a.

30 The portion 12a of the non-elastic nonwoven component 12 should extend at least 5 mm, preferably at least 10 mm, beyond the elastic film component 13 of the elastic laminate material 10 at the respective waist edge 5a, 6a of the front and/or back panel 5, 6 in order to form a sufficient waistband seam area. The portion 12 of the non-elastic nonwoven component may extend all the way up to the upper waist edge of the waistband 7 or only  
35 part thereof sufficient to form the waistband seam area.

According to the embodiment shown in Fig. 6 the elastic waistband 7 is an integral part of the second non-elastic nonwoven component 12 of the elastic laminate web 10. The portion 12a of the second non-elastic nonwoven component 12 that extends beyond the elastic film component 13 is long enough to be folded upon itself and be joined to itself to form a first and second ply of non-elastic material enclosing at least one elongate elastic member 14a. Also in this embodiment the waistband seam 16 (Fig. 7) is located entirely in the portion 12a of the non-elastic component 12 that extends beyond the elastic component 13 of the elastic laminate material 10 and does not overlap with the elastic component 13.

The distance d between the waistband seam 16 and the elastic component 13 of the elastic laminate material 10 in the waist edge area 5a; 6a of the front and/or back panel 5; 6 is preferably not more than 50 mm, preferably not more than 25 mm and more preferably not more than 10 mm, in order to ensure a good fit and elasticity in the waist area.

The non-elastic portion 12a provides an improved attachment area for the waistband as compared to a direct attachment of the waistband to the elastic part of the elastic laminate. A cost saving is also achieved, since the amount of elastic component in the elastic laminate is reduced.

In an alternative embodiment only one of the front and back panels 5 and 6 is joined to an elastic waistband 7, wherein the elasticity of the elastic web material 10 is sufficient to keep the other panel in place above the hips of the wearer.

The elastic web material constitutes the sole component of in parts of the front and back panels 5 and 6 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 according to Figure 2 and 3, the elastic web material 10 constitutes the sole component of the chassis.

No additional elasticized side panels joining the front and back panels 5 and 6 are needed when using the elastic web material 10 according to the invention. If desired, additional elasticized side panels may of course be provided, especially in cases where the elastic web material 10 is arranged only in parts of the front and/or back panels.

- As stated above the elastic web material 10 has an opacity of at least 40%, preferably at least 50% and more preferably at least 60%. The opacity of the elastic web material provides a cloth-like appearance to the article, which is of particular importance when the article is a pant diaper. Especially in this case, where the elastic web material forms the sole component in considerable surface area regions of the pant diaper, such as large areas of the front and back panels, and the absorbent core covers only relatively small areas, 30% or less, of the article, the appearance of the elastic web material is of great importance for the overall appearance of the article. Thus by making the elastic web material opaque with an opacity of at least 40%, the pant diaper will appear more cloth-like and more like "normal" underwear, than if the elastic web material would have a higher degree of transparency. The opacity is measured by the Opacity Test disclosed in PCT/SE2004/001415.
- 15 It is further desired that the elastic web material has a puncture resistance of at least 15N as measured according to ASTM Designation D3763-02. Preferably, the elastic web material of the present invention has a puncture resistance of at least 20N, and more preferably at least 30N.
- 20 The elastic web material should preferably have a softness according to Kawabata of at least 20, preferably at least 30 and most preferably at least 40. It is further desired that it has a formability according to Kawabata of not more than 50, preferably no more than 30, more preferably no more than 20 and most preferably no more than 10. It is also desired that the elastic web material has a drapability according to Kawabata of no more than 40.
- 25 The softness, formability and drapability according to Kawabata are measured according to the test methods given in PCT/SE2004/001004.

#### *Elasticity test*

- The method measures how an elastic material behaves at repeated load and unload 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.

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.

5

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
- 10 • Preload: 0.05 N

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  
15 between 0 and the predetermined elongation, equal to the highest defined 1<sup>st</sup> load, are 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.

20 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 that the material should have a permanent relaxation after elongation of less than 10% after  
25 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.

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

35

*Tensile strength test*

The tensile strength of the nonwoven is measured according to the standard test WSP 110.4 (05). The same type of tensile tester, Lloyd LRX, is used as in the Elasticity test described above.

5

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.

10 The tensile tester is calibrated according to the apparatus instructions. The parameters needed for the test are adjusted to:

- Crosshead speed: 500 mm/min
- Clamp distance: 50 mm

15 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 is stopped after the sample has broken, if it is not automatically controlled. The tensile strength is noted as the maximum force (N/25.4mm).

