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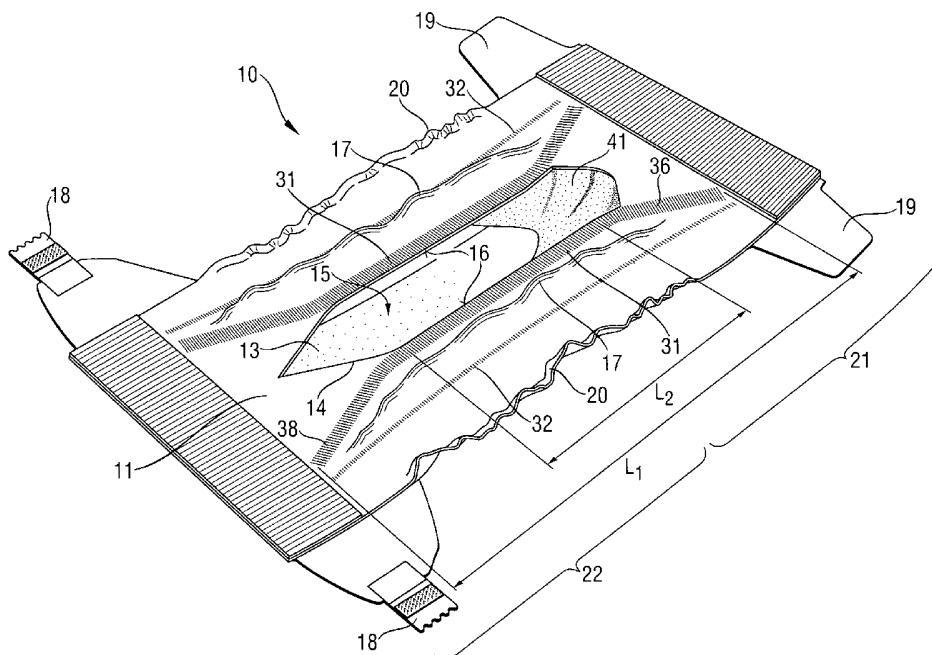
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(54) **Title:** ABSORBENT ARTICLE WITH URINE-PERMEABLE COVERSHEET



(57) **Abstract:** This invention is directed to an absorbent article, preferably a diaper or training pants, having a backsheet, an absorbent core and a topsheet, provided with at least one opening adapted to receive fecal material, comprising also a genital coversheet, which in use covers the genitals, and which is positioned in, under or above part of the opening, such that a void space can be created between the genital coversheet and the absorbent core and such that a void space is present between the topsheet and the absorbent core.

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ABSORBENT ARTICLE WITH URINE-PERMEABLE COVERSHEET

FIELD OF THE INVENTION

5 This invention is directed to an absorbent article, preferably a diaper or training pants, having a backsheet, an absorbent core and a topsheet, provided with at least one opening adapted to receive fecal material, comprising also a genital coversheet, which in use covers the genitals, and which is positioned in, under or above part of the opening, such that a void space is present between the topsheet and the absorbent core.

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BACKGROUND OF THE INVENTION

It is well known that fecal material is often difficult to remove from the skin of the user, in particular on sensitive skin such as by young babies and the skin around the genitals. Moreover, it is well known that fecal material on the skin can cause irritation and redness of the skin and some times even dermatitis of the skin.

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One of the solutions to reduce the fecal material on the skin is to provide a means to isolate the fecal material immediately after discharge, away from the skin. For example, diapers with a topsheet with one or more openings, through which the feces can pass to a void space between the topsheet and the absorbent core, have been developed. The fecal material is then stored underneath this topsheet, away from the skin.

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However, the inventors have found that occasionally still some fecal material may transfer back onto the skin including on the genitals.

Thereto, the inventors have developed an absorbent article with a genital coversheet, which protects in use the genitals from being soiled by the fecal material. This cover is typically only present in the areas of the topsheet and of the opening, which are in proximity with the genitals (i.e. the front of the opening in the topsheet of the diaper), to allow sufficient open space to pass the fecal material through. The cover may be an integral part of said topsheet with the opening, or it may be an additional component (sheet) attached to for example the topsheet with the opening.

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Preferably, the genital coversheet is such that it forms a pocket in use, which can partially enclose the genitals.

SUMMARY OF THE INVENTION

5 The invention provides an absorbent article having a backsheet, an absorbent core and a topsheet, provided with at least one opening adapted to receive fecal material, said topsheet and said opening thereof each having a front region and a back region, characterised in that said diaper comprises a genital coversheet, which in use covers the genitals, and which is positioned in, under or above said front region of the opening,
10 wherein a void space is formable between the genital coversheet and the absorbent core, and wherein a void space is present between the topsheet and the absorbent core.
Thus, the genital coversheet reduces the size of the opening.

Such a genital coversheet is typically urine permeable, so that the urine can pass through
15 it to the absorbent core of the diaper, and it preferably has a low rewet, so that the amount of urine passing back to the genitals is minimized.

In another embodiment, the invention provides an absorbent article, typically an adult or infant diaper or training pants comprising a backsheet, absorbent core and a topsheet, and
20 integral therewith a genital cover portion, said topsheet having a front region and a back region, and said topsheet comprising in part of said front region and part of said back region an opening, preferably a single opening, to receive fecal material, characterised in that said topsheet comprises in the front region a genital cover portion that is urine permeable and that the topsheet comprises in the back region an urine-
25 impermeable and feces-impermeable feces-retaining portion, having a mean pore size of less than 20 microns and a air-permeability of at least 3 Darcy, wherein there is a void space between the genital-cover portion of the topsheet and the absorbent core and between the feces-retaining portion of the topsheet and the absorbent core.

It may be preferred that the absorbent article has a topsheet and/ or the genital coversheet
30 that is coloured or opaque to mask in use any fecal material deposited under the topsheet and/ or under the genital coversheet.

BRIEF DESCRIPTION OF THE FIGURES

Figure 1 shows a perspective view of a preferred absorbent article of the present invention, comprising a preferred genital coversheet.

Figure 2 shows a plane view of the absorbent article of Figure 1.

5 Figure 3 shows a section view of an absorbent article according to the line III-III in Figure 2.

Figures 4 and 5 show how the slit opening may be cut in the topsheet.

Figure 6 shows a perspective view of a preferred genital coversheet before implementation in the absorbent article.

10 Figure 7 shows a perspective view of the preferred genital coversheet, folded for implementation in the absorbent article.

DETAILED DESCRIPTION OF THE INVENTION

As used herein, the following terms have the following meanings:

15

As used herein, 'absorbent article' means any article that can absorb body fluids and is suitable to be placed in close proximity to the genitals of the user, including in particular and adult or infant diaper and so-called training or pull-up pants.

20 As used herein 'front region' and 'back region' refer to the two regions, which are in use, respectively, closest to the front of the wearer and the back of the wearer.

As used herein 'crotch side portion' is the portion of the topsheet between the longitudinal side edge of the opening and the longitudinal side edge of the topsheet, and
25 the crotch side portion may thus be part of the front region and/ or the back region.

As used herein, the term 'void space' is a cavity in the article present in at least the relaxed state, which serves to accept and contain bodily exudates such as fecal material, typically being at least 5 cm³ in relaxed state.

30

When used herein, 'longitudinal' is the direction running substantially parallel to the maximum linear dimension of the component, typically to the longitudinal axis of the article, and includes directions within 30° of this parallel, when applicable.

- 5 The 'lateral' or 'transverse' direction is orthogonal to the longitudinal direction and in the same plan of the majority of the article and the longitudinal axis and includes directions within 30° of the orthogonal, when applicable.

'Extendibility' and 'extendable', when used herein, means that the width or length of the
10 component (in relaxed position) can be increased.

As used herein, the term 'attached' encompasses configurations wherein a first element is directly secured to another element by affixing the element directly to a second element.

- 15 As used herein, the term 'joined' or 'connected' encompasses configurations wherein a first element is indirectly secured to a second element by affixing the first element to a third, intermediate member(s), which in turn are affixed to the second element.

As used herein 'stretched' or 'stretched state' means that the article or topsheet thereof is
20 stretched to its maximum length, which is typically determined by the length of a non-elastically extendable component which is part thereof, e.g. the backsheet or the non-elastically extendable material of the topsheet.

As used herein 'relaxed' or 'relaxed state' means the state that no forces are applied to the
25 article or component thereof (other than naturally occurring forces such as gravity), when the article is laid on a horizontal surface, such that the transverse front and back edge are flat on the horizontal surface and the transverse centre line or axis is on the horizontal surface.

30 As used herein, 'elasticated' means typically, that the component consists of or comprises elastic material, which is elastic in at least one direction. 'Non-elasticated' when used herein means that the component does not comprise any elastic material.

As used herein, 'along' means 'at least partially substantially parallel to and adjacent to'. Adjacent includes 'in close proximity with' and 'in contact with'.

