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**Absorbent article with four channels**

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An absorbent article comprising a liquid pervious topsheet, a liquid impervious backsheet, and an absorbent core comprising an absorbent material between a top core wrap sheet and a back core wrap sheet, said absorbent core being positioned in between said topsheet and said backsheet, said absorbent core having a first and second longitudinal edge and a first and second transverse edge, said absorbent core having a first portion (130a), (130b) and a second portion (130b), (130a) on either side of a transverse crotch line (L), wherein the absorbent core is provided with a plurality of attachment zones where the top core wrap sheet is attached to the back core wrap sheet.

## Absorbent article with four channels

### TECHNICAL FIELD

The present invention pertains to the technical field of absorbent articles, more preferably  
5 disposable personal care articles such as diapers, baby pants, adult incontinent garments, and the  
like, and to absorbent structures for use in such absorbent articles. More specifically the present  
invention relates to an absorbent structure comprising an absorbent core between a topsheet and a  
backsheet.

### 10 BACKGROUND

Absorbent articles such as diapers, baby pants, adult incontinent garments and the like, typically  
comprise an absorbent core, positioned in between a liquid permeable or pervious, hydrophilic or  
semi hydrophilic topsheet and a liquid impermeable or impervious backsheet. The absorbent core  
comprises absorbent material that is able to absorb fluid and liquid bodily excretions of the user of  
15 the absorbent article.

An existing problem which has been associated with such absorbent cores containing no or little  
cellulose fibers or fluff pulp is related to the migration, loss and leakage of the absorbent  
particulate polymer material from the absorbent article during dry and/or wet state, which leads to  
20 irritation, skin problems and overall discomfort for the user. The lack of effective and efficient  
immobilization and liquid distribution lead to dysfunctional absorbent articles due to lowered  
uptake capacity, gel blocking, leakages and the creation of ruptures and/or pinholes through the  
liquid pervious topsheet and/or liquid impervious backsheet of such absorbent articles.

Absorbent cores generally have a high absorbent capacity and the absorbent core may expand  
25 several times its weight and volume. These increases may cause the absorbent article to deform  
and/or to sag in the crotch region as they become saturated with liquid. This may cause leaks to  
occur via a longitudinal and/or transversal edge of the absorbent article.

### SUMMARY

30 The object of embodiments of the invention is to provide an absorbent article of the type stated in  
the preamble, with improved liquid distribution and absorption capacities.

According to an aspect of the invention there is provided an absorbent article comprising a liquid  
pervious topsheet, a liquid impervious backsheet, and an absorbent core comprising an absorbent  
35 material between a top core wrap sheet and a back core wrap sheet. The absorbent core is  
positioned in between the topsheet and the backsheet. The absorbent core has a first and second

longitudinal edge and a first and second transverse edge. The absorbent core has a first portion and a second portion on either side of a transverse crotch line. The absorbent core is provided with a plurality of attachment zones where the top core wrap sheet is attached to the back core wrap sheet, said plurality of attachment zones comprising at least

- 5 - a first and a second elongate attachment zone extending next each other, at least in the first portion of the absorbent core in the direction of the first transverse edge, and
  - a third and a fourth elongate attachment zone extending next to each other, at least in the second portion of the absorbent core, in the direction of the second transverse edge.
- 10 The first attachment zone may be separated from the third attachment zone by absorbent material, and the second attachment zone may be separated from the fourth attachment zone by absorbent material. In that manner a capillary bridge is created between the first and second attachment zones on the one hand and the third and fourth attachment zones on the other hand.
- Preferably, measured in a transverse direction, a first maximum distance between the first and the
- 15 second attachment zone is bigger than a second maximum distance between the third and the fourth attachment zone.

It is noted that the first transverse edge may be a front edge or a rear edge depending on the desired use of the absorbent article. Similarly, the first portion may be a front portion or a rear portion

20 depending on the desired use of the absorbent article. By having a different distance between the attachment zones in the front portion and in the rear portion, it is possible to tailor the absorbent article to the wearer. For example, for a male person the maximum distance may be larger in the front portion than in the rear portion, whilst for a female person the maximum distance may be larger in the rear portion than in the front portion. Further it is possible to optimize the difference

25 between the front and the rear portion for obtaining a unisex absorbent article.

For an embodiment with a third and fourth attachment zone, the first distance between the first and the second attachment zone may be at least 5%, preferably at least 10% bigger, even more preferably at least 20% bigger than a second distance between the third and the fourth attachment

30 zone. This difference may be optimized in function of the desired used. For example, for male persons the difference may be bigger. In some embodiments the first distance between the first and the second attachment zone may be at least 30%, or even at least 40% bigger, than a second distance between the third and the fourth attachment zone.

35 In an embodiment, the first and the second elongate attachment zone may each have a front end adjacent to absorbent material and a rear end adjacent to absorbent material or on the transverse

crotch line. And the third and the fourth elongate attachment zone may each have a rear end adjacent to absorbent material and a front end adjacent to absorbent material.

Seen in a projection on the longitudinal direction of the absorbent core, the first and the second attachment zone may extend over a length which is less than the length of the third and fourth

- 5 attachment zone. To fit better to the body the third and fourth attachment zones which are closer to each other may be longer to extend over a longer part of the crotch region, for example the third and fourth attachment zones may extend both in the first and the second portion of the absorbent core. Preferably, the first and the second attachment zone extend over a length which is at least 5% less, more preferably at least 10% less than the length of the third and fourth attachment zone.
- 10 Preferably the first and the second attachment zone extend over a length which is at least 25%, more preferably at least 35%, even more preferably at least 45% of the length of the third and fourth attachment zone.

- In preferred embodiments, especially suitable for male persons, the first transverse edge may be a
- 15 front edge intended to be positioned at a front side of a person, and the second transverse edge may be a rear edge intended to be positioned at a rear side of a person; wherein the first portion of the absorbent core is a front portion and the second portion is a rear portion.

- In another embodiment, especially suitable for female persons, the first transverse edge may be a
- 20 rear edge intended to be positioned at a rear side of a person, and the second transverse edge may be a front edge intended to be positioned at a front side of a person; wherein the first portion of the absorbent core is a rear portion and the second portion is a front portion.

- The first attachment zone and the second attachment zone may be arranged symmetrically with
- 25 respect to a longitudinal center axis of the absorbent core extending between the first and second transverse edge. Since the body is more or less symmetrical this is usually preferred.

- The first distance between the first and the second attachment zone may be between 15 and 70% of the width of the absorbent core, more preferably between 20 and 50%. For example, the first
- 30 distance between the first and the second attachment zone may be between 10 mm and 100 mm, more preferably between 20 mm and 80 mm, preferably between 30 mm and 70 mm.

- The second distance between the third and the fourth attachment zone may be between 5 and 60% of the width of the absorbent core, more preferably between 10 and 40%. For example, the second
- 35 distance between the third and the fourth attachment zone may be between 5 mm and 60 mm, more preferably between 10 mm and 50 mm, even more preferably between 15 mm and 40 mm.

The length of the first and the second attachment zone may be larger than 5% of the length of the absorbent core; preferably larger than 10%, more preferably larger than 15%, e.g. larger than 20%. Similarly, the length of the third and the fourth attachment zone may be larger than 5% of the length of the absorbent core; preferably larger than 10%, more preferably larger than 15%, e.g. larger than 20%.

The length of the third and the fourth attachment zone may be larger than the length of the first and the second attachment zone, preferably at least 10% larger, more preferably at least 20% larger, even more preferably at least 30% larger, even more preferably at least 50% larger.

In a possible embodiment, seen in a projection on a longitudinal direction of the absorbent article, a projection of the first and second attachment zone does not overlap with a projection of the third and fourth attachment zone. However, in other embodiments there may be a partial overlap.

In another possible embodiment the first attachment zone may be connected to the third attachment zone through a first semi-permanent attachment zone and the second attachment zone may be connected to the fourth attachment zone through a second semi-permanent attachment zone. Such semi-permanent attachment zones are configured to be detached upon wetting, so that liquid can flow in a transverse direction through the absorbent material of the absorbent core.

The absorbent material may comprise cellulosic fluff pulp and/or superabsorbent particles. The absorbent material may be substantially fluffless.

Preferably, substantially no absorbent material is present in the plurality of attachment zones. Preferably, the first, second, third and fourth attachment zones are permanent attachment zones which remain attached upon wetting.

A distance between the transverse crotch line and a transverse center line extending perpendicular on the longitudinal direction of the absorbent core, through the middle of the absorbent core, may be smaller than 10%, more preferably smaller than 5% of the length of the absorbent core.

The length of the first and the second attachment zone may be larger than 30 mm, preferably larger than 40 mm, more preferably larger than 50 mm. The length of the third and the fourth attachment zone may be larger than 30 mm, preferably larger than 40 mm, more preferably larger than 50 mm. The first and second attachment extend, seen in the transverse direction of the absorbent core, over the transverse distance which may be at least 1 mm, preferably at least 3 mm, more preferably at least 4 mm, even more preferably at least 5 mm, most preferably at least 6 mm.

The first attachment zone and the second attachment zone may be substantially parallel and extend in a longitudinal direction of the absorbent core; or an angle between the first attachment zone and a longitudinal direction of the absorbent core and an angle between the second attachment zone and the longitudinal direction of the absorbent core may be smaller than  $5^\circ$ . The third attachment zone and the fourth attachment zone may be substantially parallel and extend in a longitudinal direction of the absorbent core; or an angle between the third attachment zone and a longitudinal direction of the absorbent core and an angle between the fourth attachment zone and the longitudinal direction of the absorbent core may be smaller than  $5^\circ$ .

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In the first and second attachment zone said top core wrap sheet may be attached to said back core wrap sheet through permanent and semi-permanent attachment portions, said semi-permanent portions may be being configured to release after having been in contact with liquid whilst said permanent portions may be configured not to release after having been in contact with liquid.

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A position and/or shape of one or more attachment zones of the plurality of attachment zones may be indicated by means of a distinguishable color and/or colored pattern. The position and/or shape of one or more of the plurality of attachment zones may be indicated by means of a printed ink layer. The distinguishable color and/or colored pattern may be provided on at least one of the topsheet, the top core wrap sheet, the backsheet, the back core wrap sheet, and any sheet in between the topsheet and the backsheet.

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Seen in a projection on a longitudinal direction of the absorbent core, the plurality of attachment zones together may cover at least 30 %, preferably at least 40% of a length of the absorbent core.

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In yet other embodiments which are suitable for both male and female persons (unisex), the difference between the first distance and the second distance may be less than 20% of the width of the absorbent article, e.g. less than 10%, between 0 and 8%, or between 1 and 5%, wherein the width is measured in the transverse direction of the absorbent core.

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In an embodiment, the width of the first and second attachment zone (measured in in a transverse direction of the absorbent core) may be different from the width of the third and fourth attachment zone. Also the width of any one of the attachment zones may vary along a longitudinal direction of the absorbent core.

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BRIEF DESCRIPTION OF FIGURES

The accompanying drawings are used to illustrate presently preferred non-limiting exemplary embodiments of devices of the present invention. The above and other advantages of the features and objects of the invention will become more apparent and the invention will be better understood from the following detailed description when read in conjunction with the accompanying drawings, in which:

Figure 1 is a perspective view of a preferred embodiment of a diaper in a wetted state;

Figures 2A and 2B illustrate another preferred embodiment of an absorbent article according to the invention;

10 Figure 3A is a perspective view of an exemplary embodiment of a diaper;

Figure 3B is a top plan view of the diaper of figure 3A;

Figure 3C is a schematic cross-section along line C-C of figure 3B;

Figure 3D is a schematic cross-section along line D-D of figure 3B;

Figure 4 illustrates a schematic cross-section of an absorbent core, wherein three possible locations are indicated for the attachment zones;

Figures 5A and 5B are cross-sectional views illustrating the effect of liquid being absorbed by the absorbent core of an exemplary embodiment of an absorbent article;

Figures 6A- 6F illustrate schematically different embodiments of providing attachment zones by attaching a top core wrap sheet to a bottom core wrap sheet;

20 Figures 7-14 illustrate yet other exemplary embodiments of an absorbent core according to the invention.

#### DESCRIPTION OF EMBODIMENTS

The same or similar features and components are indicated with the same reference numerals throughout the figures.