20 *Manufacturing process*

The pant diaper may be manufactured by a process which is illustrated in Fig. 8, which is a highly schematic representation of the process. The various components of the absorbent article are united on a conveyor belt running in a direction of travel denoted by arrow A. The pant diaper is produced in crosswise direction, i.e. in the transverse direction, x, of the diaper. The chassis structure is formed from a compound chassis web 22 comprising a central nonwoven chassis web 23, a pair of elastic laminate webs 24, 25 with a central gap therebetween and a pair of waistband features 26, 27. The elastic laminate webs 24, 25 each comprises an elastic component web 28, 29 and a non-elastic component web 30, 31, wherein the non-elastic component web is wider than the elastic component web, so that it has a portion 30a, 31a that extends beyond the elastic component web.

35 In the embodiment shown in Fig. 8 the non-elastic component web 30, 31 is laminated to the elastic component web 28, 29 in the manufacturing process. Alternatively the elastic laminate web 24, 25 is introduced in the manufacturing process as a prefabricated laminate. The elastic laminate web 24, 25 may be of any optional kind referred to above.

A pair of continuous lengths of non-elastic web material 26, 27 intended to form the elastic waistband feature 7, are fed in the direction of travel A and are with a first side edge joined to the outer side edges of the respective elastic laminate web 25, 25 in the area of the portion 30a, 31a of the non-elastic component web 30, 31 that extends beyond the elastic component web 28, 29. Elongate elastic members 32, 33 are introduced and attached to the non-elastic web materials 26, 27 in a tensioned condition. The non-elastic web material 26, 27 is subsequently folded and the second side edge is joined to the portion 30a, 31a of the non-elastic component web 30, 31 opposite the first side edge. The second side edge is either joined to the opposite side of the non-elastic component web or to the same side thereof as the first side edge of the non-elastic component web 30, 31. Joining is made by ultrasonic welding, thermal bonding, gluing or the like to form a waistband seam that is located entirely in the area of the portion 30a, 31a of the non-elastic component web 30, 31.

Alternatively to folding a single non-elastic web material 26, 27 the waistband may be formed from two separate non-elastic web materials joined together to form a first and second ply enclosing between them the elongate elastic members 32, 33.

The portion 30a, 31a of the non-elastic component web 30, 31 should extend at least 5 mm, preferably at least 10 mm, beyond the elastic component web 28, 29 in order to form a sufficient waistband seam area. The portion 30a, 31a of the non-elastic component web 30, 31 may extend all the way up to the upper waist edge of the waistband or only part thereof sufficient to form the waistband seam area.

In an alternative embodiment illustrated in Fig. 10 the waistband is formed by folding the portion 30a, 31a of the non-elastic component web 30, 31 and joining it to itself by a waistband seam located entirely in the area of said portion 30a, 31a. Elongate elastic members 32, 33 have been introduced and attached in a tensioned condition to said portion 30a, 31a of the non-elastic component web 30, 31. In this case said portion 30a, 31a is wide enough to form the waistband.

The elastic laminate webs 24, 25 are joined to the central nonwoven chassis web 23. The elastic laminate webs 24, 25 are preferably stretched in the direction of travel, A, by 10-

200% of their initial non-stretched condition before being joined to the central nonwoven chassis web 23.

5 In an alternative embodiment the elastic laminate web may be applied as a single web having no central gap. Such an embodiment produces a pant-type article having an elastic laminate covering the crotch portion as well as the front and back panels of the pant type article.

10 Core components 34 are laid down on and joined to the assembled chassis web 22. The core components 34 are composed of an absorbent core 35 arranged between a liquid impervious backsheet 36 and a liquid pervious topsheet 37. In the shown example the core component further comprises elastic elements 38 arranged in a curve-shaped pattern on the liquid impervious backsheet 36. The shown pattern is only intended as an example and other patterns may be used for the elastic elements 38, such as linear. It is also  
15 possible to dispense with elastic elements in the core component.

The core component is shown as a two-component structure with an upper, smaller absorbent core 39 and a lower larger absorbent core 40. It is understood that the construction of the absorbent core component 34 is by no means limiting for the invention.  
20

After joining the core components 34 to the chassis web 22 a portion 40 is cut out from the chassis web 22 between the core components 34, to create leg openings 41. The chassis web and the integrated core components 34 are then folded centrally and the web halves are joined in side joints 42 between the core components 34. Finally individual pant type  
25 articles 1 are cut from the production web.

It is understood that although the invention has been described with reference to preferred embodiments, several modifications are possible within the scope of the claims. The invention therefore intends to cover any variations or equivalents which are within known  
30 or customary practice within the technical field to which it belongs.