5 As used herein, 'opening in the topsheet' means an area completely circumscribed by the topsheet, but where the topsheet material is not present, and which is large enough to receive fecal material, typically being at least 2 cm long or wide, or having a surface area of at least 2 cm².

10 In a first embodiment, the absorbent article of the invention comprises one or more opening, preferably a single opening, for the reception of fecal material and a genital coversheet. Preferably, the opening is in the form of a slit opening. The opening is preferably present in (part of) the front region of the topsheet (in use towards the front of the user) and in (part of) the back region of the topsheet.

15 Preferably, the topsheet has a slit opening, which has a longitudinal dimension (length) substantially parallel to the longitudinal axis of the topsheet and of the diaper.

Preferred is that (in stretched state) the opening (or openings) of the topsheet is (are) 20 configured such that from 20% to 40%, or more preferably from 20% to 30% of the length of the opening (or total length of the openings) extends from the transverse axis of the topsheet towards the front edge of the topsheet, and the remaining percentage extends towards the back edge of the topsheet.

25 The dimensions and exact shape of the opening(s) may vary, depending on the size of the topsheet and/ or the absorbent article. For example, in a preferred embodiment the opening is in the form of a slit opening with substantially parallel longitudinal side edges, which are connected in the front and back by V-shaped or rounded V-shaped (as shown herein after) front and back edges, wherein both the front and back V-shaped edges 30 comprise two angled edges.

In a preferred embodiment, front V-shaped edges have a larger angle than the back V-shaped edges. Preferably, the front V-shaped edges have an angle of 20° to 140°,

preferably from 45° to 65°, most preferably from 55° to 60°, as described herein after and can be seen from Figures 1 and 4. As shown in these Figures, the slit opening may optionally extend into an additional cut-out area which is for example diamond shaped, as described herein after.

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The maximum length of the slit opening may be for example 40% to 90% or more preferably 50% to 80%, or even more preferably about 60% to 70%, of the total length L of the absorbent article.

Preferred may be, in particular for size 4 diapers with a maximum topsheet length of
10 between 45 cm and 55 cm, typically between 48 cm and 52 cm, that the length of the single slit opening, when the diaper is in stretched state, is from 20 cm to 40 cm, or even from 25 cm to 35 cm, or even from 28 cm to 32 cm.

The average width of the opening herein, in stretched state, is preferably from 5% to 30%,
15 or more preferably 10% to 25%, of the average width of the topsheet (including opening width), or for example for a size 4 diaper, 15 mm to 60 mm, more preferably from 20 mm to 40mm.

In a second embodiment, the absorbent article comprises a backsheet and an absorbent
20 core and a body facing liner, which is apertured, comprising a multitude of micro-apertures, as described hereinafter (referred to herein after also as sublayer for the first embodiment of the invention), and for example described in EP0714272-A.

The genital coversheet is then present above this apertured body facing liner, between the skin of the user and the body facing liner. Preferably, the genital coversheet is present in
25 only the front region of the absorbent article, above the front region of the body facing liner. The genital coversheet is preferably not completely attached to the body facing liner, or more preferably not directly attached to the body facing liner. The genital coversheet is then spaced apart from the body facing liner by spacing means, to allow formation in use of a pocket by the genital coversheet, around the genitals. Hereto, the
30 absorbent article may comprise a pair of longitudinally extending cuffs, placed along the longitudinal side edged of the absorbent article, and extending in z-direction from the X-Y plane of the article, and the genital coversheet may then be attached to these cuffs, for

example, attached to the outer surface of the cuffs (this being the surface which in use is not in contact with the skin).

In the first embodiment of the invention, relating to an absorbent article with a topsheet with one or more openings, as referred to above, the absorbent article of the invention
5 comprises a genital coversheet that is present under, in or above the opening in the topsheet, typically only that part of the opening that is in close proximity with the genitals during use, i.e. the front region of the opening. Preferably, the maximum length of the part of the genital coversheet that is present above, in or under the opening genital is 10%
10 to 50% of the maximum length of the opening, preferred 10% to 30%, or more preferably 13% to 28% or even more preferably 17% to 27%. In other words, at the most 50% of the maximum length of the opening is 'covered' by the longest part of the genital coversheet, but at least 10% of the maximum length of the opening is covered by the longest part of the genital coversheet.

15 Preferably, the genital cover sheet has a substantially transverse edge above, in or under the opening which is not straight, but preferably curved or V-shaped (arrow shaped), having the centre point of the curved edge or of the V-shaped edge closer to the front of the article than the remaining part of the curved edge or V-shaped edge. Then, the length of the part of the genital coversheet from this centre point to the front of the opening is
20 preferably 10% to 30% of the maximum length of the opening, more preferably 15% to 25%, or even to 20%.

When the genital coversheet is present under the topsheet and below the opening, thus between the topsheet and the absorbent core, then, the genital coversheet is typically not
25 attached to the absorbent core, to ensure the creation of a maximum void space for fecal material between the topsheet and the absorbent core and between the genital coversheet and the absorbent core.

The genital coversheet may be attached to the absorbent article by any means, including
30 adhesive bonding, heat bonding, pressure bonding, and including various bonding patterns, such as a longitudinal line or a longitudinal line formed from individual transverse lines or dots, etc.

Preferably, the genital coversheet is partially attached to the topsheet, forming hereby attachment areas and non-attached area(s). (Some of) the non-attached area(s) may then form the protective genital cover for the genitals, typically in the form of a pocket.

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In a preferred embodiment, the genital coversheet is extendable, either longitudinally or transversely or both, so that the pressure of the genitals onto the genital coversheet causes the genital coversheet to extend and form a pocket around the genitals. The genital coversheet may be elastically extendable, or preferably, the genital coversheet may be non-elastically extendable, in longitudinal and/ or, more preferably, in transverse
10 direction. Hereto, the genital coversheet is preferably attached, for example to the topsheet, with a pair of opposing attachment areas, with herein between one or more unattached area (s), as described above, whereby the average width of the unattached area (s) of the genital coversheet, between the pair of attachment area(s), is larger than the
15 average distance (width) between the two attachment area, preferably at least 1.2 times larger, or even 1.5 times larger.

In yet another embodiment of the invention, the genital coversheet is an integral part of the topsheet with the opening. Then, the genital coversheet is herein referred to as a
20 genital cover portion of the topsheet. This integral genital coversheet or genital cover portion is then urine permeable, as described hereinafter, and the remaining part of the topsheet (the feces-retaining portion) is urine impermeable, as described herein after. The urine permeable genital cover portion is present in the front region of the topsheet, preferably between the front edge of the topsheet and the front edge of the opening, the
25 back region of the topsheet comprises said opening and the feces-retaining portion.

Then, the genital cover portion is typically the front 10 % to 50%, or more preferably 15% to 30%, or more preferably 15% to 20%, of the surface area of the topsheet, while the fecal-material retaining portion, being the back portion of the topsheet, is the remaining percentage of the surface area of the topsheet.

30 It may also be preferred that the genital cover portion of the topsheet is extendable, preferably (at least) in transverse direction.

In another embodiment, the genital coversheet extends over the whole length of the opening and comprises also an opening, for receiving fecal material.

The genital coversheet of the absorbent articles of the invention is preferably urine permeable. Urine permeability can be determined by the Strike Through test, Edana test
5 method 150.3-96, which is modified in that it applies 2 gushes of 5ml at the same sample with a waiting time of 60 seconds between 2 gushes (without changing the absorbent pad) and in that the absorbent pad consists of 10 plies of filter paper, rather than 5 plies; the filter paper used may be Ahlstroem grade 989, or equivalent; the pick-up paper may be
10 Ahlstroem Grade 632 or equivalent. This modified Edana test method provides the strike through times of the first gush and second gush, which are each an average of the values obtained in 3 tests.

Typically, the genital coversheet has an average urine permeability of the first gush strike
15 through time of less than 7 seconds, but typically less than 5 seconds, or more preferably less than 3 seconds, and most preferably between 1 and 3 seconds or most preferably between 1 and 2 seconds. Preferably, the genital coversheet has a second gush strike through time of less than 9 seconds, preferably less than 7 seconds, or more preferably even less than 5 seconds, and preferably between 1 and 7 seconds or more preferably
20 between 2 and 5 seconds, or even more preferably between 1 and 5, or even 3 seconds.

Preferably, the genital coversheet does not allow moisture to pass back to the skin, and thereto, it preferably has a low rewet. This can be determined by the Wetback Test, Edana test method 151.3-02, under 23°C and 50% humidity test conditions, as specified
25 in the Edana test, and using a filter paper with a loading factor of 3.30, as specified therein, and resulting in average rewet values, which are an average of 3 test results (the filter paper used may be as specified above). Preferably it has an average rewet value of less than 0.8 g, preferably less than 0.5 g, more preferably less than 0.3 g, or even more preferably less than 0.2 g or even less than 0.15 g.