Figure 3A, 3B, 3C and 3D illustrate an exemplary embodiment of an absorbent article, here a diaper. Figure 3B shows the absorbent article in its flat out, un-contracted state with the wearer side facing the viewer. The skilled person understands that the absorbent article may also be a pant or an adult incontinence garment or the like. The absorbent article 100 comprises a liquid pervious topsheet, a liquid impervious backsheet, and an absorbent core 130 positioned in between the topsheet and the backsheet. The absorbent core 130 comprises absorbent material 105 between a top core wrap sheet 110 and a back core wrap sheet 120. Absorbent core 130 has a first and second longitudinal edge 131, 132 and a first and second transverse edge 133, 134.

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The absorbent core 130 is provided with a plurality of attachment zones 140, 150, 160, 170 comprising at least a first attachment zone 140 and a second attachment zone 150. The first and second attachment zones extend next to each other from the crotch region CR in the direction of the first and/or second transverse edge 133, 134. In first and second attachment zone 140, 150 the top core wrap sheet 110 is attached to the back core wrap sheet 120

- along an attachment which extends, seen in a transverse direction of the absorbent core, over a transverse distance which is at least 1 mm, preferably at least 2 mm, more preferably at least 3mm, most preferably at least 4mm; and/or

- along a discontinuous attachment at a plurality of locations at a distance of each other, seen in the transverse direction of the absorbent core. In that manner, upon wetting of the absorbent material, a first and second channel 140, 150 are created at said first and second attachment zone 140, 150, respectively.

Absorbent article 100 is provided at said top core wrap sheet with at least a first and a second attachment zone 140, 150 located a distance  $d_{12}$  of each other. In that manner a first and second channel 140, 150 formed upon wetting, each extend from a crotch region CR in the direction of the first transverse edge 133. Preferably the distance  $d_{12}$  is between 10 mm and 50 mm, more preferably between 15 and 30 mm. Preferably, the length of the first and second channel is substantially the same, more preferably the length  $l_1$  of the first channel and the length  $l_2$  of the second channel is between 60 mm and 140 mm, more preferably between 75 mm and 125 mm. Preferably, the distance between the first attachment zone 140 and the first longitudinal side 131 is between 20 and 30 mm, and the distance between the second attachment zone 150 and the second longitudinal side 132 is between 20 and 30 mm. Preferably, the distance between the first/second attachment zone and the transverse edge 133 is between 50 and 125 mm, more preferably between 75 and 115 mm.

First channel 140 and second channel 150 are substantially parallel and run in the longitudinal direction of absorbent core 130. However, it is also possible for first and second channel 140, 150 to extend under a small angle with respect to the longitudinal direction of absorbent core 130, e.g. an angle between 5 and 10°. For example, first and second attachment zone 140, 150 (and hence first and second channel 140, 150) may be diverging slightly outwardly in the direction of first transverse edge 133. Preferably first channel 140 and second channel 150 are arranged symmetrically with respect to a longitudinal center line CL of absorbent core 130.

Absorbent article 100 is further provided with a third and a fourth channel 160, 170 located at a distance  $d_{34}$  of each other. Third and fourth channel 160, 170 each extend from crotch region CR



in the direction of second transverse edge 134. The distance d12 between first and second channel 140, 150 is different from the distance d34 between third and fourth channel 160, 170. Preferably the distance d34 is between 25 mm and 80 mm, more preferably between 35 mm and 55 mm. Preferably, the length of the third and fourth channel 160, 170 is substantially the same, more preferably the length l3 of the third channel and the length l4 of the fourth channel is between 30 mm and 130 mm, more preferably between 30 mm and 70 mm. Preferably, the distance between the third attachment zone 160 and the first longitudinal side 131 is between 20 and 30 mm, and the distance between the fourth attachment zone 170 and the second longitudinal side 132 is between 20 and 30 mm. Preferably, the distance between the third/fourth attachment zone 160, 170 and the transverse edge 134 is between 30 mm and 100 mm, more preferably between 40 mm and 75 mm. Third channel 160 and fourth channel 170 are substantially parallel and run in the longitudinal direction of absorbent core 130. However, it is also possible for third and fourth channel 160, 170 to extend under a small angle with respect to the longitudinal direction of absorbent core 130, e.g. an angle between 5 and 10°. For example, third and fourth channel 160, 170 may be diverging slightly outwardly in the direction of second transverse edge 134. Preferably third channel 160 and fourth channel 170 are arranged symmetrically with respect to a longitudinal center line CL of absorbent core 130.

Preferably, the distance between an end point 141 of first channel 140 and an end point 161 of third channel 160 is smaller than 25 mm, more preferably smaller than 20 mm. Similarly, preferably, the distance between an end point 151 of second channel 150 and an end point 171 of fourth channel 170 is smaller than 25 mm, more preferably smaller than 20 mm. More preferably, endpoints 141, 151, 161 and 171 are located on substantially the same transverse line L functioning as a fold line along which the diaper can be folded in two. However, in other embodiments the fold line may pass through the third and fourth attachment zone 160, 170 (see e.g. figure 1 and figure 2B) or through the first and second attachment zone.

First, second, third and fourth channel 140, 150, 160, 170 each have a bottom which forms the attachment zone, see figure 3C and figure 3D. At bottom 145, 155, 165, 175 top core wrap sheet 110 is attached to back core wrap sheet 120. The width w of the bottom, seen in a transverse direction of absorbent core 130, is preferably larger than 2 mm, more preferably larger than 3 mm and even more preferable larger than 4 mm. To that end the attachment between top core wrap sheet 110 and the back core wrap sheet 120 may be an attachment extending over a transverse distance which is at least 2 mm, preferably at least 3 mm, more preferably at least 4 mm; and/or the attachment may be a discontinuous attachment in a plurality of locations at a distance of each other, seen in a transverse direction of absorbent core 130. Preferably the attachment at the bottom

between the top core wrap sheet and the back core wrap sheet is realized by any one of the following or a combination thereof: pressure bonding, thermobonding, sonic bonding, chemical bonding, adhesive, mechanical bonding. The width  $w$  of the bottom 145, 155 may be different from the width of the bottom 165, 175. Also the width of any one of the attachment zones may vary seen in a longitudinal direction of the absorbent core.

Outside of the plurality of channels 140, 150, 160, 170, absorbent core 130 has a maximum thickness  $t$ . Preferably, each channel 140, 150, 160, 170 extends through at least 90 % of the maximum thickness of absorbent core 130, more preferably through 100% of the thickness of absorbent core 130, such that, in the channel 140, 150, 160, 170, substantially no absorbent material is present that between top core wrap sheet 110 and back core wrap sheet 120. It is noted that the channel 140, 150, 160, 170 may be located below and/or above the bottom 145, 155, 165, 175, as will be explained in more detail below with reference to figure 4.

In a possible embodiment the attachment between top core wrap sheet 110 and back core wrap sheet 120, here at a bottom of each channel 140, 150, 160, 170, is a semi-permanent attachment configured to release after having been in contact with urine for a predetermined period of time, wherein said predetermined period of time is preferably smaller than 30 s.

In another possible embodiment the attachment between top core wrap sheet 110 and back core wrap sheet 120, here at the bottom of each channel 140, 150, 160, 170, is a permanent attachment; and absorbent core 130 is configured such that, in a wetted state of absorbent core 130, the absorbent material extends over bottom 145, 155, 165, 175 of channel 140, 150, 160, 170. This is illustrated in figures 5A and 5B for first and second channels 140, 150. Channels 140, 150, 160, 170 guide urine  $U$  or any other aqueous liquid through the side walls of channels 140, 150, 160, 170 into absorbent core 130. Those side walls create an additional path along which the liquid can flow into absorbent core 130 and enhance the diffusion of the liquid into absorbent core 130. Also, because of the swelling of the core material of absorbent core 130, the outer bands of absorbent core 130 will rotate around channels 140, 150, 160, 170 as indicated by arrows  $A$  in figure 5B. In that manner the diaper takes the shape of a tub or cup, such that any liquid  $NL$  which would not yet be absorbed by the absorbent material 105 is maintained in the tub shape. This results in a better protection against leakage and a diaper fitting perfectly to the body. Hence the diaper of figures 3A-3D will create more freedom of movement for the wearer of a wetted diaper.

It is clear to the skilled person that the attachment zones may be provided by means of continuous attachments in the transversal direction of the absorbent core and/or continuous attachments in the

longitudinal direction of the absorbent core and/or discontinuous attachments in the transversal direction of the absorbent core and/or discontinuous attachments in the longitudinal direction of the absorbent core.

Absorbent core 130 has a front portion 130a extending at one side of a transverse crotch line which corresponds in this embodiment with fold line L, and a rear portion 130b extending at the other side of the transverse crotch line L. First and second channel 140, 150 extend at least in front portion 130a of absorbent core 130, and third and fourth channel 160, 170 extend at least in rear portion 130b of the absorbent core 130. Preferably a distance between the transverse crotch line L and a transverse center line T extending perpendicular on the longitudinal direction of the absorbent core 130, through the middle of the absorbent core 130, is smaller than 10%, more preferably smaller than 5% of the length of the absorbent core 130.

Absorbent core 130 of figures 3A and 3B may be preferred for female persons. The plurality of attachment zones comprise at least a first and a second elongate attachment zone 140, 150 extending next each other, at least in the front portion of the absorbent core in the direction of the front edge 133, and a third and a fourth elongate attachment zone 160, 170 extending next to each other, at least in the rear portion 130b of the absorbent core 130, in the direction of the rear edge 134. Measured in a transverse direction, a first largest distance d12 between the first and the second attachment zone 140, 150 is smaller than a second largest distance d34 between the third and the fourth attachment zone 160, 170. Preferably the second distance d34 is at least 5%, more preferably at least 10% bigger, even more preferably at least 20% bigger than a second distance d12. The distance d34 may be between 15 and 70% of the width of the absorbent core, more preferably between 20 and 50%; wherein preferably the distance d34 is between 10 mm and 100 mm, more preferably between 20 mm and 80 mm, even more preferably between 30 mm and 70. The distance d12 is between 5 and 60% of the width of the absorbent core, more preferably between 10 and 40%; wherein preferably the distance d12 is between 5 mm and 60 mm, more preferably between 10 mm and 50 mm, even more preferably between 15 mm and 40 mm. Due to the specific physiological structure of a female at the genital region, such a pattern has the advantage that liquid can be distributed over substantially the entire absorbent core, and that any leakage risks in various positions of the female wearer can be reduced.

Seen in a projection on the longitudinal direction of the absorbent core, preferably the first and the second attachment zone 140, 150 extend over a length which is more than the length of the third and fourth attachment zone 160, 170. The length of the first and the second attachment zone 140, 150 may be larger than 30 mm, preferably larger than 40 mm, more preferably larger than 50 mm.

The length of the third and the fourth attachment zone may be larger than 30 mm, preferably larger than 40 mm, more preferably larger than 50 mm.

The first and the second elongate attachment zone 140, 150 each have a front end 142, 152 adjacent to absorbent material and a rear end 141, 151 adjacent to absorbent material; and the third and the fourth elongate attachment zone 160, 170 each have a rear end 162, 172 adjacent to absorbent material and a front end 161, 171 adjacent to absorbent material. In other embodiments the first zone 140 may be connected to the third zone 160, and the second zone 150 may be connected to the fourth zone 170.

Seen in a projection on a longitudinal direction, the first and second attachment zone 140, 150 do not overlap with the third and fourth attachment zone 160, 170. However, in other embodiments there may be some overlap.

The first attachment zone 140 may be separated from the third attachment zone 160 by absorbent material, and the second attachment zone 150 may be separated from the fourth attachment zone 170 by absorbent material.

In other non-illustrated embodiments, the first attachment zone 140 may also be connected to the third attachment zone 160 through a first semi-permanent attachment zone and the second attachment zone 150 may also be connected to the fourth attachment zone 170 through a second semi-permanent attachment zone. The semi-permanent attachment may be configured to release after having been in contact with urine for a predetermined period of time.

Seen in a projection on a longitudinal direction of the absorbent core 130, the plurality of attachment zones together may cover at least 30 %, preferably at least 40% of a length of the absorbent core 130. In a possible embodiment, the plurality of channels 140, 150, 160, 170 together cover at least 60%, preferably at least 70% of the length  $l_a$  of absorbent core 130; indeed, in the embodiment of figure 3A-3D the channels cover a length equal to  $l_1+l_3$  which is more than 60% of the length  $l_a$  of absorbent core 130.