**Claims**

1. A pant-type absorbent article (1) such as a pant diaper, a sanitary pant or incontinence pant, said article having a chassis (4) comprising a core region (3) holding an absorbent core (2), said chassis further comprising a front panel (5), a back panel (6) and an elastic waist feature (7), each of the front and back panels having a waist edge (5a, 6a), a crotch edge (5b,6b) and a pair of side edges (5c,6c;5d,6d), wherein the front and back panels being joined to each other along two opposite side edges to define a waist-opening and a pair of leg-openings, at least one of the front and back panels (5;6) comprises an elastic laminate material (10) constituting the sole component of at least part of the front and/or back panels, said elastic laminate material (10) comprising at least one elastic component (13) and at least one non-elastic component (12), the elastic waist feature (7) being joined to the waist edge (5a;6a) of at least one of the front and back panels (5;6), said article having a longitudinal (y) and a transverse direction (x),
- characterized in
- that a portion (12a) of said non-elastic component (12) of the elastic laminate material (10) extends beyond said elastic component of the elastic laminate material at the waist edge (5a, 6a) of the front and/or back panel (5; 6) and that the elastic waist feature (7) is joined to the front and/or back panel in said portion (12a) of the non-elastic component (12) that extends beyond said elastic component (13) to form a waistband seam (16) that is located entirely in the area of said portion (12a) of the non-elastic component (12).
2. The absorbent article as claimed in claim 1,
- characterized in
- that the elastic waist feature (7) is a separate waistband component comprising a first and a second ply (20, 21) of non-elastic web material enclosing between them at least one elongate elastic member (14a), said separate waistband component being joined to the portion (12a) of said at least one non-elastic component (12) of the elastic laminate material (10) that extends beyond said elastic component (13) of the elastic laminate material.
3. The absorbent article as claimed in claim 2,

characterized in

that said elastic waistband (10) is formed from a folded non-elastic web material so as to form said first and second plies (20, 21) enclosing said at least one elongate elastic member (14a).

5

4. The absorbent article as claimed in claim 1,

characterized in

that said elastic waist feature (7) is an integral part of the portion (12a) of the non-elastic component (12) of the elastic laminate web material (10) that extends beyond  
10 said elastic component (13) of the elastic laminate material and, said portion (12a) of the non-elastic component is folded and joined to itself to form a first and second ply of non-elastic material enclosing between them at least one elongate elastic member (14a).

15 5. The absorbent article as claimed in any of claims 1-3,

characterized in

that said portion (12a) of the non-elastic component (12) of the elastic laminate material (10) extends at least 5 mm, preferably at least 10 mm, beyond said elastic component of the elastic laminate material at the waist edge (5a, 6a) of the front and/or  
20 back panel (5; 6).

6. The absorbent article as claimed in any of the preceding claims,

characterized in

that the distance (d) between the waistband seam (16) and said elastic component (13)  
25 of the elastic laminate material (10) in the waist edge area of the front and/or back panel (5; 6) is not more than 50mm, preferably not more than 25mm and more preferably not more than 10mm.

7. The absorbent article as claimed in any of the preceding claims,

30 characterized in

that said elastic web material (10) constitutes the sole component of the chassis (4) in at least 20% of the total surface area of the article.

8. The absorbent article as claimed in claim 7,  
characterized in  
that the elastic web material (10) constitutes the sole component of the chassis (4) in at  
least 25%, preferably at least 30%, more preferably at least 40%, of the total surface area  
5 of the article.

9. The absorbent article as claimed in any of the preceding claims,  
characterized in  
that said elastic web material (10) has an elasticity in the transverse direction of the article  
10 of at least 30%, preferably at least 50%, more preferably 70%, when measured according  
to the elasticity test specified in the description.

10. The absorbent article as claimed in claim 9,  
characterized in  
15 that the elastic web material (10) has an elasticity in the longitudinal direction of the article  
of at least 20% when measured according to the elasticity test specified in the description.

11. The absorbent article as claimed in any of the preceding claims,  
characterized in  
20 that the elastic laminate material (10) composed of first and second layers of fibrous  
material (11,12) and an elastic film layer (13) located between said first and second fibrous  
layers.

12. The absorbent article as claimed in claim 11,  
25 characterized in  
that said elastic film layer (13) is breathable and has a Water Vapour Transmission Rate  
according to ASTM E96-00 Procedure D of at least 1500 g/m<sup>2</sup> 24h, preferably at least  
3000 g/m<sup>2</sup> 24h.

30 13. The absorbent article as claimed in claims 11 or 12,  
characterized in  
that the first and/or second layer (11, 12) of fibrous materials constitutes said non-elastic  
component having a portion that extends beyond the elastic film (13), constituting said

elastic component of the elastic laminate, in the waist edge area of the first and/or second body panel (5, 6).

14. The absorbent article as claimed in claim 13,  
5 characterized in  
that at least one of the front and back panels (5, 6) comprises an activated two-layer elastic laminate comprising a first non-elastic fibrous nonwoven web (11) and an elastic film (13) and a second non-elastic nonwoven web (12) that has been laminated to the elastic film of the two-layer laminate after activation and while the two-layer elastic  
10 laminate was stretched by 35-200% of its non-stretched extension, to form a three-layer elastic laminate material, wherein the second non-elastic nonwoven web (12) constitutes said non-elastic component having a portion that extends beyond the elastic film (13), in the waist edge area of the first and/or second body panel (5, 6).