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Also preferred may be that the genital coversheet can let low viscosity fecal material pass through and entangle it, thereby protecting the genitals from said fecal material. Preferred

is thereto that the genital coversheet is formed from materials with large pores, and large caliper, e.g. an a mean pore size of 50 to 400 microns, or even more preferably from 100 to 300 microns, and an average caliper (measured under compression of 0.3 psi) of 0.5 mm to 1.5 mm, preferably 0.7 mm to 1 mm, such as carded resin-bonded or air-through
5 nonwovens made of for example PET fiber.

Preferred genital coversheets are thereto hydrophilic, or treated with a hydrophilising agent to render them hydrophilic. Preferred materials for the genital coversheet are nonwoven and woven materials comprising hydrophilic fibers and/ or nonwoven or
10 woven materials treated with a hydrophilising agent, e.g. a surfactant.

A preferred genital coversheet is also soft to touch. Thereto, it may be preferred that at least the surface in contact with the genitals is formed by a carded or spunbond material.

15 Preferred are for example spunbond nonwovens, laminates of spunbond nonwovens (S) and meltblown nonwovens (M), such as SM and SMMS laminates, or carded nonwovens, or apertured formed films, such as for example described in WO96/00549, which each may be coated with a hydrophilising agent, e.g. a surfactant.

Also highly preferred are carded nonwoven materials, with preferably an average calliper
20 (measured under compression of 0.3 psi) of at least 0.3 mm, preferably at least 0.5 mm, even more preferably 0.7 mm, and/ or with a mean pore size of from 100 to 300 microns.

Preferred may be that the genital coversheet of part thereof is colored (e.g. other than the normal white color of known diapers), comprising thereto a coloring agent, and/ or that
25 the genital coversheet is opaque, comprising thereto an opacifying agent. This helps to mask the fecal material deposited in the absorbent article and present under the genital coversheet.

Preferably, the topsheet has, typically adjacent to, or in close proximity with, each
30 longitudinal side edge of the opening a primary elasticated area, to form typically a pair of opposing, preferably at least partially parallel, elasticated areas, such as described in copending application EP-A-1201212.

Preferred may be that the genital coversheet is attached to the topsheet by at least two attachment areas that are along, either directly adjacent or not, part of the longitudinal side edges of the opening.

- 5 When the genital coversheet is attached to the topsheet with at least a pair of opposing attachment areas, then the attachment areas are preferably not where the primary elasticated areas are, but preferably in close proximity to said primary elasticated areas.

Preferred may be that the topsheet comprises these attachment areas (where the genital
10 coversheet is attached to the topsheet) along the opposing longitudinal side edges of the (split) opening in said topsheet, but spaced apart from these edges, preferably by about 2 to 20 mm, more preferably by about 5 to 15mm.

An elasticated area in the topsheet may be formed from a multitude of thin strands of
15 elastic material or for example from a single band of elastic material.

The primary elasticated areas extend preferably from said side edges of the opening(s) towards or completely to the front and back edge of the topsheet. Thus, the primary elasticated areas are preferably longer than the opening. Preferred is that the elasticated area is positioned over the full length of the topsheet, or at least the part of the topsheet
20 which in use is intended to receive body exudates, typically the topsheet minus the parts thereof which form (part of) the waist bands.

The width of the elasticated areas on the topsheet will vary, typically depending on the exact dimensions of the topsheet and/ or the article.

25 For example, for size 4 diapers as described above, a primary elasticated area, in stretched state, may be an elastic band, or a multitude of elastic strands, that has an average width of about 3 mm to 50 mm, preferably 3 mm to 40 mm, or even more preferably 3mm, or even 5 mm to 20 mm.

30 Also, the length of the primary elasticated area will typically depend on the size of the topsheet and/ or the article. For example, for a size 4 diaper as described above the

average length of the elasticated area in stretched state, may preferably be at least 35 cm, preferably from 35 cm to 45 cm.

The primary elasticated area is preferably shaped such that it has a centre portion that is substantially parallel to the centre portion of the opposing primary elasticated area.

Each of the two centre portion has a length L2, which is preferably 30% to 70% of the total length L1 of a corresponding elasticated area, and preferably about 40% to 80% of the maximum length of the opening; hereby, it is preferred that the total length of the elasticated area is about 70% to 90%, or preferably from about 80% to 90% or preferably about 85% of maximum length of the topsheet.

Preferred is that the front end portions of two opposing primary elasticated areas bend away from one another (in the plane of the topsheet), so that the distance between the end edges of the opposing front end portions of two opposing elastic areas is larger than the distance between the centre portions of two opposing elastic areas, and equally, the distance between the end edges of the opposing back end portions of two opposing elastic areas is larger than the distance between the centre portions of two opposing elastic area.

Then, the front end portion of a primary elasticated area has typically an angle with a longitudinal line through the centre portion of the elasticated area and parallel to the longitudinal axis of the topsheet, said angle being between 10° and 40°, or preferably between 17° to 35°, or even more preferably between 20° and 35°.

Then, the back end portion of each of the primary elasticated area has also preferably an angle with a longitudinal line through the centre portion of the elasticated area and parallel to the longitudinal axis of the topsheet, said angle being between 10° and 40°, or preferably between 17° to 35°, or even more preferably between 20° and 35°.

When both front end portions and both back end portions have an angle as above, then the primary elasticated areas have, as is herein referred to, an X-shape, and a preferred X-shape is exemplified in Figures 1 and 2, as described herein after.

It may be that the front end and/ or the back end and/ or the centre portion of an elasticated area are curved rather than straight, and then the angles above are determined by the angle of the tangent line through the centre point of the front end and/ or back end,

with the line parallel to the longitudinal axis of the topsheet and tangent to the centre point of the centre portion of the elasticated area.

Preferably, the absorbent article comprises in each crotch side portion (i.e. the portion of the topsheet between the longitudinal side edge of the topsheet and the longitudinal side edge of the opening) a secondary elasticated areas, and each secondary elasticized area preferably has an overall curvature, curving away from the primary elasticated area of the same crotch side portion. The overall curvature is the curved line through the two end points of a secondary elasticated area and through the point on the same secondary elasticated area that is closest to the primary elasticated area of the same crotch side portion (herein referred to as 'closest point'), whereby the two end points are always further apart from the primary elasticated area than said closest point, or in other words, an end point is never the closest point. An end point of a secondary elasticated area is herein the point of the transverse end edge of the secondary elasticated area, which is transversely closest to the longitudinal side edge of the topsheet, and transversely furthest apart from a primary elasticated area.

This curved line has a radius R with a length of between 0.3 times the length of the absorbent article (L) to 3.2 times the length of the article, i.e. the radius is $0.3L$ to $3.2L$, or preferably $0.4L$ to $2.8L$.

Thus, the secondary elasticated area may be a perfect curved line, a curved line with an inflection point (as shown in for example Figure 2), or two (straight) lines connected with an angle with one another ('angled'), etc.

The transverse distance of this closest point to the primary elasticated area is preferably at least 0.5 mm, preferably between 0.5 mm and 30 mm, or even more preferably between 3.0 mm and 20 mm.

The end points of each secondary elasticated area are preferably close to the longitudinal side edges of the topsheet, but preferably not in contact with the longitudinal side edges of the topsheet, preferably the transverse distance between the longitudinal side edges and an end point being at least 5.0 mm, preferably at least 10 mm. Preferably, the end points of a secondary elasticated area are close to the transverse edge of the topsheet, but

preferably not in contact with the transverse end edge of the topsheet, the longitudinal distance between an end point and the transverse end edge of the topsheet being preferably between 1 and 20% of the total length of the topsheet and/ or of the article, more preferably between 5 and 15% or even between 9% and 13% of the total length of the topsheet and/ or the article (length L).

Preferably, the average transverse distance between the primary and secondary elasticated area of a crotch side portion is at least 15 mm, or more preferably at least 20 mm or even more preferably at least 25 mm, this average being the average of 3 distances, namely the transverse distance from the closest point (of the secondary elasticated area) to the primary elasticated, the transverse distance from the front end point (of the secondary elasticated area) to the primary elasticated area, and the transverse distance from the back end point (of the secondary elasticated area) to the primary elasticated area, i.e. the 3 transverse distances of the 3 points that determine the curvature of the secondary elasticated area.

Preferably, the secondary elasticated area does not comprise any angles and it is curved over its full length, with a single curvature, optionally with an inflection point.

The average width of a secondary elasticated area, e.g. a multitude of strands or a single band of elastic material, is from 0.5 to 20 mm or even from 0.5 to 10 mm.

The length of a secondary elasticated area will depend on the length of the article and the topsheet thereof, and the elastic cross machine direction (CD) force required, e.g. the curvature required and distance to the primary elasticated area required, as mentioned above.

The topsheet comprises preferably also one or more tertiary elasticated areas. A tertiary elasticated area is then present between a secondary elasticated area and a longitudinal side edge of the topsheet, and preferably spaced apart from the closest secondary

elasticated are with an average transverse distance of at least 5 mm, or preferably at least 10mm, or even more preferably at least 15mm.