The plurality of channels 140, 150, 160, 170 may be indicated with a color and/or with a pattern which is different from the color and/or pattern of topsheet. More in particular the area of the channels may comprise a print allowing a user to visually distinguish the channels. This print may be arranged on the topsheet, on the top core wrap sheet, on the back core wrap sheet, on the backsheets, or on any sheet in between the topsheet and the backsheets, as long as it is visible for a

user. As the sheets may be partially transparent, the print may be arranged on a sheet in between the topsheet and the backsheet, as long as it is visible through the topsheet and/or the backsheet. Preferably the print is visible when looking at the topsheet of the diaper. For example, a topsheet area above first and second channels 140, 150 may be printed with an ink of a first color and a  
5 topsheet area above third and fourth channels 160, 170 may be printed with the same color or with a different color. In that manner a user will be able to easily recognize the front and rear portion of a diaper, and will recognize more easily how to put on the diaper.

The chassis of the diaper 100 in figures 3A-3D comprises a liquid pervious topsheet (not shown in  
10 figures 3C and 3D, but the topsheet is a layer above top core wrap sheet 110) and liquid impervious backsheet (not shown in figures 3C and 3D, but the backsheet is a layer below back core wrap sheet 110). The topsheet may be attached to the top core wrap sheet 110, e.g. in the attachment zones 140, 150, 160, 170. Also, the backsheet may be attached to the back core wrap sheet 120, e.g. in the attachment zones 140, 150, 160, 170. Preferably the chassis further includes  
15 side panels or ears 210, elasticized leg cuffs 230 and elastic waist elements (not shown). A front end portion of diaper 100 is configured as a front waist region 100a. The opposite rear end portion is configured as a back waist region 100b of diaper 100. An intermediate portion of diaper 100 is configured as crotch region CR, which extends longitudinally between first and second waist regions 100a and 100b. Waist regions 100a and 100b may include elastic waist elements such that  
20 they gather about the waist of the wearer to provide improved fit and containment. Crotch region CR is that portion of diaper 100 which, when the diaper 100 is worn, is generally positioned between the wearer's legs. The periphery of diaper 100 is defined by the outer edges of the diaper 100 in which longitudinal edges 101, 102 run generally parallel to a longitudinal axis of diaper 100 and transverse end edges 103, 104 run between the longitudinal edges 101, 102 generally parallel  
25 to a transverse axis of diaper 100. The chassis also comprises a fastening system, which may include at least one fastening or securing member 212 and at least one landing zone 220. The various components within diaper 100 may be bound, joined or secured by any method known in the art, for example by adhesives in uniform continuous layers, patterned layers or arrays of separate lines, spirals or spots. Top core wrap sheet, topsheet, back core wrap sheet, backsheet,  
30 absorbent material and other components may be assembled in a variety of well-known configurations and are well known in the art.

Backsheet covers absorbent core 130 and preferably extends beyond the absorbent core 130 toward  
35 longitudinal edges 101, 102 and end edges 103, 104 of diaper 100 and may be joined with top sheet. Backsheet prevents bodily exudates absorbed by the absorbent core 130 and contained within diaper 100 from soiling other external articles that may contact the wearer, such as bed

5 sheets and undergarments. In preferred embodiments, backsheet is substantially impervious to bodily exudates and comprises a laminate of a nonwoven and a thin plastic film such as a thermoplastic film. Backsheet may comprise breathable materials that permit vapor to escape from diaper 100 while still preventing bodily exudates from passing through backsheet. It may be semi-rigid, non-elastic and can be made fully or partially elasticized and include backing.

10 The top sheet which is located above the top core wrap sheet 110, is preferably soft, exhibits good strikethroughs and has a reduced tendency to rewet from the liquid absorbent material. Top sheet may be semi-rigid and non-elastic, or may be fully or partially elasticized. Topsheet is intended to be placed in close proximity to the skin of the wearer when diaper 100 is worn. Topsheet permits bodily exudates to rapidly penetrate it so as to flow more quickly toward absorbent core 130 via a top surface thereof and via the plurality of channels 140, 150, 160, 170, preferably not allowing such bodily exudates to flow back through topsheet. Topsheet may be constructed from any one of a wide range of liquid and vapor permeable, preferably hydrophilic, materials. The upper and lower surface of topsheet may be treated differently. Topsheet may include e.g. a surfactant on the upper surface so as to facilitate liquid transfer there through, especially at a central zone or area of topsheet located over absorbent core 130, and/or a hydrophobic agent on the lower surface to minimize the liquid contained within absorbent core 130 from contact wetting topsheet thereby reducing rewet values. Topsheet may be coated with a substance having rash preventing or rash reducing properties. Preferably, topsheet covers substantially the entire wearer facing area of diaper 100, including substantially all of front waist region 100a, back waist region 100b, and crotch region CR. Optionally, side panels 210, 210' and/or waist feature layers of the inner region may be formed from the same single topsheet material. Alternatively, topsheet may be formed from multiple different materials which vary across of topsheet. Such a multiple piece design allows for creation of preferred properties and different zones of the topsheet.

Absorbent core 130 may comprise any absorbent material that is generally compressible, conformable, non-irritating to the wearer's skin, and capable of absorbing and retaining bodily exudates. Absorbent core 130 may comprise a wide variety of liquid absorbent materials commonly used in absorbent articles. Preferably, absorbent core 130 comprises fluff material, typically cellulosic fluff pulp. However, in other embodiments, absorbent core 130 may be substantially fluffless and comprise superabsorbent polymers. Also, absorbent core 130 may comprise a combination of cellulosic fluff pulp and superabsorbent polymers. Absorbent core 130 may be configured to extend substantially the full length and/or width of diaper 100. However, as in the embodiment of figures 3A-3D, preferably absorbent structure 130 is not coextensive with the entire diaper 100 and is limited to certain regions of diaper 100 including crotch region CR. In

various embodiments, the absorbent core 300 extends to the edges of diaper 100 but the absorbent material is concentrated in the crotch region CR or another target zone of the diaper 100. In figures 3A-3D, absorbent core 130 is shown as having a substantially rectangular configuration, however, absorbent core 130 may be shaped differently, such as, elliptical, dogbane shaped, T-shaped or I-shaped. More in particular the width of the front portion 130a may be smaller than the width of the rear portion 130b of the absorbent core.

Examples of commonly occurring absorbent materials used for absorbent core 130 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-swella-  
ble, 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.

Diaper 100 may also utilize a pair of containment walls or cuffs 230. Each cuff 230 is a longitudinally extending wall structure preferably positioned on each side of absorbent core 130 and spaced laterally from the center line CL. When diaper 100 is worn, the elastic members function to contract cuffs 230 about the buttocks and the thighs of the wearer in a manner, which forms a seal between diaper 100, the buttocks and the thighs.

The waist regions 100a and 100b each comprise a central region and a pair of side panels or ears 210, 210' which typically comprise the outer lateral portions of the waist regions. In order to keep diaper 100 in place about the wearer, preferably at least a portion of the back waist region 100b is attached by fastening or securing members 212 to at least a portion of the front waist region 100a. Alternatively, the absorbent article may be pants and the like. In this configuration, the absorbent article may or may not have fastening members.

Diaper 100 may also employ additional layers, such as an acquisition layer and/or dispersion layer situated between topsheet and absorbent core 130, and/or coverstock layers, and/or other layers situated between absorbent core 130 and backsheet. An acquisition layer and/or dispersion layer serves to slow down the flow so that the liquid has adequate time to be absorbed by absorbent core 130. Figure 5A and 5B show an acquisition layer 190 above top core wrap layer 110.

Figure 4 illustrates an absorbent core 130 comprising an absorbent material 105 between a top core wrap sheet 110 and a back core wrap sheet 120. The absorbent core has a first and second longitudinal edge 131, 132. The absorbent core 130 is provided with a plurality of attachment

zones 145. Figure 4 illustrates that the attachment zones 145 may be positioned at different locations. As illustrated on the left in figure 4, the attachment zone may be positioned more or less centrally such that an upper channel portion 140a and a lower channel portion 140b is formed. In an alternative embodiment, the attachment zone 145 may be positioned at the bottom such that an upper channel 140 is created, see the example in the middle of figure 4. According to yet another embodiment, the attachment zone 145 may be located at the top, such that the channel 140 is formed below top core wrap sheet 110. The skilled person understands that any variants thereof are also possible, as long as the attachment zones allow the formation of channels upon wetting of the absorbent core 130.

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Figure 1 shows a perspective view of a preferred embodiment of diaper in the wetted state, and figures 2A and 2B show schematically the same diaper. Figure 1 clearly illustrates the formation of three tubes 301, 302, 303 giving the diaper a tub shape which is well adapted to the body.

Figure 2A illustrates a top view of an absorbent article, here a diaper 100, in its flat out, uncontracted state with the wearer side facing the viewer. The skilled person understands that the absorbent article may also be a pant or an adult incontinence garment or the like. Preferably the chassis includes side panels or ears 210, elasticized leg cuffs and elastic waist elements. A front end portion of diaper 100 is configured as a front waist region 100a. The opposite rear end portion is configured as a back waist region 100b of diaper 100. Waist regions 100a and 100b may include elastic waist elements such that they gather about the waist of the wearer to provide improved fit and containment. The periphery of diaper 100 is defined by the outer edges of the diaper 100 in which longitudinal edges 101, 102 run generally parallel to a longitudinal axis of diaper 100 and transverse end edges 103, 104 run between the longitudinal edges 101, 102 generally parallel to a transverse axis of diaper 100. The chassis also comprises a fastening system, which may include at least one fastening or securing member 212 and at least one landing zone not visible. The various components within diaper 100 may be bound, joined or secured by any method known in the art, for example by adhesives in uniform continuous layers, patterned layers or arrays of separate lines, spirals or spots. Top core wrap sheet, topsheet, back core wrap sheet, backsheets, absorbent material and other components may be assembled in a variety of well-known configurations as described above in connection with figures 3A-3D.

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Figure 2B illustrates the absorbent core 130 of the absorbent article 100 of figure 2A. The absorbent article 100 comprises a liquid pervious topsheet, a liquid impervious backsheets, and the absorbent core 130 positioned in between the topsheet and the backsheets. The absorbent core 130 comprises absorbent material between a top core wrap sheet and a back core wrap sheet. Absorbent core 130 has a first and second side edge 131, 132, a front edge 133 and a rear edge 134, wherein

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the absorbent core 130 is provided with a plurality of attachment zones 140, 150, 160, 170 where the top core wrap sheet is attached to the back core wrap sheet, and where preferably substantially no absorbent material is present. The plurality of attachment zones comprise at least a first and a second elongate attachment zone 140, 150 extending next each other from the crotch region CR in the direction of the first transverse edge 133, at least in the front portion of the absorbent core, and a third and a fourth elongate attachment zone 160, 170 extending next to each other from the crotch region CR in the direction of the second transverse edge 134, at least in the rear portion 130b of the absorbent core 130. Measured in a transverse direction, a first largest distance d12 between the first and the second attachment zone 140, 150 is bigger than a second largest distance d34 between the third and the fourth attachment zone 160, 170. Such an embodiment is very suitable both for male and female persons. Preferably the first distance d12 between the first and the second attachment zone 140, 150 is at least 5%, more preferably at least 10% bigger, even more preferably at least 20% bigger, even more preferably at least 40% bigger than a second distance d34 between the third and the fourth attachment zone 160, 170. The distance d12 between the first and the second attachment zone may be between 15 and 70% of the width of the absorbent core, more preferably between 20 and 50%; wherein preferably the distance d12 between the first and the second attachment zone is between 10 mm and 100 mm, more preferably between 20 mm and 80 mm, even more preferably between 30 mm and 70 mm. Preferably, the distance between the first attachment zone 140 and the first longitudinal side 131 is between 20 and 30 mm, and the distance between the second attachment zone 150 and the second longitudinal side 132 is between 20 and 30 mm. Preferably, the distance between the first/second attachment zone 140, 150 and the transverse edge 133 is between 30 mm and 100 mm, more preferably between 40 mm and 75 mm. The distance d34 between the third and the fourth attachment zone is between 5 and 60% of the width of the absorbent core, more preferably between 10 and 40%; wherein preferably the distance d34 between the third and the fourth attachment zone is between 5 mm and 60 mm, more preferably between 10 mm and 50 mm, even more preferably between 15 mm and 40 mm. Due to the specific physiological structure of male at the genital region, such a pattern has the advantage that liquid can be distributed over substantially the entire absorbent core, and that any leakage risks in various positions of the male wearer can be reduced.