15 15. The absorbent article as claimed in claim 14,  
characterized in  
that the second non-elastic nonwoven web (12) has been laminated to the elastic film of two-layer laminate after activation while the two-layer elastic laminate was stretched by 35-180%, preferably 50-150% and more preferably 70-120% of its non-stretched  
20 extension to form said three-layer elastic laminate material.

16. The absorbent article as claimed in any of the preceding claims,  
characterized in  
that the elastic web material (10) has a basis weight of no more than  $100\text{g/m}^2$ , preferably  
25 no more than  $90\text{g/m}^2$ .

17. The absorbent article as claimed in any of the preceding claims,  
characterized in  
that said non-elastic component (12) is a nonwoven material having a tensile strength in  
30 the longitudinal (y) direction of the article of at least  $10\text{N}/25\text{mm}$ , preferably at least  $20\text{N}/25\text{mm}$ , more preferably at least  $25\text{N}/25\text{mm}$  and most preferably at least  $30\text{N}/25\text{mm}$ .

18. The absorbent article as claimed in any of the preceding claims,  
characterized in

that a crotch panel (18) of a substantially inelastic web material is arranged in the crotch portion (19) of the article, said crotch panel (18) being joined to the front and back panels (5,6) comprising said elastic web material (10).

- 5 19. The absorbent article as claimed in any of the preceding claims,  
c h a r a c t e r i z e d i n  
that the surface area of the absorbent core (2) amounts to no more than 30%, preferably  
no more than 20%, of the total surface area of the article, as measured in a flat state of  
the article.

10

20. A method for producing pant-type absorbent articles (1) such as a pant diapers,  
sanitary pants or incontinence pants as claimed in claim 1, each article having a chassis  
(4) comprising a core region (3) holding an absorbent core (2), said chassis further  
comprising a front panel (5), a back panel (6) and an elastic waistband feature (7), at least  
15 one of the front and back panels (5;6) comprises an elastic laminate material (10)  
comprising at least one elastic component (13) and at least one non-elastic component  
(12), the method including a continuous process comprising forming a chassis web (22),  
and joining the absorbent core component (34) to the chassis web (22),  
c h a r a c t e r i z e d i n

- 20 forming at least part of said chassis web (22) from said elastic laminate material (10),  
said elastic laminate material being fed as a web (24, 25) in a direction of travel (A) and  
having a pair of opposite sides along said direction of travel, said web (24, 25) of  
elastic laminate material having a portion (30a, 31a) of said non-elastic component  
web (30, 31) that extends beyond said elastic component web (28, 29) along at least  
25 one side thereof, joining said elastic waistband feature (26, 27) to said portion (30a,  
31a) of the non-elastic component web (30, 31) that extends beyond the elastic  
component web (28, 29) and forming a waistband seam that is located entirely in the  
area of said portion (30a, 31a) of the non-elastic component web (30, 31).

- 30 21. A method as claimed in claim 20, c h a r a c t e r i z e d i n  
feeding a separate waistband web material (26, 27) of non-elastic material in said  
direction of travel (A) and joining it to said elastic laminate web material (24, 25) in said  
portion (30a, 31a) of said non-elastic component web (30, 31) that extends beyond  
said elastic component web (28, 29), said separate waistband web material being

combined with at least one elongate elastic member (32, 33) to form said elastic waistband feature.

22. A method as claimed in claim 21, characterized in  
5 that said portion (30a, 31a) of the non-elastic component web (30, 31) extends at least 5 mm, preferably at least 10 mm, beyond the elastic component web (28, 29).

23. A method as claimed in claim 21, characterized in  
Introducing at least one elongate elastic member (32) to said portion (30a) of said non-  
10 elastic component web (30) that extends beyond said elastic component web (29),  
folding said portion (30a) and joining it to itself to form a first and second ply of non-  
elastic material enclosing between said at least one elongate elastic member (32) to  
form said elastic waistband feature.

- 15 24. A method as claimed in any of claims 20-23, characterized in that said article is produced in crosswise direction, wherein said direction of travel (A) is in the transverse direction (x) of the article.