The tertiary elasticated areas are preferably also curved, with an overall curvature as described above for the secondary elasticated area, but whereby the minimum radius is
5 0.1L.

Preferably, the elasticated areas herein are formed by attaching an elasticated material in stretched state or partially being in stretched state to the topsheet, or to one or more carrier material(s), which is (are) then subsequently attached to the topsheet.

10

The elastic materials are typically in the form of a multitude of strands or a single band with an average thickness (e.g. gauge) of at least 20 microns, more preferably at least 40 microns, or even at least 60 microns, typically up to about 300 microns, or even up to 200 microns or even up to 150 microns. Highly preferred materials have an average thickness
15 of about 70 to 100 microns.

Preferred elastic materials used hereto include VFE-CD, available from Tredegar, and L-86, L-89, or L-90, available from Fulflex (Limerick, Ireland).

20 The longitudinal side edges of the topsheet are preferably joined or attached to the longitudinal side edges of the backsheet, by any attachment means known in the art, to form longitudinal opposing attachment areas. In one preferred embodiment of the present invention, the topsheet and the backsheet are attached directly to one another in some locations and are indirectly joined together in other locations.

25

Preferably, the absorbent article of the invention is sag-tolerable, and it thereto has preferably a topsheet that is sag-tolerable. This means that the topsheet does not sag and that the topsheet keeps its z-direction alignment with the anal region and genitals of the wearer, and typically also its x and y direction alignment, when the backsheet and
30 absorbent core sag due to increased weight of the body exudates received by the article. The absorbent article, preferably diaper or training pants, has thereto means to ensure that the topsheet stays in about the same contact or close proximity with the wearer's anal

and/ or genital region when the backsheet and core sag, compared to just after application of the article to the wearer, when the backsheet and core do not yet sag. Typically the topsheet is sag-tolerable to such an extent that when the geometrical centre point of the backsheet is pulled down with 4 cm, the topsheet does not move down with more than 0.5
5 cm, or even not more than 0.25 cm, or typically the topsheet does not move down at all, and/ or such that the longitudinal side edges of the opening do not move in the x and y direction with more than 0.5 cm, or preferably not more than 0.25 cm, or does not move at all.

10 Preferably, the average width of the topsheet, including the width of the opening, is larger than the average distance between the longitudinal attachment areas of the topsheet to the backsheet, mentioned above. Also preferred is that the average width of the topsheet, including the width of the opening, is larger than the average width of the backsheet. The topsheet may for example have one or more transverse and/ or, more preferably,
15 longitudinal folds, which can unfold in use and allow sagging of the core and backsheet, while the topsheet remains in place.

The topsheet herein may be liquid or urine pervious or impervious. It may be preferred that the topsheet is liquid or urine pervious in one direction, but liquid or urine
20 impervious in the opposite direction, e.g. that body fluids may penetrate through the topsheet to the remaining part of the diaper, but that no or limited amounts of liquid (urine) can penetrate in reverse direction, towards the wearer's skin.

However, in a highly preferred embodiment, the topsheet or at least more than 50% of its
25 surface area (that faces the wearer in use) is hydrophobic. Preferred is that the topsheet is urine impermeable and feces impermeable. Thereto, the topsheet is for example made of a material having a Strike Through time for the first gush of more than 120 seconds, as determined by the test method described above. Preferred topsheets herein are considered urine-impermeable and feces impermeable and thus suitable herein, when they
30 have a low surface energy and a uniform pore size distribution, preferably with the low surface energy values, pore sizes and air permeability values described in co-pending application EP-A-1417945. Preferred are materials with an alcohol repellency of at least

7 or more preferably at least 8 or even more preferably at least 9, or even more preferably at least 10; preferably having a surface energy of less than 25mN/m; preferably having a contact angle with water of above 130°; and preferably having a mean pore size of less than 20 microns, preferably less than 17 microns, or most preferably less than 13 microns, but preferably at least 2 microns, or preferably at least 5 microns. Preferably, the topsheet has an air permeability of at least 3 Darcy, or preferably at least 10 Darcy, or even more preferably at least 20 Darcy, or even more preferably at least 30 Darcy, or most preferably at least 50 Darcy.

10 Preferred topsheets herein are made of hydrophobic material or are treated to be hydrophobic (in order to isolate the wearer's skin from liquids contained in remaining part of the diaper), with for example a hydrophobic surface coating. Preferred hydrophobic surface coatings are for example described in co-pending application US60/543,785, filed February 11, 2004. Preferably, the hydrophobic surface coating comprises one or more

15 silicone polymers or fluorinated polymers. Suitable silicone polymers are for example selected from the group consisting of silicone MQ resins, polydimethylsiloxanes, crosslinked silicones, silicone liquid elastomers, and combinations thereof. Typically, the molecular weight of such silicone polymers should be at least about 4000 MW, preferably at least about 10,000 MW, more preferably at least about 15,000 MW, even more

20 preferably at least about 20,000 MW, and most preferably at least about 25,000 MW. Preferred polydimethylsiloxanes are selected from the group consisting of vinyl-terminated polydimethylsiloxanes, methyl hydrogen dimethylsiloxanes, hydroxyl-terminated polydimethylsiloxanes, organo-modified polydimethylsiloxanes, and combinations thereof. Suitable fluorinated polymers are selected from the group

25 consisting of telomers and polymers containing tetrafluoroethylene and/or perfluorinated alkyl chains. For instance, fluorinated surfactants, which are commercially available from Dupont under the tradename Zonyl®, are suitable for use herein. In particular, Zonyl® 321, 329, 8740, 9027, and 9360 are well suited for use in the present invention. Additionally, other Zonyl® materials include fluoroadditives like micro-powders may be

30 useful herein. These include, but are not limited to Zonyl® MP1100, MP1200, MP1400, MP1500J, MP1600N, TE-3667N (which is a water dispersion). Preferably, the coating is free of aminosilicones.

These materials are preferably deposited onto the topsheet in amounts of from at least about 0.01 gsm (gram of material/square meter of topsheet), more preferably from at least about 0.05 gsm, and most preferably from at least about 0.1 gsm.

5 A suitable topsheet may be manufactured from a wide range of materials, including woven or non-woven webs of natural fibers (e.g., wood or cotton fibers) or synthetic fibers (e.g., polyester, polyethylene and/ or polypropylene fibers), or a combination of natural and synthetic fibers. If the topsheet includes fibers, the fibers may be for example spun bond, carded, wet-laid, melt blown, hydro entangled, or otherwise processed as is
10 known in the art.

Preferred are materials that are compliant, soft feeling, and non-irritating to the wearer's skin.

15 Highly preferred are webs comprising spunbond layers (S) and meltblown layer(s) (M), whereby the surfaces of the web are formed by spunbond layer(s). Preferred are such webs with a relatively high basis weight, for example more than 25gram/ m² (gsm), for example

34gsm SMMS (whereby 12gsm meltblown and 5gsm spunbond); 34gsm SMMS
20 (whereby 10gsm meltblown and 7gsm spunbond); 30gsm SMMS (whereby 10gsm meltblown and 5 gsm spunbond); 30gsm SMMS (whereby 8gsm meltblown and 7 gsm spunbond); 34gsm SMS (whereby 20gsm meltblow and 7gsm spunbond), or for example webs comprising two layers of 17 gsm SMMS, described above.

25 Any portion of the topsheet may be coated with a lotion or powder, known in the art. Preferred may be that at least lotion is present on the primary elasticated areas, and even preferably on the secondary elasticated areas. The lotion used on one elasticated area may be different to the lotion used on another elasticated area, or on the remaining part of the topsheet. Examples of lotions include those described in U.S. 5,607,760; U.S. 5,609,587;
30 U.S. 5,635,191; U.S. 5,643,588; WO 95/24173, provided the lotion is compatible with the elastic material, and does not destroy the elastic material or reduce its elasticity.

The absorbent article also comprises a, typically liquid impervious, backsheet, as known in the art. In preferred embodiments, the liquid impervious backsheet comprises a thin plastic film such as a thermoplastic film having a thickness of about 0.01 mm to about 0.05 mm. Suitable backsheet materials comprise typically breathable material, which
5 permit vapors to escape from the diaper while still preventing exudates from passing through the backsheet. Suitable backsheet films include those manufactured by Tredegar Industries Inc. of Terre Haute, IN and sold under the trade names X15306, X10962 and X10964.

The backsheet, or any portion thereof, may be elastically extendable in one or more
10 directions.

The backsheet may be attached or joined to the topsheet, the absorbent core, or any other element of the diaper by any attachment means known in the art. It may be highly preferred that the longitudinal side edges of the topsheet and backsheet are directly
15 attached to one another, but that the longitudinal edges of the topsheet and the core are not attached to one another.