The first and the second elongate attachment zone 140, 150 each have a front end 142, 152 adjacent to absorbent material and a rear end 141, 151 adjacent to absorbent material; and the third and the fourth elongate attachment zone 160, 170 each have a rear end 162, 172 adjacent to absorbent material and a front end 161, 171 adjacent to absorbent material.

Preferably, the distance  $x$  between the rear end 141 of first attachment zone 140 and the front end 161 of third attachment zone 160 is smaller than 25 mm, more preferably smaller than 20 mm. Similarly, preferably, the distance  $x$  between the rear end 151 of second attachment zone 150 and the front end 171 of fourth attachment zone 170 is smaller than 25 mm, more preferably smaller than 20 mm. In a possible embodiment, ends 141, 151, 161 and 171 may be located on substantially the same transverse line L functioning as a fold line along which the diaper can be folded in two.

Seen in a projection on the longitudinal direction of the absorbent core, preferably the first and the second attachment zone 140, 150 extend over a length which is less than the length of the third and fourth attachment zone 160, 170. The length of the first and the second attachment zone 140, 150 may be larger than 30 mm, preferably larger than 40 mm, more preferably larger than 50 mm. The length of the third and the fourth attachment zone may be larger than 30 mm, preferably larger than 40 mm, more preferably larger than 50 mm. The first attachment zone 140 and the second attachment zone 150 may be arranged symmetrically with respect to a longitudinal center axis of the absorbent core 130 extending between the front edge 133 and rear edge 134. Seen in a projection on a longitudinal direction, the first and second attachment zone 140, 150 do not overlap with the third and fourth attachment zone 160, 170. However, in other embodiments there may be some overlap.

The first attachment zone 140 may be separated from the third attachment zone 160 by absorbent material, and the second attachment zone 150 may be separated from the fourth attachment zone 170 by absorbent material. The absorbent material may comprise cellulosic fluff pulp and/or superabsorbent particles. In some embodiments the absorbent material may be substantially fluffless.

The areas A1, A2, A3 may have a different amount of absorbent material per surface area. Preferably the central area A3 has a larger amount of absorbent material per surface area than the intermediate area A2. Preferably, the intermediate area A2 has a larger amount of absorbent material per surface area than a circumferential area A1.

Features for other embodiments described above may apply in a similar manner for the embodiment of figures 2A and 2B.

Figures 6A, 6C and 6E illustrate different embodiments of a top core wrap sheet 110 and/or bottom core wrap sheet 120 of an absorbent core. Figures 6B, 6D and 6F illustrate schematically how

attachment zones may be provided by attaching the top core wrap sheet 110 to the bottom core wrap sheet 120 in the corresponding embodiments of figures 6A, 6C and 6E. Figure 6A illustrates an embodiment wherein a separate top core wrap sheet 110 and separate bottom core wrap sheet 120 are provided and wherein between the top core wrap sheet 110 and bottom core wrap sheet 120 absorbent material 105 is present. Figure 6B illustrates the embodiment of figure 6A wherein the top core wrap sheet 110 is attached to the bottom core wrap sheet 120 at attachment 140. This corresponds with the embodiments as illustrated in figures 1C and 1D. Figure 6C illustrates an embodiment wherein first core wrap sheet 110 is used in combination with a second core wrap sheet 120 wherein the second core wrap sheet 120 comprises a fibrous substrate layer 120a and absorbent material 105a embedded within the fibers 105b of substrate layer 120a. In other words, in the embodiment of figure 6B the absorbent core is an integral part of the second core wrap sheet 120. It is clear to the skilled person that the first core wrap sheet 110 may correspond to the top core wrap sheet and the second core wrap sheet 120 may correspond to the bottom core wrap sheet, or vice versa. Figure 6D illustrates the embodiment of figure 6C wherein the top core wrap sheet 110 is attached to the bottom core wrap sheet 120 at attachment 140. Figure 6E illustrates an embodiment wherein the top core wrap sheet 110 and bottom core wrap sheet 120 are made of one piece of sheet material. In other words, the top core wrap sheet 110 is formed integrally with the bottom core wrap sheet 120. The piece of sheet material 110, 120 is wrapped around the absorbent material 105 such that an upper portion of the sheet material can be considered to be the top core wrap sheet 110 and a bottom portion of the sheet material can be considered to be the bottom core wrap sheet 120. Figure 6F illustrates the embodiment of figure 6E wherein the top core wrap sheet 110 is attached to the bottom core wrap sheet 120 at attachment 140. Preferably the attachment 140 between the top core wrap sheet 110 and the bottom core wrap sheet 120 is realized by any one of the following or a combination thereof: pressure bonding, thermobonding, sonic bonding, chemical bonding, adhesive, mechanical bonding. It is clear to the skilled person, that when attachment zones are described within this disclosure, the attachment between the top core wrap sheet and back core wrap sheet may be interpreted to be formed according to any one of the above described embodiments or combinations thereof.

Figure 7 illustrates a further embodiment of the absorbent core 130 of the absorbent article of figure 2A. According to the embodiment of figure 7, the plurality of attachment zones comprises a first and a second attachment zone 140, 150 extending next to each other from a crotch region in the direction of the front edge 133, and a third attachment zone 180 extending from the crotch region in the direction of the rear edge 134, wherein seen in a projection on a transverse direction the third attachment zone 180 is located between the first and the second attachment zone 140, 150. The first attachment zone 140 and the second attachment zone 150 are substantially parallel and

extend in a longitudinal direction of the absorbent core 130. The largest distance between the first 140 and the second attachment zone 150 is  $d_{12}$ . Seen in a projection on the longitudinal direction of the absorbent core, the first and the second attachment zone extend over a length which may be less than the length of the third attachment zone. The first and the second elongate attachment zone 140, 150 each have a front end 142, 152 adjacent to absorbent material and a rear end 141, 151 adjacent to absorbent material; and the third elongate attachment zone 180 has a rear end 182 adjacent to absorbent material and a front end 181 adjacent to absorbent material. In other embodiments, the first attachment zone and/or the second attachment zone 140, 150 may be connected to the third zone 180. This embodiment is particularly advantageous for male, due to the specific physiological structure of male at the genital region. It is clear to the skilled person that there may also be embodiments advantageous for female and/or can be used for both male and female, for example embodiments wherein the first and second attachment zone 140, 150 extending next to each other from the crotch region in the direction of the rear edge 134, and the third attachment zone 180 extending from the crotch region in the direction of the front edge 133. The exemplary embodiment of figure 8 is similar to the embodiment of figure 2B, with the difference that the first attachment zone 140 and the second attachment zone 150 are not parallel, and diverge in the direction of a front edge 133 of absorbent core 130. The largest distance  $d_{12}$  between the first 140 and the second attachment zone 150 may be between a front end 142 of the first attachment zone 140 and a front end 152 of the second attachment zone 150.

The exemplary embodiment of figure 9 is similar to the embodiment of figure 8, with this difference that the first and second attachment zone 140 and 150 are substantially parallel in the crotch region and diverge in the direction of a front edge 133 of absorbent core 130. Further, the first attachment zone 140 may be connected to the third attachment zone 160 through a first semi-permanent attachment zone 135, and the second attachment zone 150 may be connected to the fourth attachment zone 170 through a second semi-permanent attachment zone 136. The plurality of attachment zones may be permanent attachment zones which remain attached when wetted.

The exemplary embodiment of figure 10 is similar to the embodiment of figure 7, with this difference that the first attachment zone 140 and the second attachment zone 150 are not parallel as they start from a crotch region and diverge in the direction of a front edge 133 of absorbent core 130, and become substantially parallel as they extend further in the direction of a front edge 133 of absorbent core 130. The largest distance between the first 140 and the second attachment zone 150  $d_{12}$  may be between a front end of the first attachment zone 140 and a front end of the second attachment zone 150.

The exemplary embodiment of figure 11 illustrates that patterns are possible where each of the plurality of attachment zones comprise one or more sections. For example as shown in figure 11, the first attachment zone may comprise one or more sections 140, 140', and/or the second attachment zone may comprise one or more sections 150, 150', and/or the third attachment zone may comprise one or more sections 160, 160', 160'', and/or the fourth attachment zone may comprise one or more sections 170, 170', 170''.

The exemplary embodiment of figure 12 illustrates that patterns are possible where the first attachment zone 140 and the second attachment zone 150 may be connected with a transversal attachment zone 1045', and/or the third attachment zone 160 and the fourth attachment zone 170 may be connected with a transversal attachment zone 1045. The transversal attachment zones 1045, 1045' may connect the front ends and/or rear ends of the first and the second attachment zones 140, 150 and/or the third and the fourth attachment zones 160, 170. Furthermore, the transversal attachment zone needs not to be straight: it may be rounded as in example of figure 10, or take another shape.

The exemplary embodiment of figure 13 illustrates that patterns are possible where the first attachment zone 140 and the second attachment zone 150 may be connected by at least one transversal semi-permanent attachment zone 1046, 1046', 1046'', and the third attachment zone 160 and the fourth attachment zone 170 may also be connected with at least one transversal semi-permanent attachment zone 1047, 1047', 1047'', 1047'''. The at least one transversal semi-permanent attachment zone may be configured to release after having been in contact with urine for a predetermined period of time, wherein said predetermined period of time is preferably smaller than 30 s. The at least one transversal semi-permanent attachment zone may be straight, or rounded, or take other shapes.

The exemplary embodiment of figure 14 illustrates that patterns are possible that the first and second attachment zones 140, 150 are substantially parallel in a part of the crotch region, whilst the transverse distance between the first and second attachment zones gradually decrease in the direction of a front edge 133 of absorbent core 130.

The exemplary embodiments shown in figures 7 to 14 are particularly advantageous for male, due to the specific physiological structure of male at the genital region. However it is clear to the skilled person that how to best adapt this embodiment using other configurations, such as the ones described above, to make the embodiments advantageous for female, and/or suitable for both male

and female. Features for other embodiments described above may apply in a similar manner for the embodiments of figures 7 to 14.

5 Whilst the principles of the invention have been set out above in connection with specific embodiments, it is to be understood that this description is merely made by way of example and not as a limitation of the scope of protection which is determined by the appended claims.

## Conclusies

1. Een absorberend voorwerp omvattende een vloeistofdoorlaatbaar bovenvel, een vloeistofondoorlaatbaar ondervel, en een absorberende kern omvattende een absorberend materiaal  
5 tussen een bovenste kernwikkkelvel en een onderste kernwikkkelvel, waarbij de absorberende kern is gepositioneerd tussen het bovenvel en het ondervel, waarbij de absorberende kern een eerste en tweede longitudinale rand en een eerste en tweede transversale rand heeft, waarbij de absorberende kern een eerste deel (130a), (130b) en een tweede deel (130b), (130a) aan weerszijden van een transversale kruislijn (L) heeft, waarbij de absorberende kern voorzien is van een aantal  
10 bevestigingszones waar het bovenste kernwikkkelvel is bevestigd aan het onderste kernwikkkelvel, waarbij het aantal bevestigingszones, ten minste een eerste en een tweede langwerpige bevestigingszone (140, 150); (160, 170) welke zich, ten minste in het eerste deel van de absorberende kern in de richting van de eerste transversale rand (133), 134), naast elkaar uitstrekken, en een derde en vierde langwerpige bevestigingszone (160, 170); (140, 150) welke  
15 zich, ten minste in het tweede deel van de absorberende kern, in de richting van de tweede transversale rand (134), (133) naast elkaar uitstrekken, omvat; waarbij de eerste langwerpige bevestigingszone gescheiden is van de derde langwerpige bevestigingszone door absorberend materiaal, en waarbij de tweede langwerpige bevestigingszone gescheiden is van de vierde langwerpige bevestigingszone door absorberend materiaal.  
20
2. Het absorberend voorwerp van conclusie 1, waarbij, gemeten in de transversale richting, een eerste maximale afstand (d12), (d34) tussen de eerste en de tweede bevestigingszone groter is dan een tweede maximale afstand (d34), (d12) tussen de derde en vierde bevestigingszone.
- 25 3. Het absorberende voorwerp van conclusie 2, waarbij de eerste afstand tussen de eerste en tweede bevestigingszone ten minste 5%, bij voorkeur ten minste 10% groter, nog meer voorkeur ten minste 20% groter is dan een tweede afstand tussen de derde en vierde bevestigingszone.
4. Het absorberende voorwerp volgens één der voorgaande conclusies, waarbij de eerste  
30 transversale rand een voorrand is bedoeld om gepositioneerd te worden bij een voorzijde van een persoon, en de tweede transversale rand een achterrاند is bedoeld om gepositioneerd te worden bij een achterzijde van een persoon; waarbij het eerste deel van de absorberende kern een voorste deel is en het tweede deel een achterste deel is.
- 35 5. Het absorberende voorwerp volgens één der voorgaande conclusies, waarbij de eerste en de tweede langwerpige zone (140, 150) elk een voorste uiteinde (142, 152) aangrenzend aan

absorberend materiaal en een achterste uiteinde (141, 151) aangrenzend aan absorberend materiaal hebben; en waarbij de derde en de vierde langwerpige bevestigingszone (160, 170) elk een achterste uiteinde (162, 172) aangrenzend aan absorberend materiaal en een voorste uiteinde (161, 171) aangrenzend aan absorberend materiaal hebben.