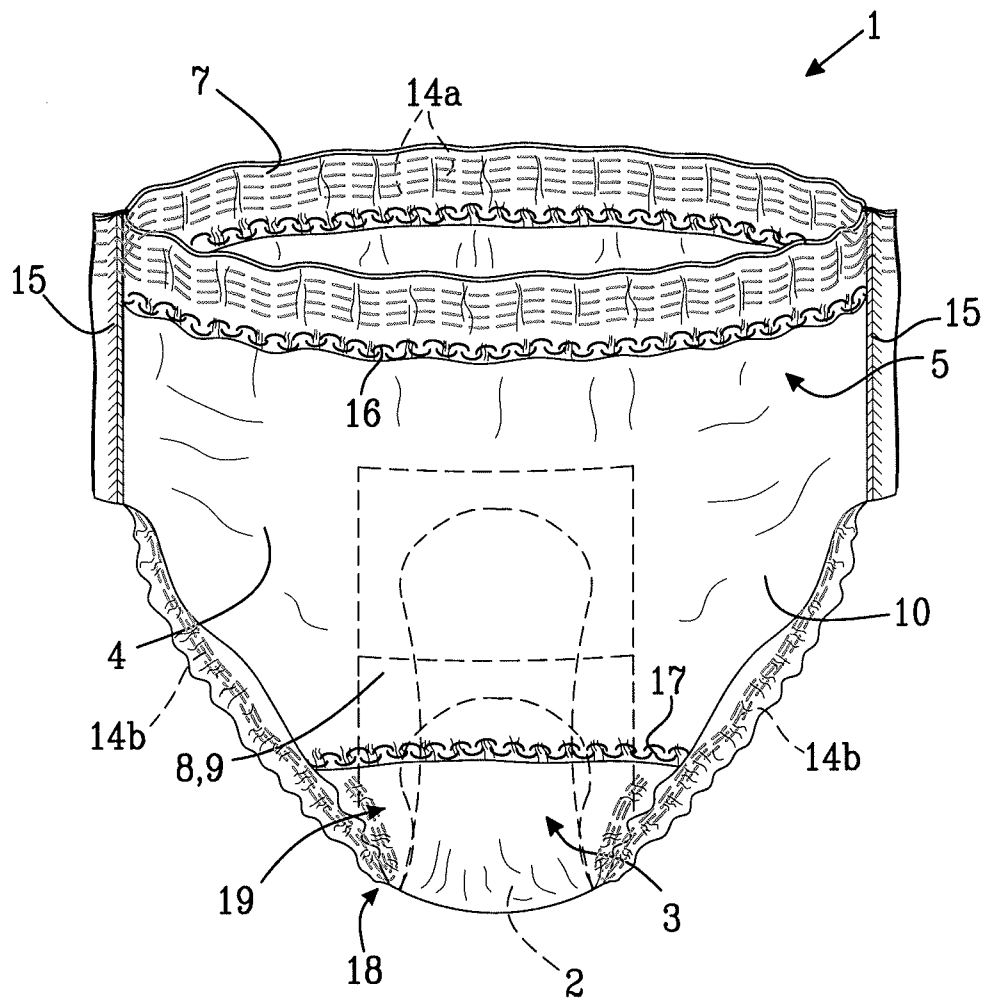
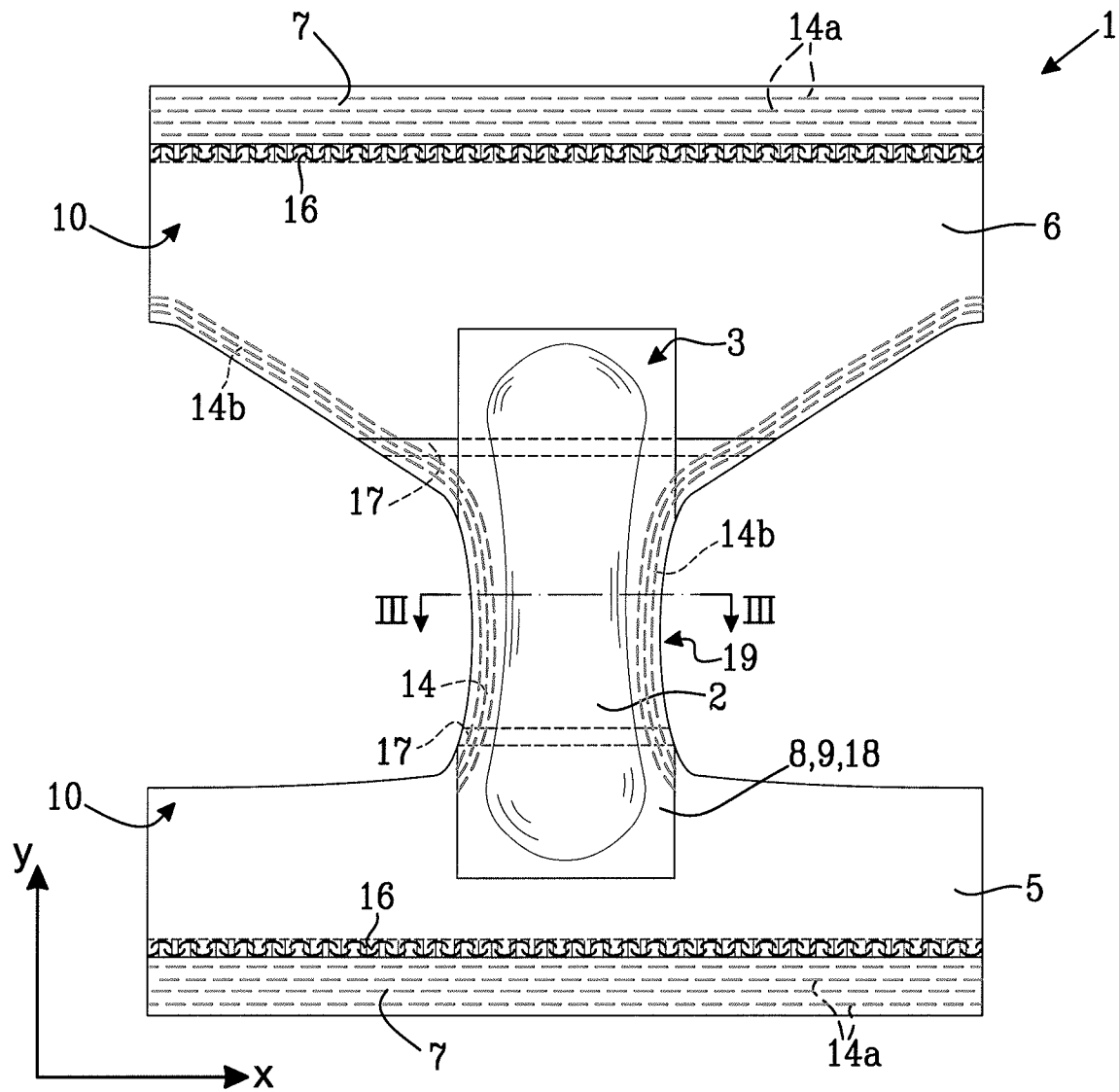
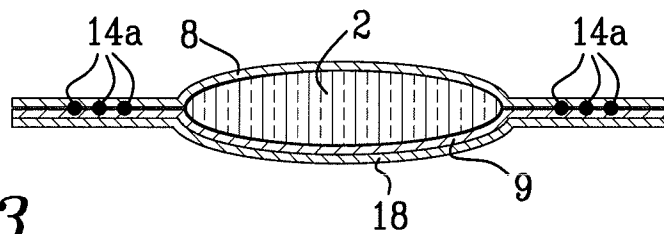