The attachment means to attach the topsheet and the backsheet, but also the genital coversheet herein may include a uniform continuous layer of adhesive, a patterned layer
20 of adhesive, or an array of separate lines, spirals, or spots of adhesive, such as disclosed in U.S. 4,573,986. Adhesives that have been found to be satisfactory are manufactured by H. B. Fuller Company of St. Paul, Minnesota and marketed as HL-1620 and HL-1358-XZP. Alternatively, the attachment means may comprise heat bonds, pressure bonds, ultrasonic bonds, dynamic mechanical bonds, or any other suitable attachment means or
25 combinations of these attachment means as are known in the art.

The absorbent core may comprise any absorbent material which is generally compressible, conformable, non-irritating to the wearer's skin, and capable of absorbing and retaining urine, such as comminuted wood pulp, creped cellulose wadding; melt
30 blown polymers, including coform; chemically stiffened, modified or cross-linked cellulosic fibers; tissue, including tissue wraps and tissue laminates; absorbent foams; absorbent sponges; super absorbent polymers; absorbent gelling materials; or any other

known absorbent material or combinations of materials; preferred may be absorbent cores which have an absorbent storage layer which comprises more than 80% by weight of the absorbent core content (e.g. excluding core wrap) of absorbent gelling material, and which is preferably free of airfelt.

5

The absorbent article may also include a sub-layer (which may be the same as the body facing liner described above) disposed between the topsheet and the absorbent core, capable of accepting, and/ or immobilizing bodily exudates, typically fecal material. Suitable materials for use as the sub-layer may include large cell open foams, macro-
10 porous compression resistant non woven highlofts, large size particulate forms of open and closed cell foams (macro and/or microporous), highloft non-wovens, polyolefin, polystyrene, polyurethane foams or particles, structures comprising a multiplicity of vertically oriented, preferably looped, strands of fibers, or preferably apertured formed films, as described above with respect to the genital coversheet. (As used herein, the term
15 "microporous" refers to materials that are capable of transporting fluids by capillary action, but having a mean pore size of more than 50 microns. The term "macroporous" refers to materials having pores too large to effect capillary transport of fluid, generally having pores greater than about 0.5 mm (mean) in diameter and more specifically, having pores greater than about 1.0 mm (mean) in diameter, but typically less than 10 mm or
20 even less than 6 mm (mean).

The absorbent article herein is preferably a disposable adult or infant diaper or training pants/ pull-up pants. Diapers or training pants of the invention may have side panels, and/ or more preferably one or more pairs of elasticated leg cuffs that provide improved
25 containment of liquids and other body exudates. Leg cuffs may also be referred to as leg bands, side flaps, barrier cuffs, or elastic cuffs, as described in; U.S. 3,860,003; U.S. 4,808,178 and 4,909; U.S. 4,695,278 and 4,795,454.

The diapers herein preferably have a fastening system, typically joined to the waistband,
30 as known in the art. Preferred fastening systems comprise fastening tabs and landing zones, wherein the fastening tabs are attached or joined to the back region of the diaper and the landing zones are part of the front region of the diaper.

Preferred may be that the articles of the invention (e.g. diaper) when packed in their packaging material, comprise two transverse folds, so that when unfolded for use by the user or care taker, the article (e.g. diaper) is in a U-shape and easier to apply.

5

Preferred processes to make a diaper of the invention

A topsheet with an opening, typically along its longitudinal axis, and primary elasticated areas and a genital coversheet is obtained as follows.

- 10 A longitudinally extending (slit) opening may be formed (cut) in the topsheet material first and a pair of primary elastic bands are attached, in stretched state, to the topsheet, so that an elastic band is present adjacent or in close proximity of each longitudinal edges of the opening. Alternatively, the primary elastic bands are first attached to the topsheet in stretched state, extending longitudinally over the topsheet, for example an X-shape,
15 whereafter an longitudinally extending (slit) opening is formed (cut) through part of the topsheet material and part of the elastic bands, typically along the longitudinal axis of the topsheet material and the strands or bands.

- Preferred adhesives for attaching the primary elastic strands or bands include H2031,
20 available from ATO-Findley and HL-1620 available from H.B. Fuller (St Pauls, USA).

- In a non-limiting example, two elastic band of L-89 elastic material, available from Fulflex, with (in relaxed state) a thickness of about 0.1mm, a width of 20 mm and a length of 17 cm, are obtained and also a sheet of a polypropylene nonwoven material,
25 which is 20-25 cm wide and 50-55 cm long, such as available from BBA, Fibertex or Pegas.

- In stretched state, a slit opening with a length of between 25 cm and 35 cm, typically about 31 cm to 33 cm is cut in the nonwoven. This may be cut as a slit, whereby the slit
30 opening obtains its width due to the spreading elasticated areas, or the slit opening may be cut with a width dimension, for example up to 4.0 cm. Typically, the slit opening is cut as a slit without width dimension, but in the front region of the topsheet, end the front

point of the slit opening, an additional diamond shaped cut is made, as can be seen in Figure 4.

If the elasticated areas are present on the surface of the topsheet which is in contact with the skin of the user, it may be preferred that an additional layer, e.g. nonwoven material, is placed on the elastic areas, to avoid direct contact by the elastic areas with the skin.

One elastic band is glued in a partially stretched state to each longitudinal edge of the opening of the nonwoven. This is for example done such that the centre 9 cm of the elastic band is stretched 336%, and the end portions of each 4 cm are maintained in unstretched state. Each elastic band is then glued on the non-woven in a manner that the front end region of one elastic band bends away from the front end region of the opposing elastic band, and the back end region of one elastic band bends away from the back end region of the opposing elastic band, in the shape of an X. This is done such that, after application, the transverse distance between to the inner two edges of the front end regions and of the back end regions is for example 80 mm in stretched state. The distance between the centre point on the elasticated areas is for example only 40 mm.

The angle of the front end region with the line through the centre portion and parallel to the longitudinal axis of the topsheet, as described above and can be seen in Figure 2 and 3 as angle α , is for example, about 10° to 40°, as described herein. The angle of the back end region, as described above and can be seen in Figure 2 as angle β , is also for example, about 10° to 40°.

Then, the genital coversheet is attached to the topsheet in stretched state, such that the front 15% to 30% of the maximum length of the opening is covered by the longest part of the genital coversheet. The genital coversheet has preferably a curved or V-shaped edge above the opening. The genital coversheet may for example have the shape shown in Figure 5, and it may be folded prior to attachment to the topsheet, for example as shown in Figure 6.

The genital coversheet is for example attached to the surface of the topsheet which is not in contact with the skin of the user, with at least two longitudinal areas (lines, spirals,

dots) of adhesive, each being between a longitudinal edge of the topsheet and an elastic band, e.g. about 0.5 to 1.5 cm spaced away from said elastic band, and with a V-shaped attachment area, as shown in Figure 6. The distance between the two substantially parallel attachment areas is for example at the most about half the width of the genital coversheet between these areas, so that the genital coversheet hangs downwards in use, under the opening, as a pocket for the genitals.

The topsheet may be used on a Pampers Premium Size 4 diaper, designed for a baby weight range of 21-37 pounds, or it may replace the layer of a Pampers premium Size 4 diaper which is on the absorbent core and in use in contact with the skin of the baby. Thereto, the topsheet with the elastic bands are attached to the front and back waistbands, and typically to the longitudinal side edges of the backsheet.

Description of the Figures

Figure 1 shows a perspective view of a preferred absorbent article (10), a diaper (10), of the present invention with a front region (21) and back region (22) and with a genital coversheet (41), placed under the topsheet (11) and under the opening (14) in said topsheet. A void space (15) is present between the absorbent core (13) and the topsheet (11) and between the absorbent core (13) and the genital coversheet (41). In use, the genital coversheet (41) will cover the genitals of the user. Typically, the genital coversheet (41) is such that it can form a pocket around the genitals. This is further shown in Figure 3, discussed below.

The diaper (10) typically comprises also a back waist band with preferably ears with fasteners (18) and a front waist band (19) with receiving areas for the fasteners. Typically, the fasteners comprise hooks and/ or adhesive and the receiving areas are preferably formed from loop-containing material.

As described above, the topsheet (11) is typically sag-tolerable and thereto non-elastically extendable and it preferably has thereto one or more transverse folds and/ or longitudinal folds (17).

The topsheet (11) is elasticated, having primary elasticated areas (31) positioned along the longitudinal side edges (16) of the opening (14). The topsheet (11) may also have secondary elasticated areas (32), or even tertiary elasticated areas (not shown). The

primary elasticated areas (31) have each a centre region with a length L_2 , the centre regions being substantially parallel to one another, whereby L_2 is typically about 30% to 70% of the total length L_1 of the primary elasticated areas (31), and preferably about 40% to 80% of the maximum length of the opening (14). The primary elasticated areas (31) are preferably in an X-shape, whereby the front end portions (36) bend away from one another and the back end portions (38) bend away from one another.

The diaper (10) typically also comprises elasticated bands along the longitudinal side edges of the diaper (10), so called leg cuffs (20).