5

6. Het absorberende voorwerp volgens één der voorgaande conclusies, waarbij, gezien in een projectie op de longitudinale richting van de absorberende kern, de eerste en de tweede bevestigingszone zich uitstrekken over een lengte die kleiner is dan de lengte van de derde en de vierde bevestigingszone.

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7. Het absorberende voorwerp volgens één der voorgaande conclusies, waarbij de lengte van de derde en de vierde bevestigingszone ten minste 10% groter is dan de lengte van de eerste en de tweede bevestigingszone, bij voorkeur ten minste 20% groter.

15

8. Het absorberende voorwerp volgens één der voorgaande conclusies, waarbij de afstand tussen een eindpunt van de eerste bevestigingszone en een eindpunt van de derde bevestigingszone kleiner is dan 25 mm.

20

9. Het absorberende voorwerp volgens één der voorgaande conclusies, waarbij de eerste afstand tussen de eerste en de tweede bevestigingszone tussen 15 en 70% van de breedte van de absorberende kern is, meer bij voorkeur tussen 20 en 50%.

25

10. Het absorberende voorwerp volgens één der voorgaande conclusies, waarbij de tweede afstand tussen de derde en de vierde bevestigingszone tussen 5 en 60% van de breedte van de absorberende kern is, meer bij voorkeur tussen 10 en 40%.

30

11. Het absorberende voorwerp volgens één der voorgaande conclusies, waarbij de eerste afstand tussen de eerste en de tweede bevestigingszone tussen 30 mm en 70 mm is.

12. Het absorberende voorwerp volgens één der voorgaande conclusies, waarbij de tweede afstand tussen de derde en vierde bevestigingszone tussen 15 mm en 40 mm is.

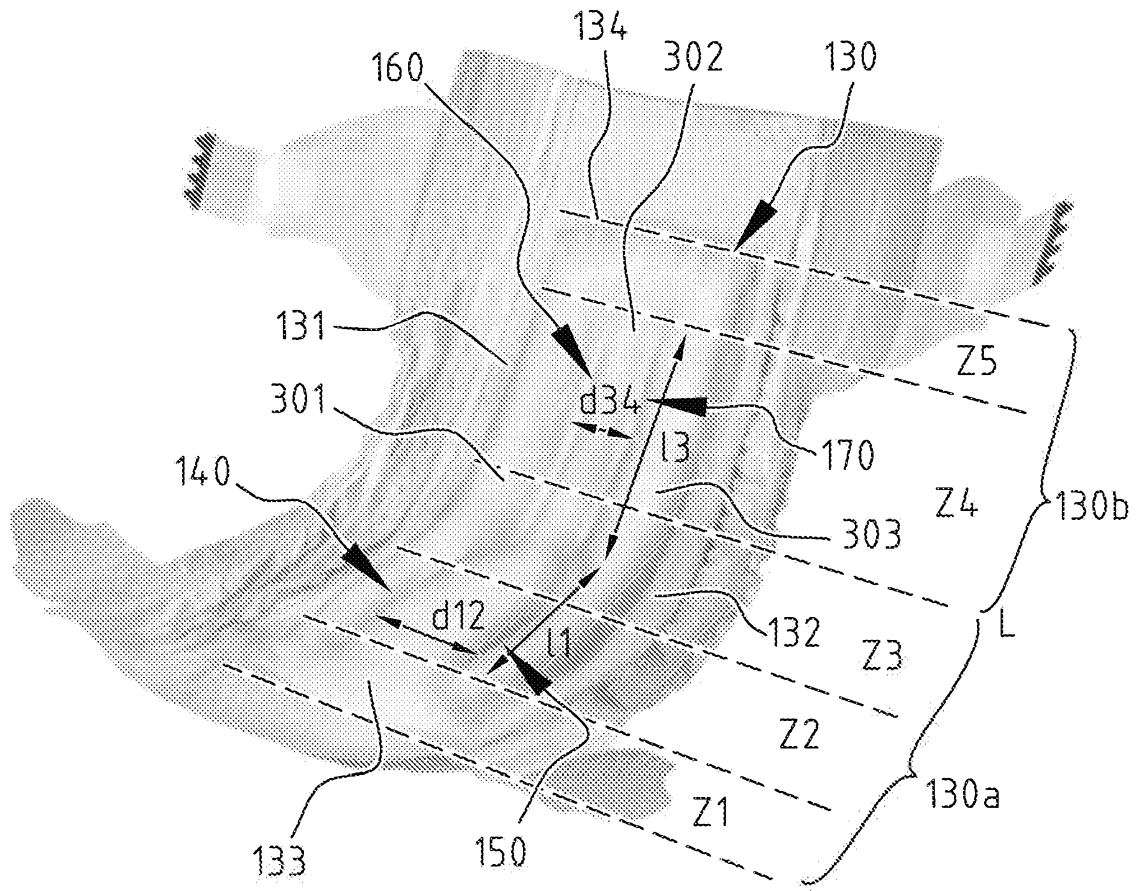
35

13. Het absorberende voorwerp volgens één der voorgaande conclusies, waarbij de lengte van de eerste en de tweede bevestigingszone groter is dan 5% van de lengte van de absorberende kern; bij voorkeur groter dan 10%, meer bij voorkeur groter dan 15%; en waarbij de lengte van de derde

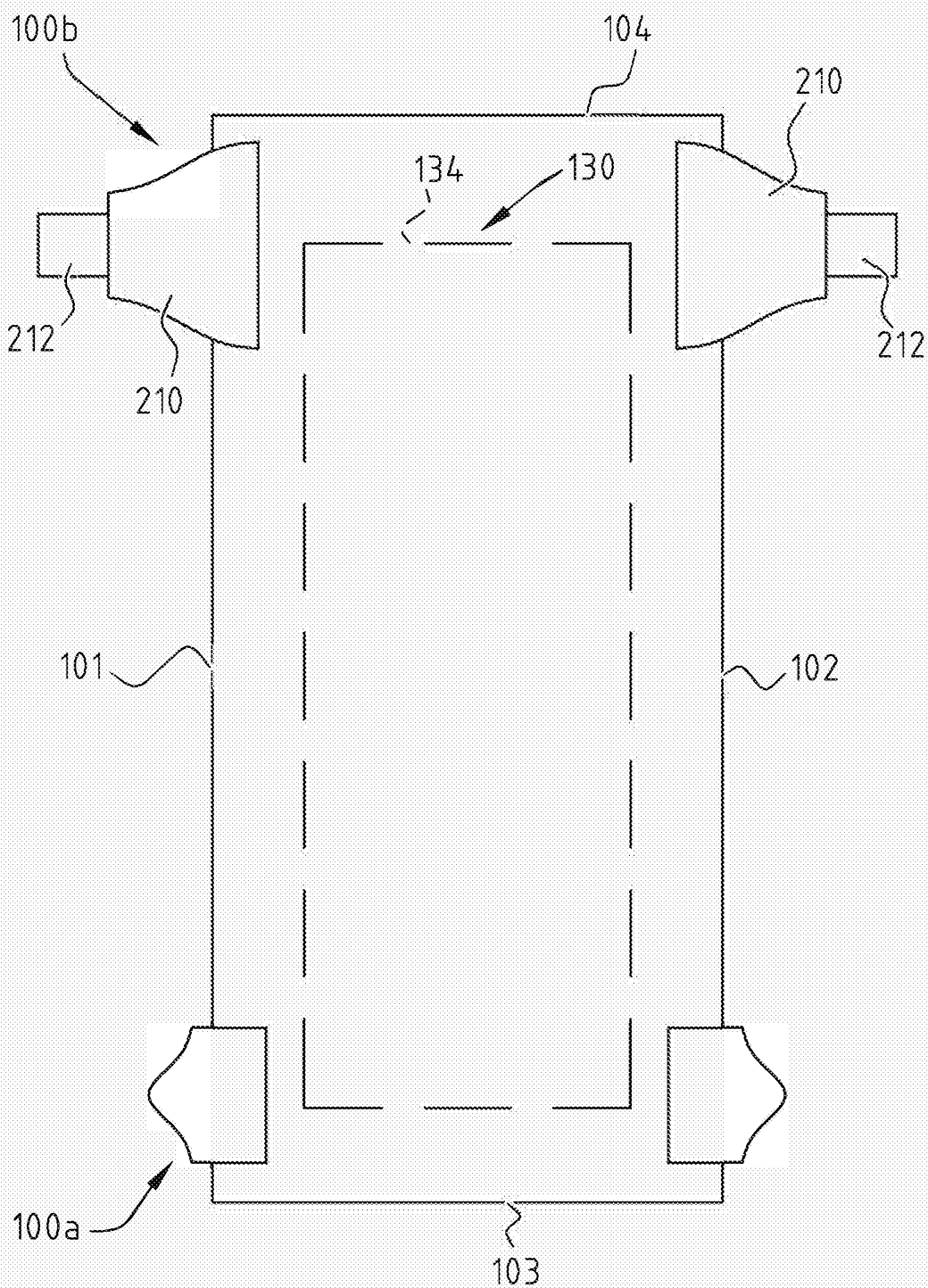


en vierde bevestigingszone groter is dan 5% van de lengte van de absorberende kern; bij voorkeur groter dan 10%, meer bij voorkeur groter dan 15%.

