

sheet material 15 may be substantially perpendicular to the top edge 11 of the separator sheet material, when the separator sheet material 15 is laid out flat in relaxed, contracted state onto an even horizontal surface. It should also be understood that some portions of the two opposing side edges of the separator sheet 10 which connect the top edge 11 to the bottom edge 12 of the separator sheet 10 may have in use a Z-direction orientation.

The separator sheet material 15 has when laid out flat onto an even horizontal surface in relaxed, contracted state, a longitudinal dimension (length), also referred to as the separator sheet's longitudinal dimension (length) in relaxed state of the separator sheet 10 and the separator sheet material 15 has when laid out flat onto an even horizontal surface in relaxed, contracted state, a transverse dimension (width), also referred to as the separator sheet's transverse dimension (width) in relaxed state of the separator sheet 10. It should be understood that the width of the separator sheet 10 or separator sheet material 15 may be longer than the length of respectively the separator sheet 10 or separator sheet material 15.

The separator sheet 10 may have a minimum longitudinal dimension in relaxed state of the separator sheet 10 between the top edge 11 and the bottom edge 12 of the separator sheet 10 of from 3.0 cm, or from 4.0 cm, or from 5.0 cm, to for example 15.0 cm, or to 10.0 cm, or to 8.0 cm or to 7.0 cm, or to 6.0 cm or to 5.1 cm.

The separator sheet 10 may have an average transverse dimension in relaxed state of the separator sheet 10 of at least 2.5 cm, or at least 4.0 cm, or at least 5.0 cm to less than 12.0 cm or less than 10.0 cm.

The top and bottom edge portions 16, 17, as referred herein, extend over the whole transverse dimension of the separator sheet 10 or separator sheet material 15 and may have each an average longitudinal dimension of 3% to 50% or 10% to 40% or 10% to 25% of the minimum longitudinal dimension of the separator sheet 10.

The separator sheet 10 is elastically extensible in at least the transverse direction, i.e. is able to extend upon application of a force, and to contract to about its original width upon release of said force, as described hereinafter. Only the top edge portion 16 of the separator sheet 10 may be elastically extensible in at least the transverse direction.

The separator sheet 10 may also be elastically extensible in the longitudinal direction.

The separator sheet 10 may be made of an elasticated sheet material 15, rendering the separator sheet 10 elastically extensible in the transverse direction at least.

“Elasticated” when used herein for the separator sheet 10 or separator sheet material 15 (and also for the cuff or cuff web material) means that it is made of an inelastic sheet material

Topsheet and topsheet web

The diaper 1 comprises a topsheet 20.

It should be understood that the topsheet 20 herein may be an individual topsheet or a topsheet that is part of a topsheet web, whereby such web is then subsequently divided into a multitude of individual topsheets. For the purpose of the invention, when referred to topsheet, this shall include a topsheet web, respectively, unless stated otherwise. The same applies for the backsheet 21 and absorbent core 22 (that may be a backsheet web or absorbent core web), as referred to herein.

The topsheet of the diaper 1 herein may be made of any suitable material known in the art, provided it allows urine to pass. Hereto, it may be made of a urine permeable material, including hydrophilic material, or material treated to be hydrophilic. It may be an apertured topsheet which comprise apertures to allow urine to pass to the absorbent core 22 under the topsheet 20;

The topsheet may be either hydrophilic or hydrophobic.

The separator sheet 10 or separator sheet material 15 may be attached to the cuffs 30a, 30b and to the topsheet 20 in relaxed, contracted state. The cuffs 30a, 30b may then be spread apart, thereby stretching the separator sheet 10 or separator sheet material 15; the cuffs 30a, 30b may for example be attached to the topsheet 20 prior to spreading or subsequent to the spreading step.

The topsheet 20 may be a stretchable material, or a material that is extensible, for example by the provision of folds. The topsheet 20 may for example comprise one or more longitudinally extending Z-fold(s) prior to attachments to the separator sheet 10 (or separator sheet material 15) and/or to the cuffs 30a, 30b. Once the topsheet 20 is unfolded, it no longer has the folds, e.g. Z-fold(s), but it may still have the longitudinally extending fold lines.

Preferred topsheet materials are nonwoven materials, including laminates and/or materials with apertures, such as apertured films, aperture formed films.