Figure 2 shows a plane (top) view of the diaper (10) of Figure 1, in stretched state. The genital coversheet (41) is placed under the topsheet (11) and attached along its longitudinal side edges to the topsheet (11), with attachment areas (42), which are for example in the form of longitudinal lines of adhesive. The attachment areas (42) are typically positioned at least or only along either longitudinal side edges of the opening (16), preferably parallel thereto and parallel to one another. Each attachment area (42) is typically (at least) positioned between a primary elasticated area (31) and the longitudinal side edge of the topsheet, or between the primary elasticated area (31) and the secondary elasticated area (32) (when present), such that the genital coversheet (41) is attached to the topsheet (11) in at least or only the non-elasticated areas (34) of the topsheet (11). It is preferred that the genital coversheet (41) has a transverse edge (43) which is not a straight edge, but instead curved or arrow-shaped, to make the genital coversheet (41) more comfortable in use.

As shown in Figure 2, the primary elasticated areas (31) are preferably in the shape of an X, whereby each front end portion (36) of the elasticated area has an angle α with the longitudinal line (35) parallel to the longitudinal axis of the topsheet and through that part of the elasticated area that is (directly) adjacent a longitudinal side edge (16) of the opening. This angle α is preferably about 17° to 30° in stretched state.

Each back end portion (38) of the elasticated area has an angle β which is preferably about 17° to 30° in stretched state.

Figure 3 shows a section view of the diaper (10) of Figures 1 and 2, according to line III-III in Figure 2. It shows the void space (15) between the genital coversheet (41) and the absorbent core (13) and between the topsheet (11) and the absorbent core (13).

- 5 The topsheet (11) with the longitudinal folds (17) is typically not attached to the absorbent core (13), but directly to the backsheets (12) with longitudinal attachment lines (23), to ensure that the diaper (10) and the topsheet (11) thereof are sag-tolerable.

The absorbent core (13) may comprise a specific sub-layer (24), which comprises means to immobilize fecal material, for example a layer with vertically extending (z-direction) fibers, or an apertured web or film, as described herein.

The genital coversheet (41) is typically urine-permeable, as described herein and it may comprise or consist of a material with micro pores, such as the apertured webs or films described herein, or for example the carded webs described herein.

The topsheet (11) shown in Figures 1, 2 and 3 is preferably made by making a longitudinal slit (58) with preferably no width dimension in the topsheet material and cutting an additional front cut out section (55) out of the topsheet, said section (55) extending from the front of this slit (58) towards the front of the diaper(10). This is further shown in Figures 4 and 5.

Preferably, the front cut out section (55) is 'diamond' shaped, although it is preferred that the 'diamond' shaped cut out section (55) has a front edge (56) which is curved. The side edges (57), extending directly from the slit (58) to the front edge of the diaper (10) and connecting the curved front edge (56) with the slit (58), are preferably connected to one another with an angle γ , which is preferably between 40° and 140° , more preferably between 55° and 110° .

30 Figure 6 shows a perspective view of the shape of a preferred genital coversheet (41) of absorbent article (10) of the invention, before implementation in the absorbent article

(10). The genital coversheet (41) has preferably a rounded or V-shaped 'transverse' edge (43), i.e. the edge (43) being in the diaper (10) above, in or under the slit opening (14).

Figure 7 shows a perspective view of the preferred genital coversheet (41) of Figure 6, which is folded for implementation into the diaper (10) of Figures 1 to 3, whereby the areas are shown which in the diaper (10) will become the attachment areas (42); said attachment areas (42) may for example comprise adhesive for attachment to the topsheet (11). It is shown in Figure 7 how, in a preferred embodiment, the genital coversheet (41) will be placed optionally along part of the longitudinal side edges (16) of the opening (14), but in any event along the edges of the cut out section (55), including edges (57) and curved edge (56).

All documents cited are, in relevant part, incorporated herein by reference; the citation of any document is not to be construed as an admission that it is prior art with respect to the present invention.

While particular embodiments of the present invention have been illustrated and described, it would be obvious to those skilled in the art that various other changes and modifications that are within the scope of this invention

CLAIMS

1. An absorbent article having a backsheet, an absorbent core and a topsheet, provided with at least one opening adapted to receive fecal material, said topsheet and said opening thereof each having a front region and a back region, wherein a void space is present between the absorbent core and the topsheet, said absorbent article comprising a genital coversheet, which in use covers the genitals, and which is positioned in, under or above said front region of the opening.
2. An absorbent article as in claim 1, wherein the genital coversheet is urine permeable and the topsheet is preferably urine-impermeable.
3. An absorbent article as in claim 1 or 2, wherein the genital coversheet is positioned above the topsheet, the genital coversheet being in use in direct contact with the user's skin.
4. An absorbent article as in claim 1 or 2, wherein the genital coversheet is positioned between the topsheet and the absorbent core, and wherein said coversheet is attached to the topsheet, but not attached to the absorbent core.
5. An absorbent article as in any preceding claim, whereby said opening has two longitudinal side edges and parts of the genital coversheet are attached to the topsheet along said longitudinal side edges of the opening and one or more parts of the genital coversheet are not attached to the absorbent article and form a pocket between said opening.
6. An absorbent article as in any preceding claim, wherein the opening in the topsheet is a slit opening that has two longitudinal side edges and the topsheet comprises elasticated areas along at least part of the longitudinal side edges of the opening.