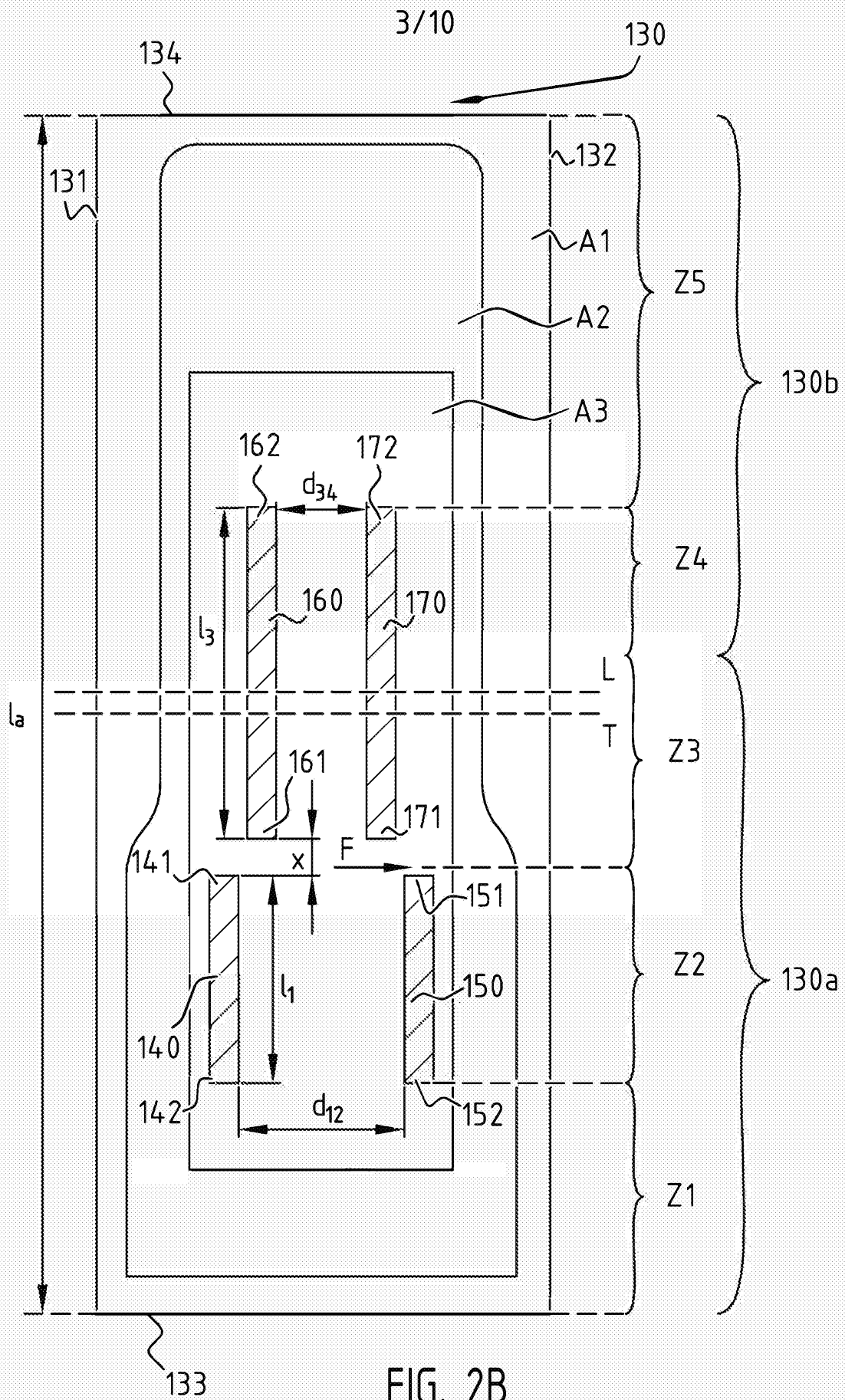
- 5 14. Het absorberende voorwerp volgens één der voorgaande conclusies, waarbij, gezien in een projectie op een longitudinale richting, de eerste en tweede bevestigingszone niet overlappen met de derde en vierde bevestigingszone.
15. Het absorberende voorwerp volgens één der voorgaande conclusies, waarbij in hoofdzaak geen absorberend materiaal aanwezig is in het aantal bevestigingszones.

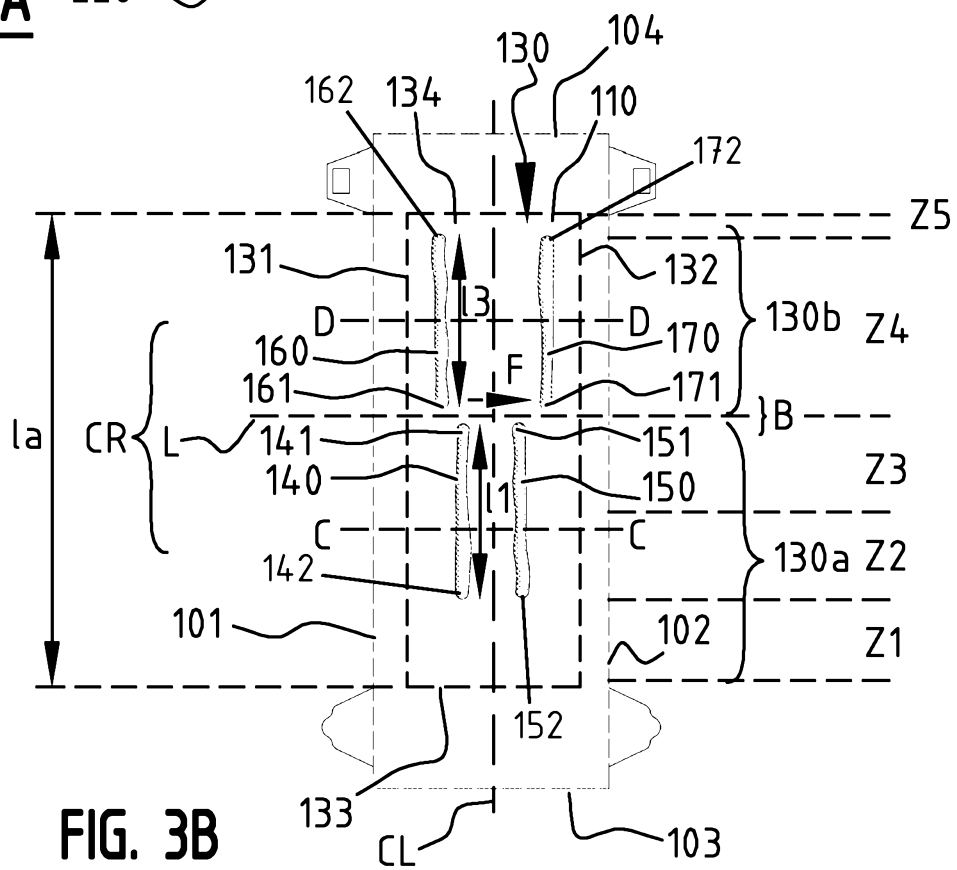
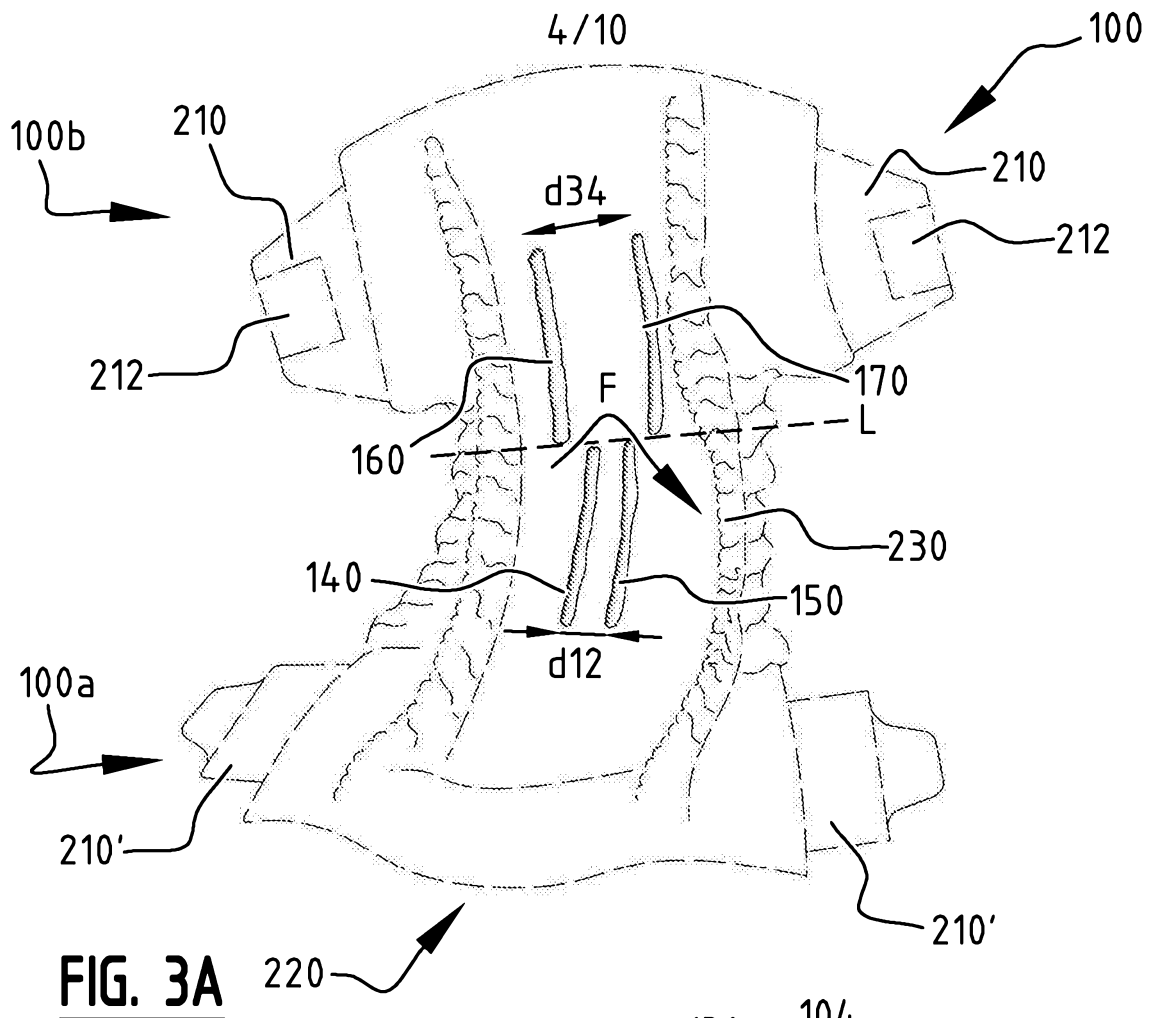