*Fig. 1*

*Fig. 2**Fig. 3*

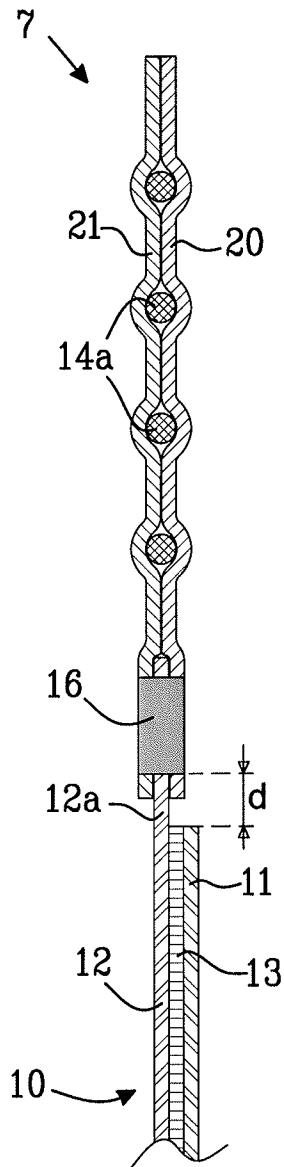


*Fig. 4*

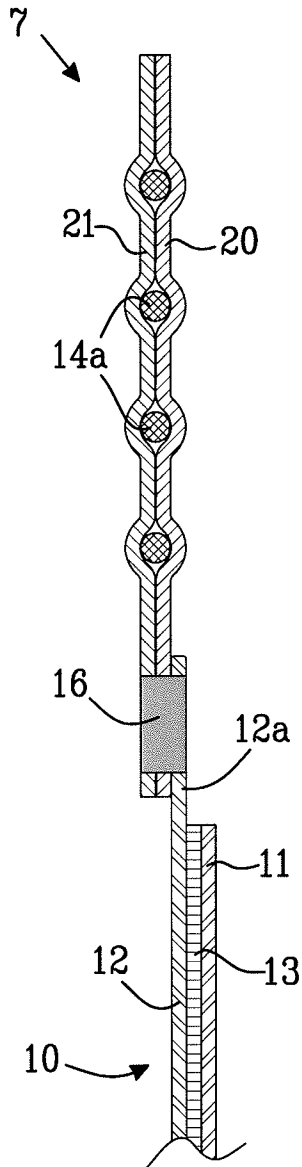


*Fig. 5*