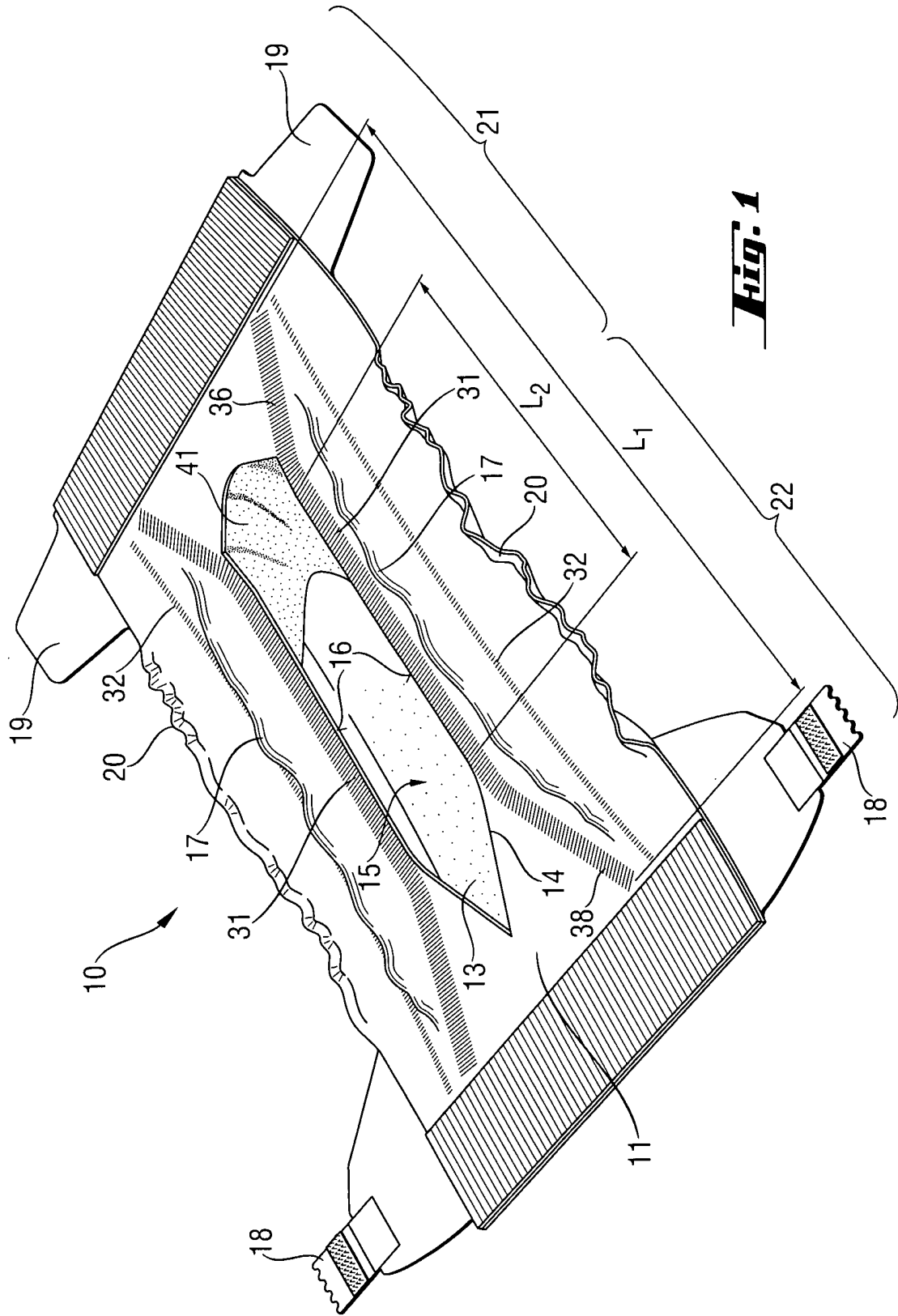
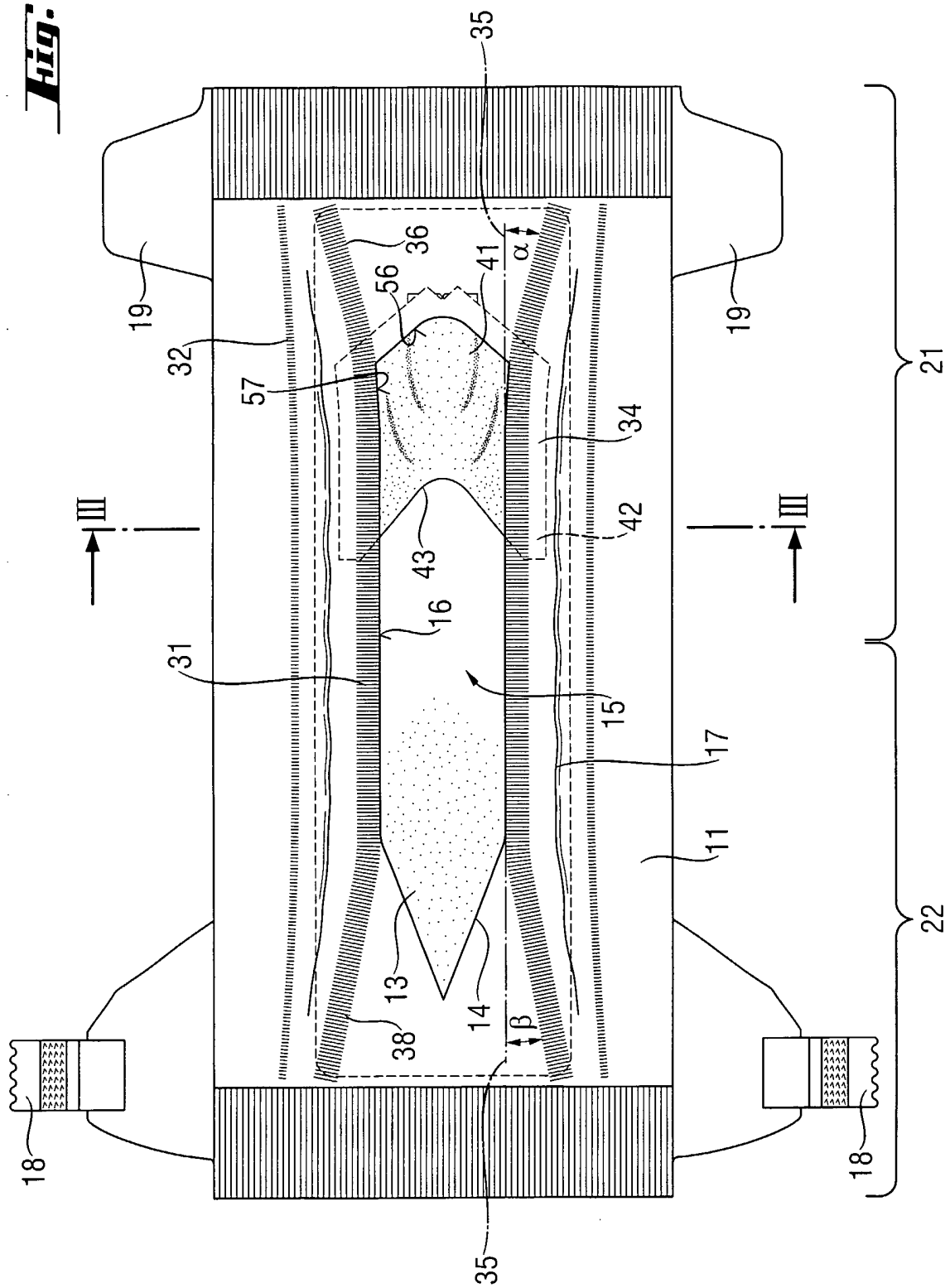