The topsheet 20, or for example only the crotch and/or back region thereof, may comprise a skin care composition, e.g. a lotion, as known in the art.

8. The diaper (1) according to any of the preceding claims, whereby the separator sheet material (15) is or comprises an elastic film or a nonwoven sheet material or a laminate of an elastic film and a nonwoven sheet material or comprises one or more elastic band(s) or strand(s).
9. A process for making an infant or adult diaper portion in a machine direction (MD) which is the direction parallel to the longitudinal dimension of the diaper portion, comprising a topsheet (20), or for making an infant or adult diaper (1) in a machine direction (MD) which is the direction parallel to the longitudinal centerline (Y) of the diaper (1), comprising a topsheet (20), a backsheet (21) and an absorbent core (22), and the diaper portion or diaper (1) comprising a pair of first and second longitudinally extending opposing elastic cuffs (30a, 30b), positioned on either longitudinal side of the topsheet (20), each having a longitudinal dimension and a transverse dimension perpendicular thereto, and having a crotch region (B), positioned in between a front region (A) and a back region (C), and the diaper (1) or diaper portion comprising a transverse separator sheet (10) being elastically extensible in at least the transverse direction and positioned substantially parallel to the transverse dimension of the diaper portion or to the transverse centerline (X) of the diaper (1), and the sheet having a transversely extending top edge portion (16) and an opposing transversely extending bottom edge portion (17), whereby parts of the top edge portion (16) are attached to the cuffs (30a, 30b) in the crotch regions or front regions thereof in cuff attachment areas (13), and whereby the bottom edge portion (16) or part(s) thereof is attached to the topsheet (20), the process comprising the steps of:
 - a) obtaining a pair of longitudinally extending opposing elastic cuffs (30a, 30b), travelling in machine direction (MD), that are preferably in stretched state, whereby there is a first average transverse spacing distance D_1 between the opposing cuffs (30a, 30b) in the crotch region (B) thereof;
 - b) obtaining an elastically extensible separator sheet material in relaxed state having a top edge portion (16) and an opposing bottom edge portion (17), substantially perpendicular to the longitudinal dimension of the cuffs (30a, 30b);
 - c) partially attaching the top edge portion (16) of the separator sheet (10) material in relaxed state to respectively the cuffs' crotch regions (B) or front regions (A), by

means of attaching a first attachment area of the top edge portion (16) to the crotch region (B) or front region (A) of a first cuff (30a) of a pair, and a second opposing attachment area of the top edge portion (16) to the crotch region (B) or front region (A) of the second cuff (30b) of a pair, to form a first cuff attachment area (13) and a second cuff attachment area (13);

- d) obtaining a topsheet (20);
- e) attaching the separator sheet material's bottom edge portion (17) or part thereof to the topsheet (20);
- f) spreading apart the cuffs (30a, 30b) in the transverse direction perpendicular to the longitudinal dimension of the cuffs (30a, 30b) to obtain cuffs (30a, 30b) with an average second transverse spacing distance D_2 between them in at least the crotch region (B), the average second distance D_2 being preferably at least about 1.8 times the average first distance D_1 ;
- g) attaching, prior to step c), or subsequently to any of steps c), e) or f), or simultaneously with step c) or e), the opposing cuffs (30a, 30b) to the topsheet (20), or backsheet (21), or absorbent core (22), by attaching a first cuff (30a) along a first longitudinal side thereof and a second cuff (30b) along a second longitudinal side thereof;
- h) optionally further attaching the bottom edge portion that is partially attached to the topsheet (20) in step e) to the topsheet (20).