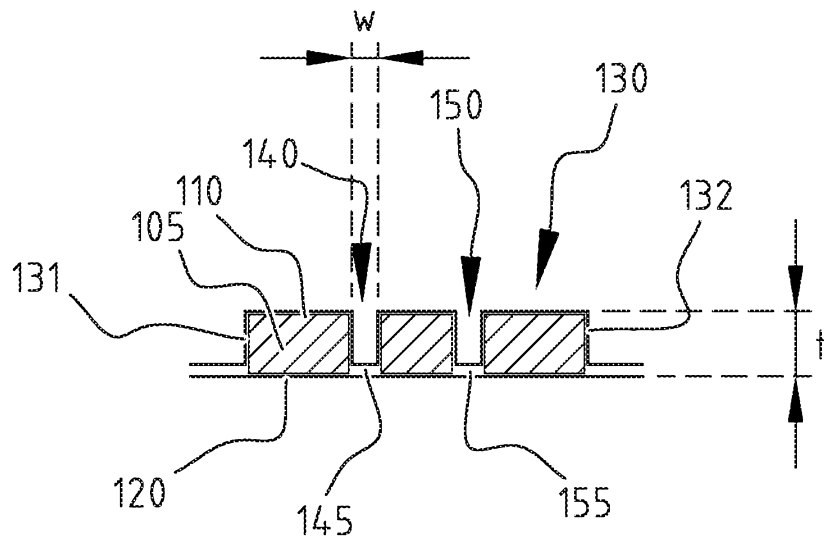
**FIG. 1**



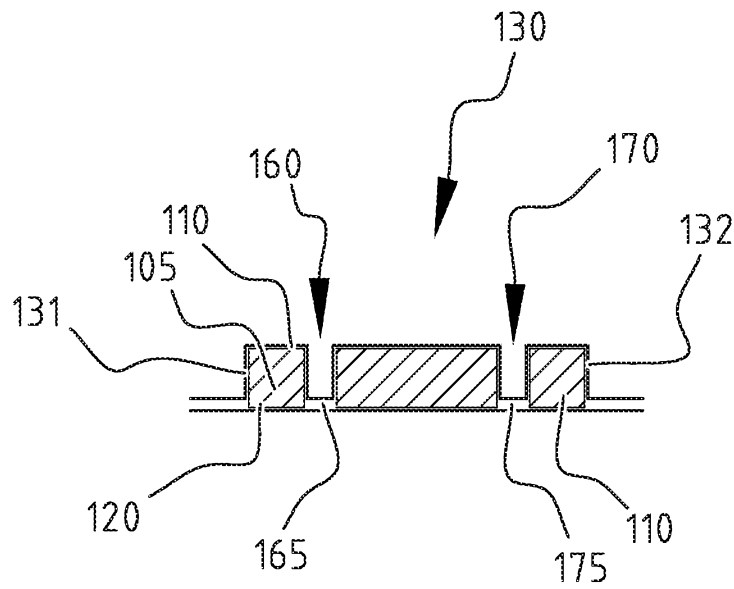
**FIG. 2A**



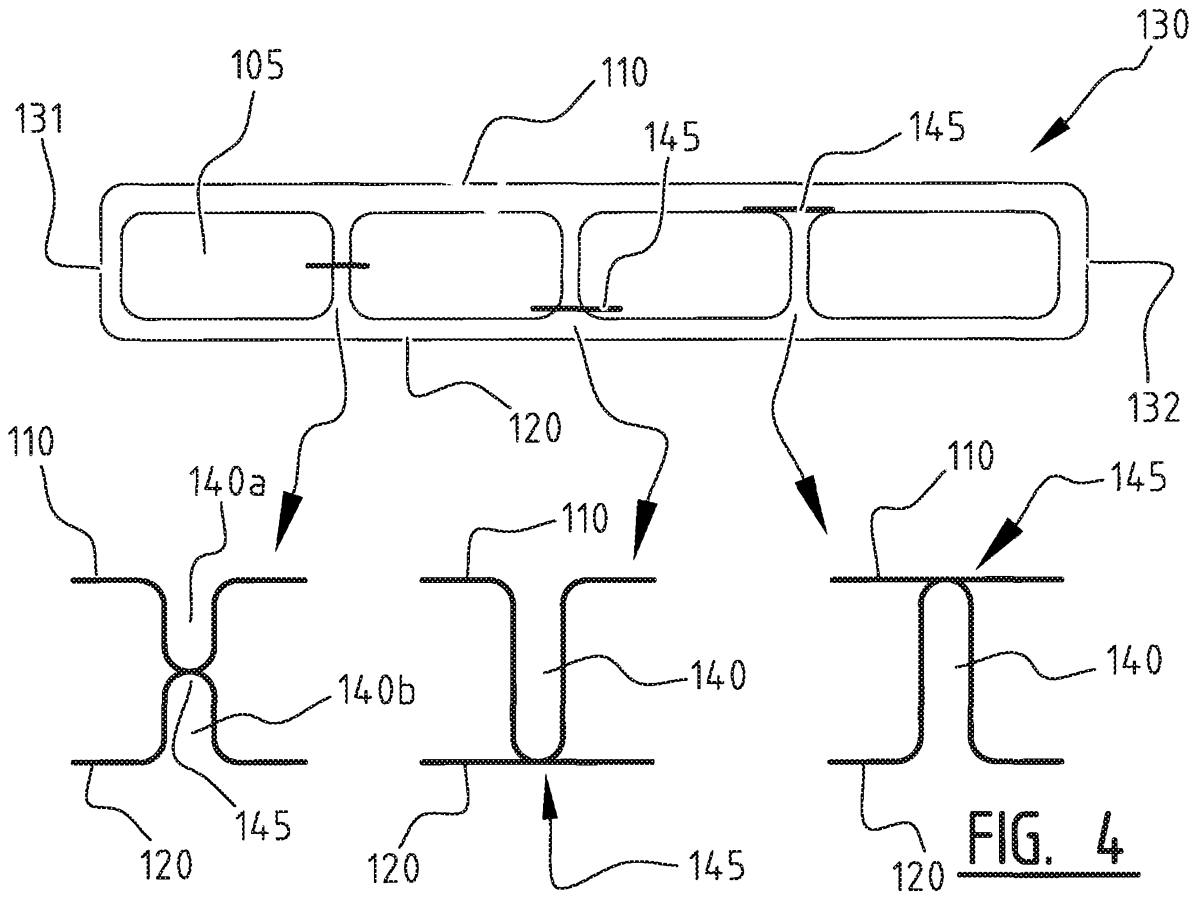


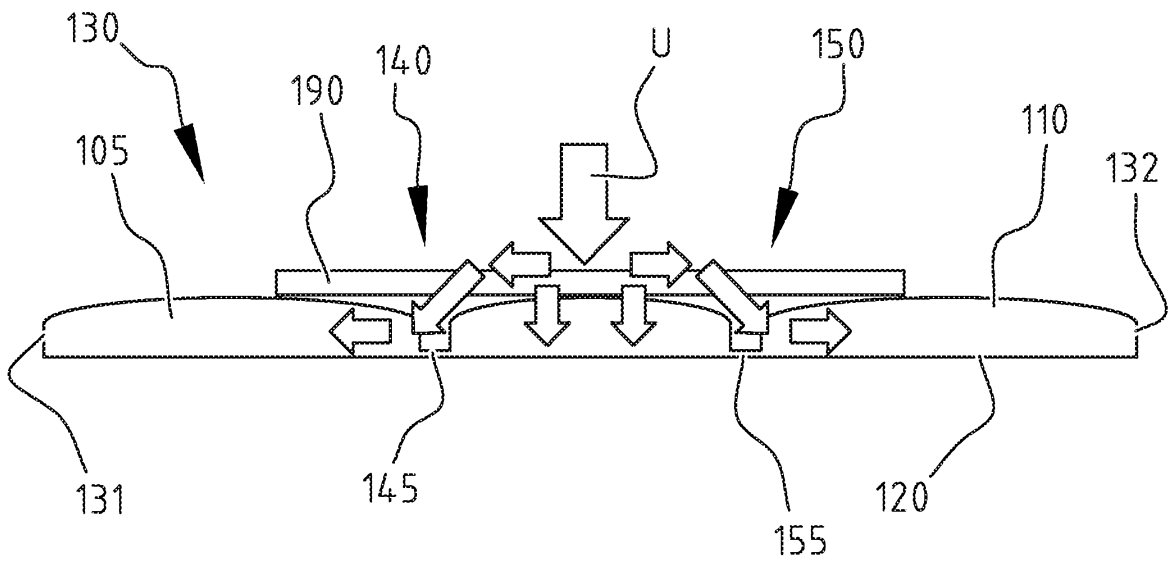


**FIG. 3C**

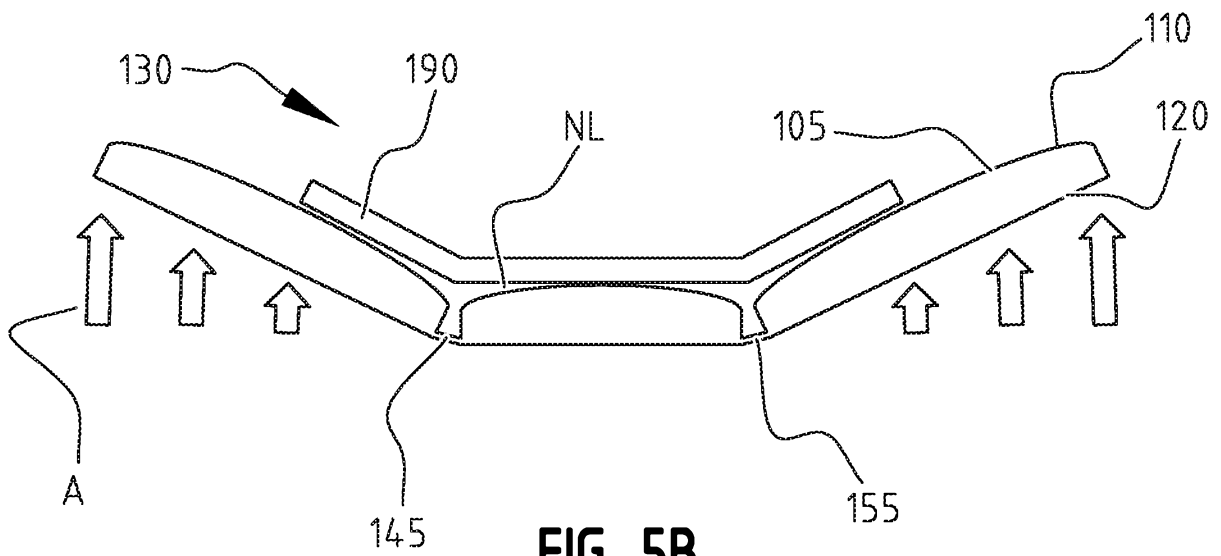


**FIG. 3D**



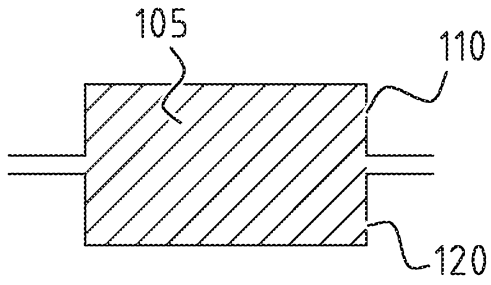


**FIG. 5A**

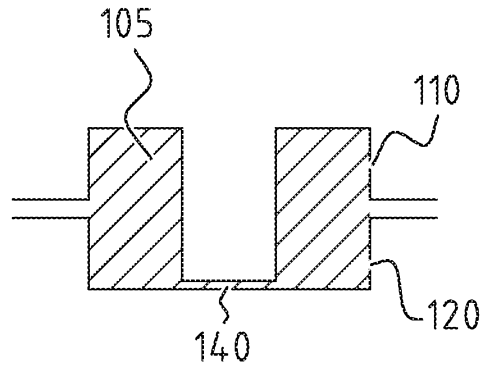


**FIG. 5B**

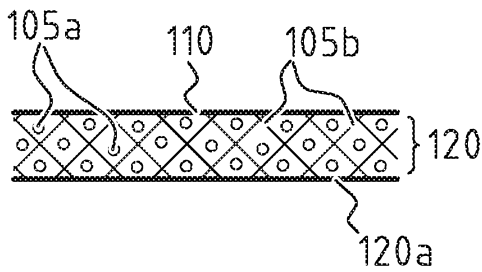




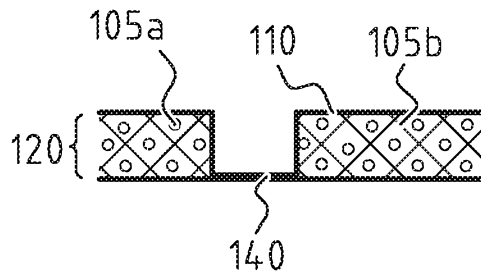
**FIG. 6A**



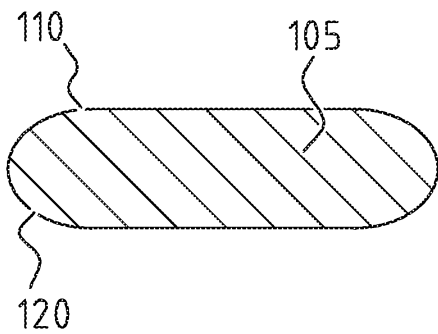
**FIG. 6B**



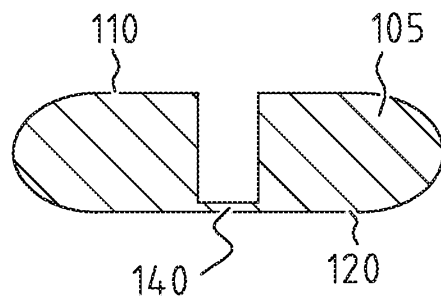
**FIG. 6C**



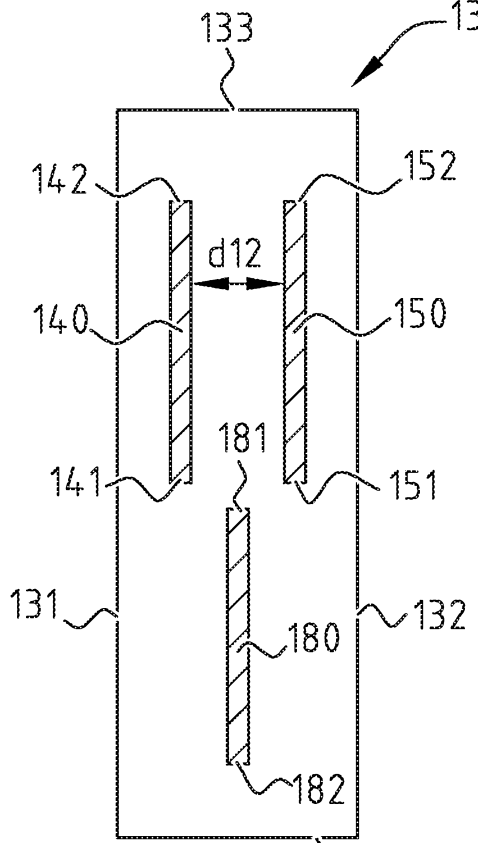
**FIG. 6D**



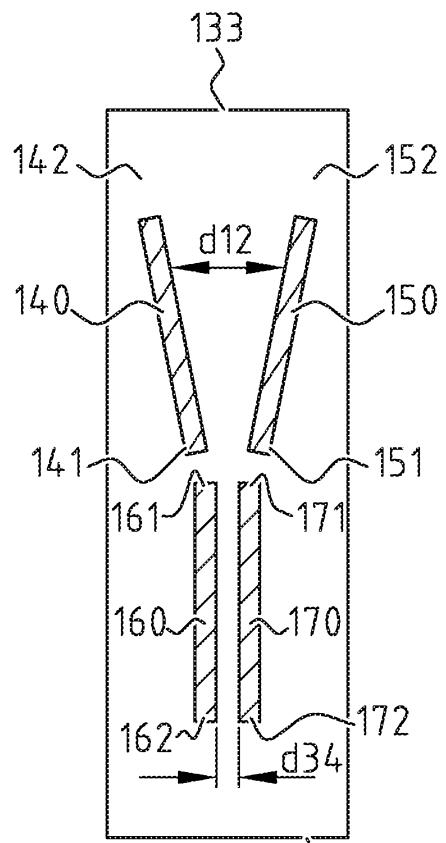
**FIG. 6E**



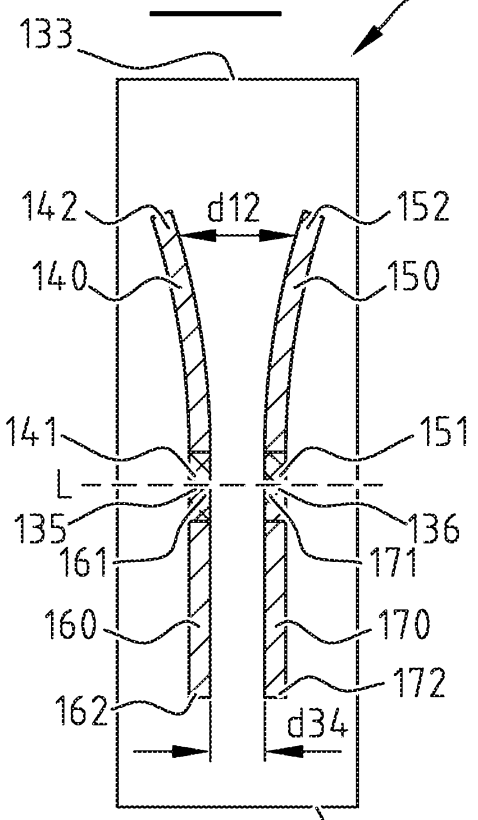
**FIG. 6F**



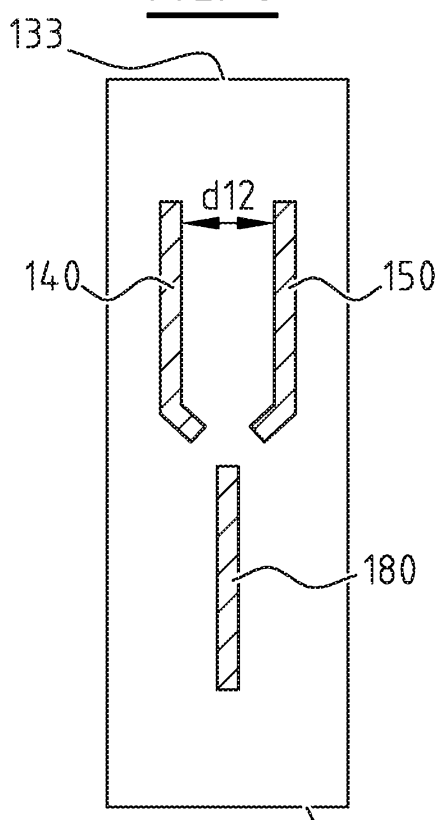
**FIG. 7**



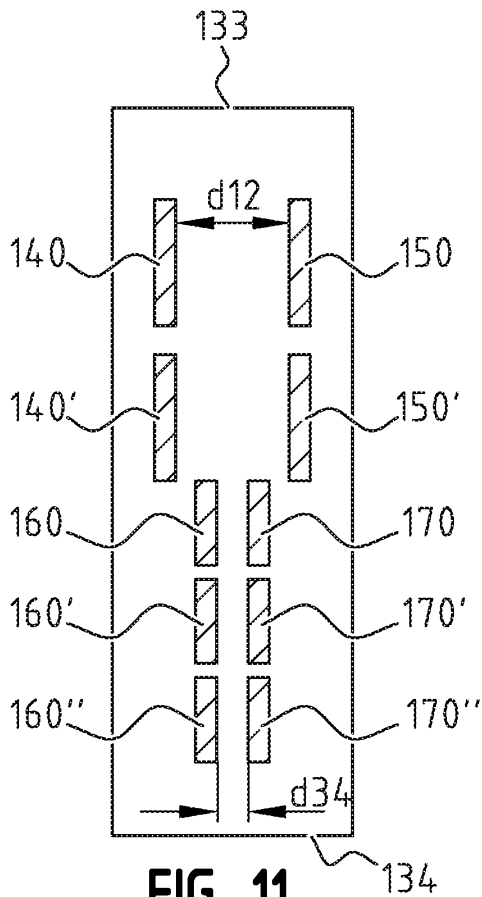
**FIG. 8**



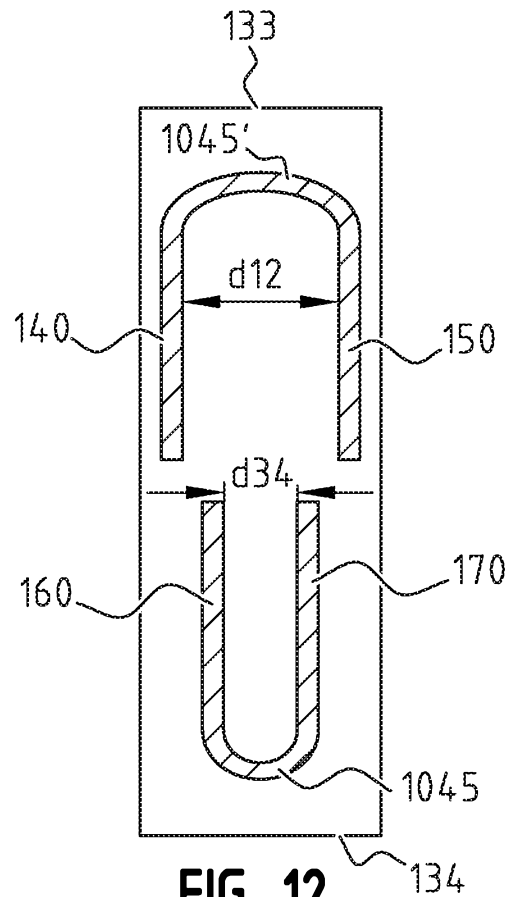
**FIG. 9**



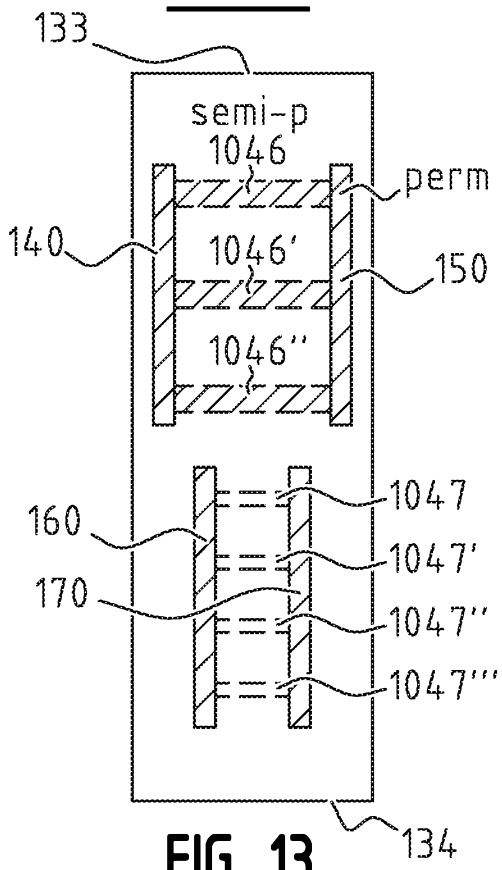
**FIG. 10**



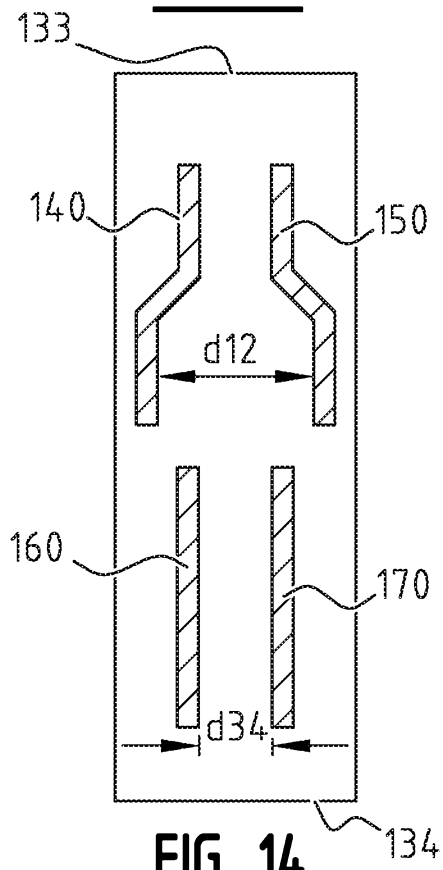
**FIG. 11**



**FIG. 12**



**FIG. 13**



**FIG. 14**

**Abstract**

An absorbent article comprising a liquid pervious topsheet, a liquid impervious backsheet, and an absorbent core comprising an absorbent material between a top core wrap sheet and a back core wrap sheet, said absorbent core being positioned in between said topsheet and said backsheet, said  
5 absorbent core having a first and second longitudinal edge and a first and second transverse edge, said absorbent core having a first portion (130a), (130b) and a second portion (130b), (130a) on either side of a transverse crotch line (L), wherein the absorbent core is provided with a plurality of attachment zones where the top core wrap sheet is attached to the back core wrap sheet.

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**FIG. 1**