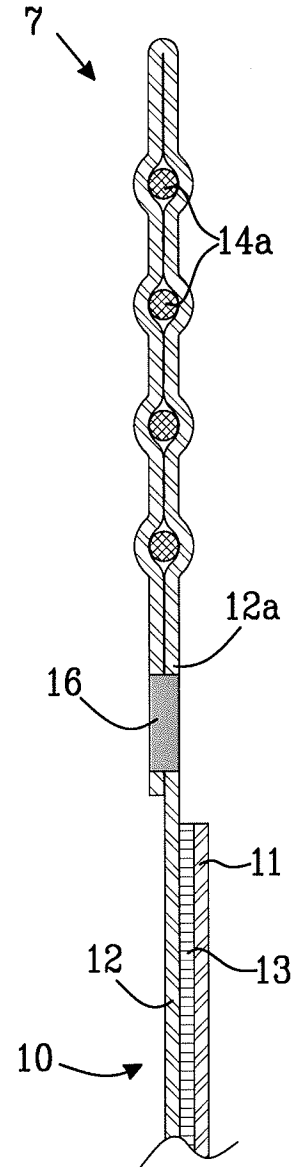


*Fig. 6*

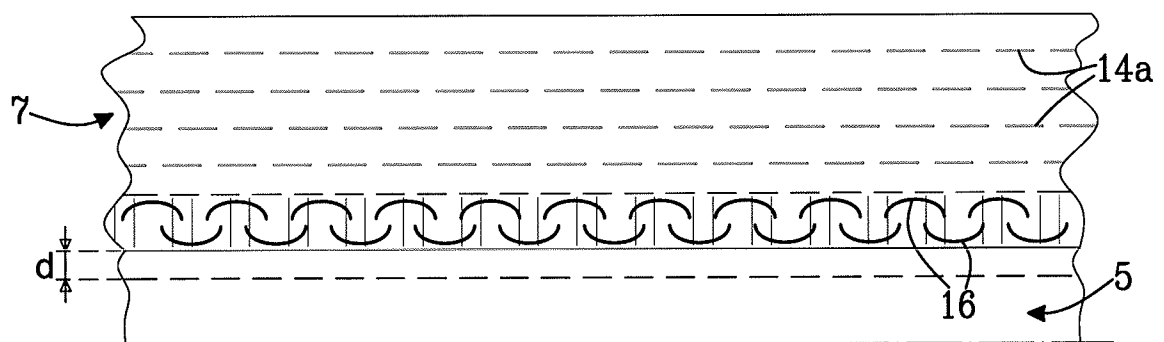
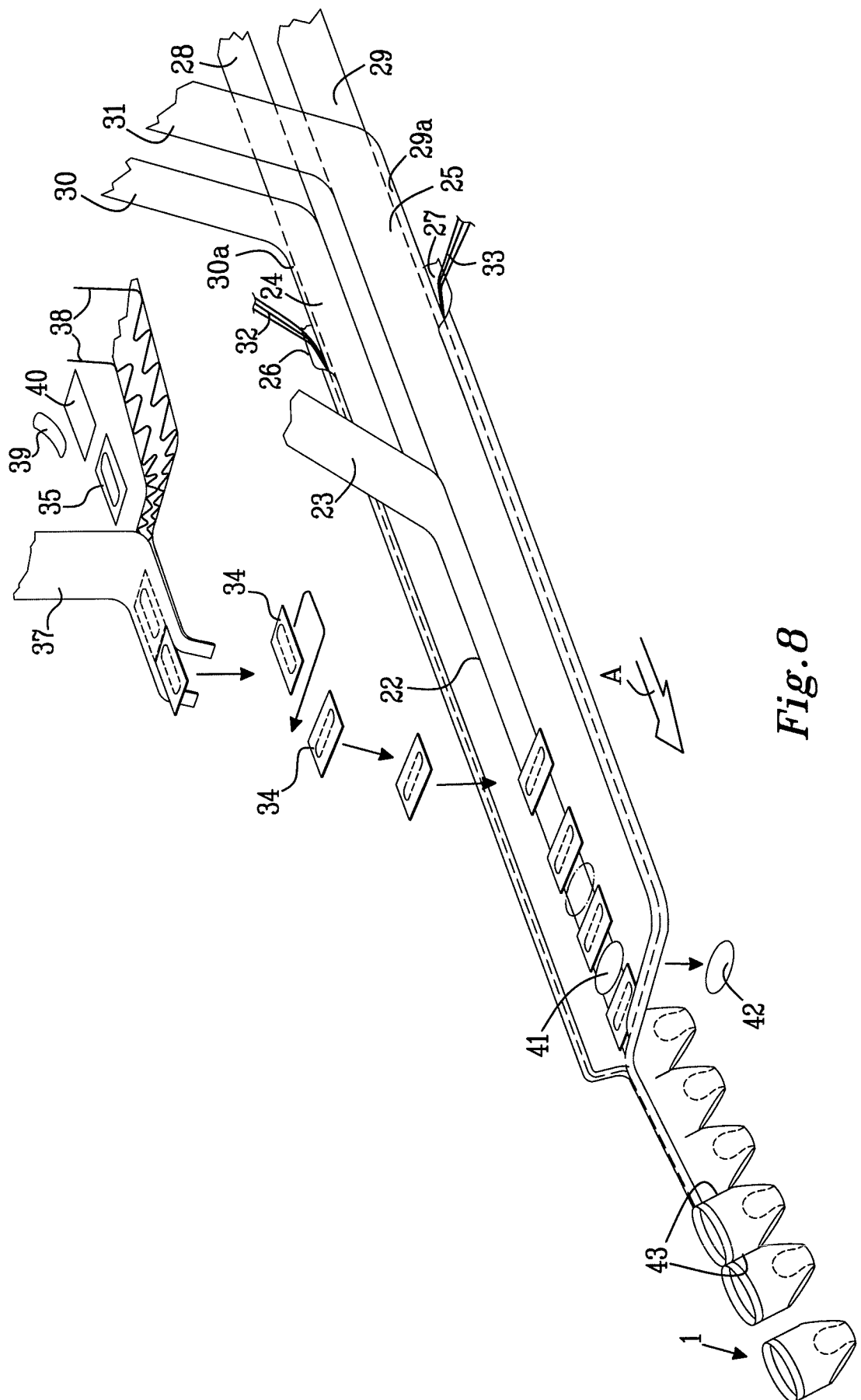