- 10. The process according to claim 9, wherein in step f), the average second distance D_2 is at least about 2.2 times the average first distance D_1 .
- 11. The process according to claim 9, wherein in step f), the average second distance D_2 is at least 3 times the average first distance D_1 , or at least about 4.0 times the average first distance D_1 .
- 12. A process for making an infant or adult diaper (1) in a machine direction (MD) according to any of claims 9 to 11, comprising a diaper portion and a backsheet (21) and an absorbent core (22), the process comprising the further steps of:
 - providing a backsheet (21) and providing an absorbent core (22), and

- attaching the backsheet (21) to the absorbent core (22) and then attaching this with the diaper portion, to obtain a diaper (1); or
 - attaching the diaper portion with an absorbent core (22) and then attaching this with a backsheet (21), to obtain a diaper (1); or
 - attaching the topsheet (20) to the absorbent core (22) and/or to the backsheet (21) carrying the absorbent core (22), prior to attachment of the cuffs (30a, 30b) to the topsheet (20) in step g).
13. The process according to any of claims 9 to 12, whereby the step g) takes place prior to step f), and whereby the topsheet (20) comprises one or more machine direction (MD) oriented Z- fold(s) in the steps prior to f).
14. The process according to any of claims 9 to 13, whereby the step h) is present, and the bottom edge portion is attached to the topsheet (20) in two additional areas (14) on either side of the attachment area (14) of step e).
15. A diaper portion or diaper (1) obtainable by the process of claims 9 to 14.

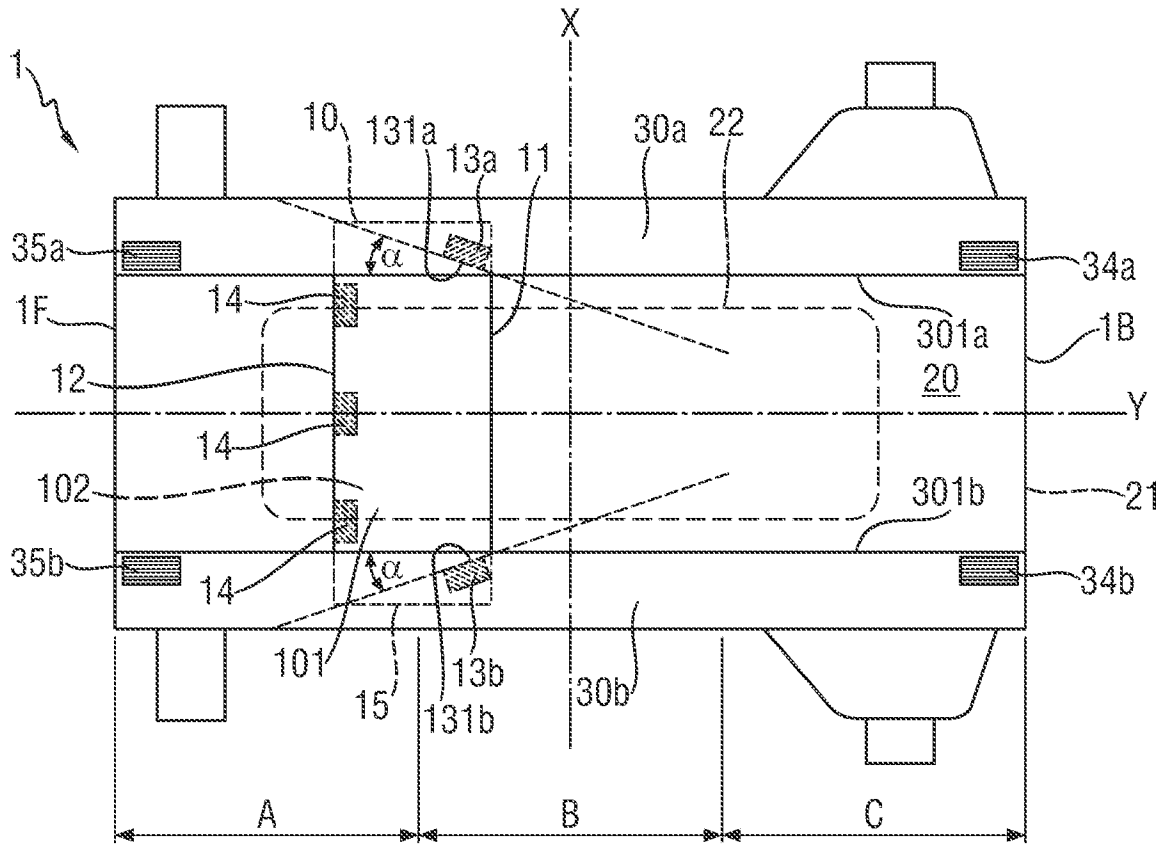


Fig. 3

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2014/013753

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