Fig. 1

Fig. 2



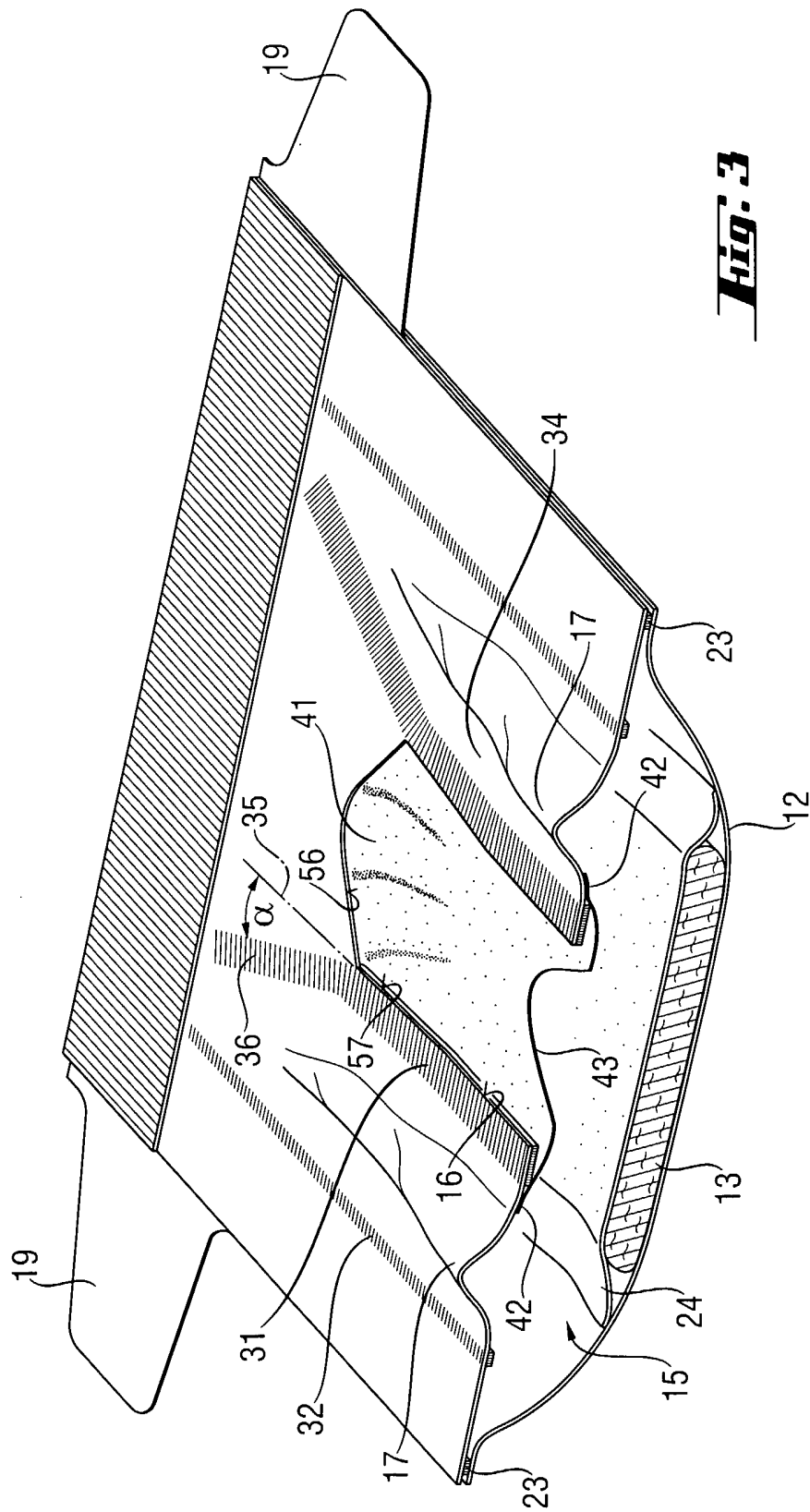


Fig. 3

Fig. 5

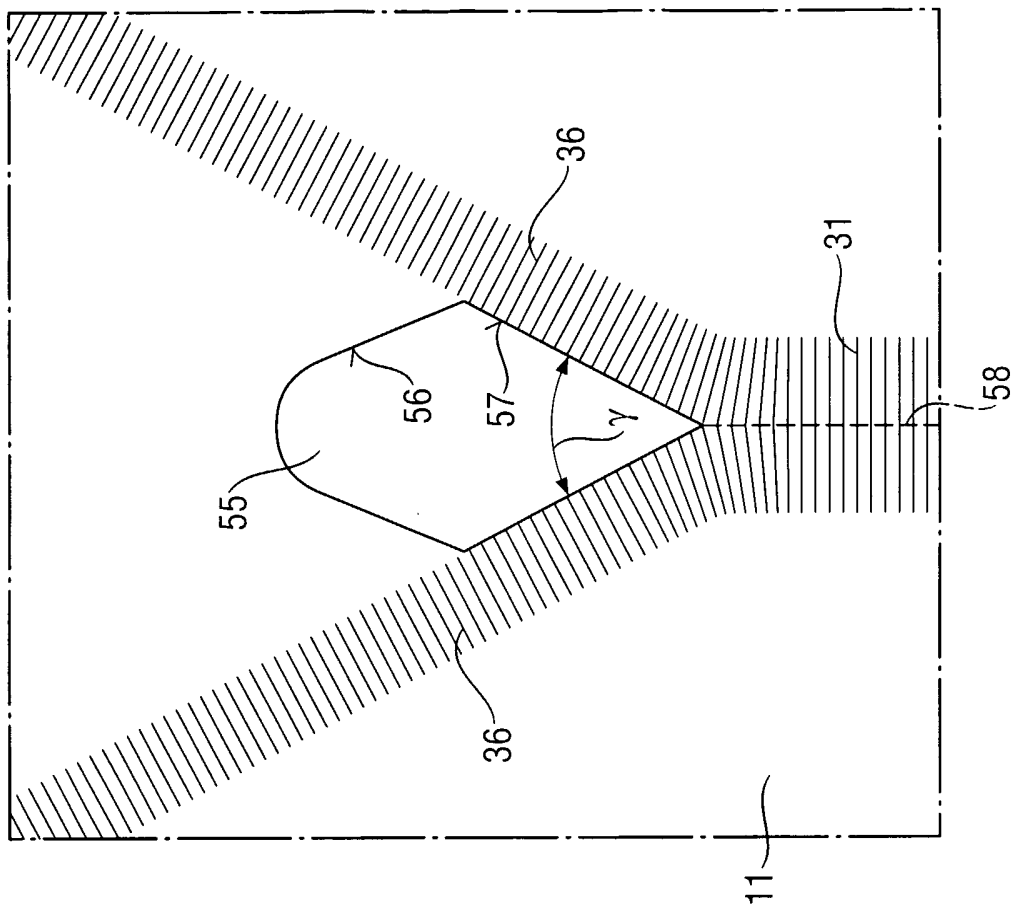
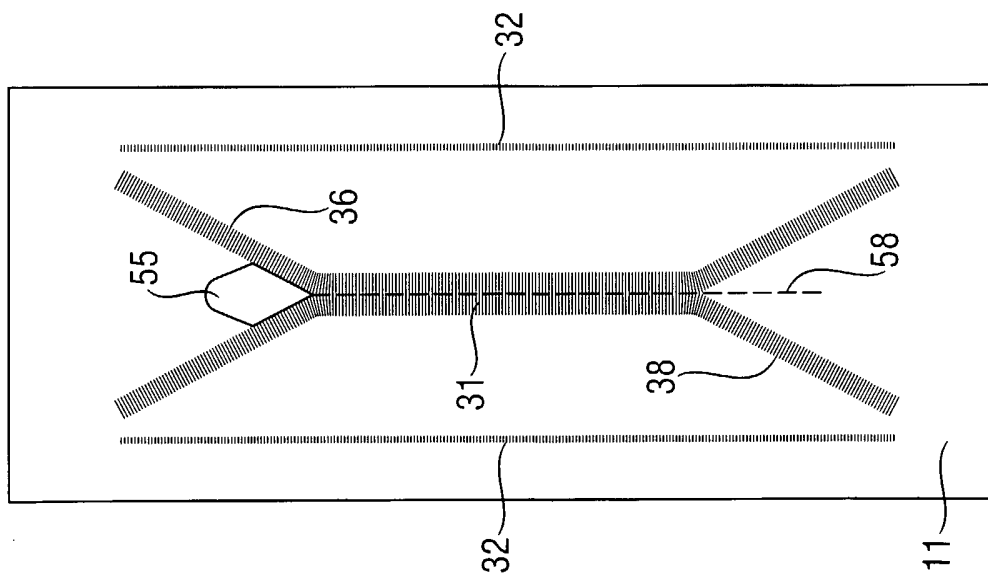


Fig. 4



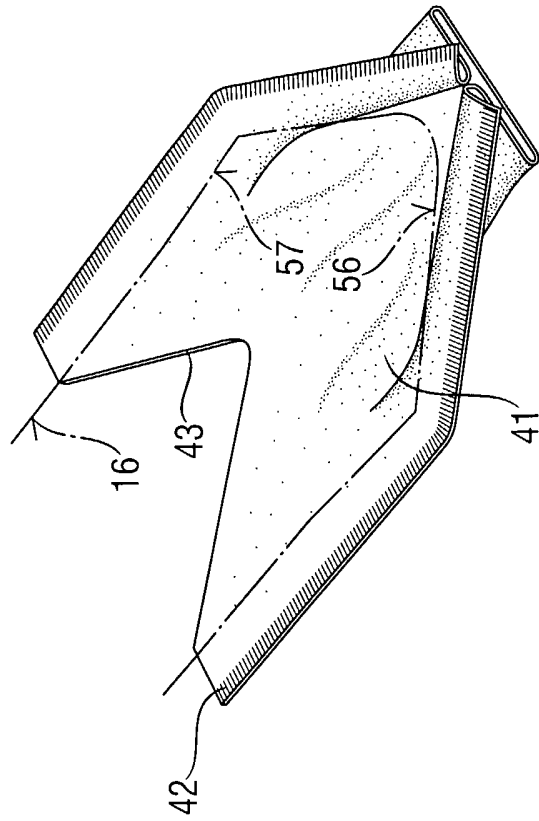


Fig. 1

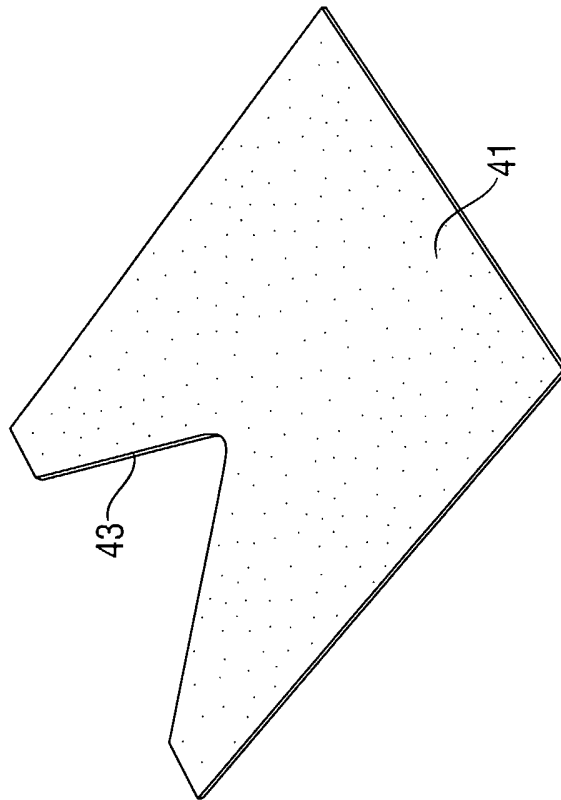


Fig. 6

INTERNATIONAL SEARCH REPORT

Inte Application No
PCT/US2005/032112

A. CLASSIFICATION OF SUBJECT MATTER
A61F13/15

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A61F

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

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

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 853 403 A (TANZER ET AL) 29 December 1998 (1998-12-29) column 15, lines 51-55; figures 17-8,10-13 column 16, line 3 - column 17, line 46 column 18, line 56 - column 20, line 26 column 24, lines 16-18	1-16
X	EP 0 357 298 A (THE PROCTER & GAMBLE COMPANY) 7 March 1990 (1990-03-07) column 5, lines 5-34 column 7, lines 20-29 column 9, lines 19-21; figures 1-3	1,8, 10-13
X	GB 2 268 073 A (* UNI-CHARM CORPORATION) 5 January 1994 (1994-01-05) page 4, line 4 - page 6, line 4; figures 1-3	1,10-13
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Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

* Special categories of cited documents:

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O document referring to an oral disclosure, use, exhibition or other means

P document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

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Date of the actual completion of the international search

1 December 2005

Date of mailing of the international search report

08/12/2005

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Joly, F

INTERNATIONAL SEARCH REPORT

In Application No
PCT/US2005/032112

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 064 899 A (THE PROCTER & GAMBLE COMPANY) 3 January 2001 (2001-01-03) column 3, lines 1-12 column 4, lines 49-53 column 5, lines 23-48; figures 1-3 -----	1,10-13
X	EP 0 359 410 A (THE PROCTER & GAMBLE COMPANY) 21 March 1990 (1990-03-21) column 2, lines 9-13 column 4, lines 40-49 column 5, line 40 - column 7, line 40 column 8, lines 21,22 column 9, line 1 - column 10, line 9; figures 1-6 -----	1,6,7, 10-13
A	US 4 285 342 A (MESEK ET AL) 25 August 1981 (1981-08-25) figures 5,8 -----	1
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