*Fig. 7*



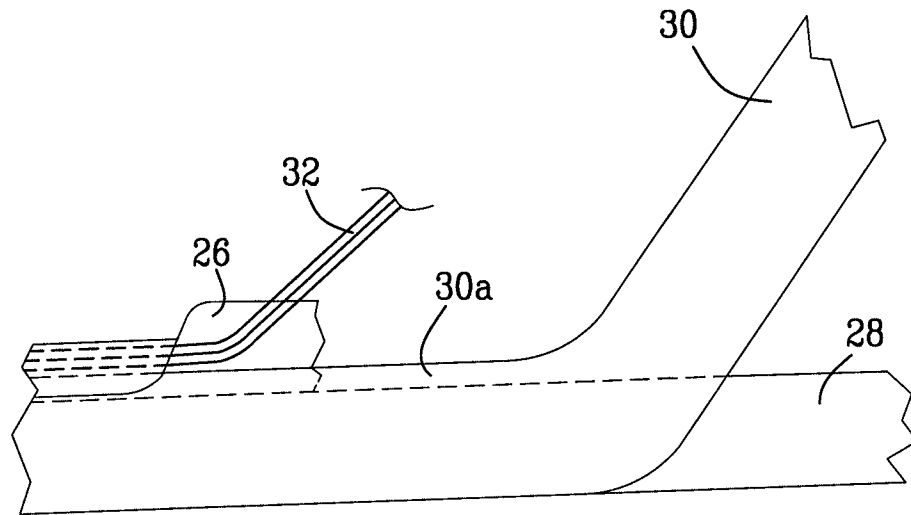


*Fig. 9*

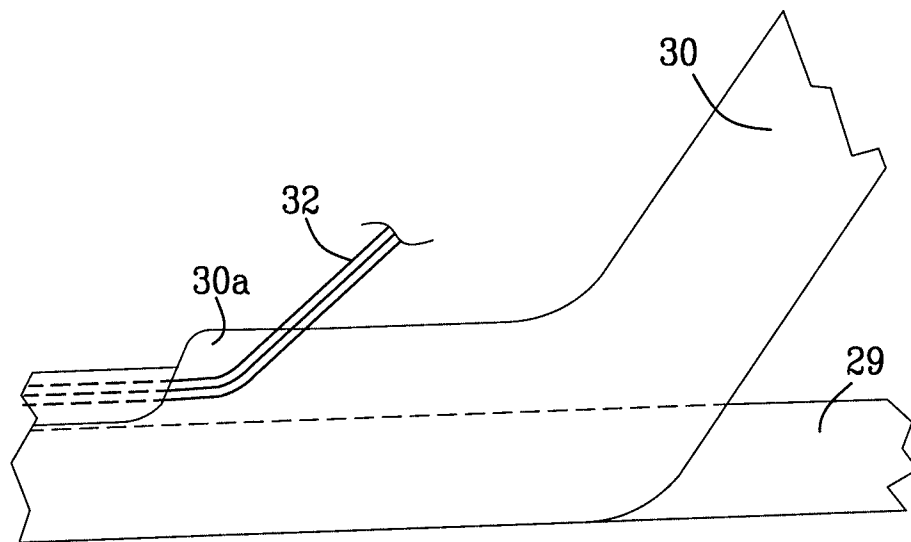


*Fig. 10*

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE2010/050714

## 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

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

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## C. DOCUMENTS CONSIDERED TO BE RELEVANT

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

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## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE2010/050714

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