## RAPPORT BETREFFENDE HET ONDERZOEK NAAR DE STAND VAN DE TECHNIEK

### Octrooiaanvraag 2020902

Classificatie van het onderwerp <sup>1</sup> : A61F13/49; A61F13/534	Onderzochte gebieden van de techniek <sup>1</sup> : A61F
Computerbestanden: EPODOC, WPI	Omvang van het onderzoek: Volledig
Datum van de onderzochte conclusies: 31 juli 2018	Niet onderzochte conclusies: -

### Van belang zijnde literatuur

Categorie <sup>2</sup>	Vermelding van literatuur met aanduiding, voor zover nodig, van speciaal van belang zijnde tekstgedeelten of figuren	Van belang voor conclusie(s)
X	US 2015/0065973 A (PROCTER & GAMBLE) 5 maart 2015 * paragrafen [0037], [0041], [0086]; figuur 37 *	1-15
	- - -	
L	EP 3403630 A (DRYLOCK TECH NV) 21 november 2018 - - - - -	
Datum waarop het onderzoek werd voltooid: 29 april 2019		De bevoegde ambtenaar: Dr. R. Boers  <b>Octrooicentrum Nederland</b> onderdeel van Rijksdienst voor Ondernemend Nederland

<sup>1</sup> Gedefinieerd volgens International Patent Classification (IPC).

<sup>2</sup> Verklaring van de categorie-aanduiding: zie apart blad.



Categorie van de vermelde literatuur:

- X: op zichzelf van bijzonder belang zijnde stand van de techniek
- Y: in samenhang met andere geciteerde literatuur van bijzonder belang zijnde stand van de techniek
- A: niet tot de categorie X of Y behorende van belang zijnde stand van de techniek
- O: verwijzend naar niet op schrift gestelde stand van de techniek
- P: literatuur gepubliceerd tussen voorrangs- en indieningsdatum
- T: niet tijdig gepubliceerde literatuur over theorie of principe ten grondslag liggend aan de uitvinding
- E: octrooiliteratuur gepubliceerd op of na de indieningsdatum van de onderhavige aanvraag en waarvan de indieningsdatum of de voorrangsdatum ligt voor de indieningsdatum van de onderhavige aanvraag
- D: in de aanvraag genoemd
- L: om andere redenen vermelde literatuur
- &: lid van dezelfde octrooifamilie; corresponderende literatuur



## AANHANGSEL

### Behorende bij het Rapport betreffende het Onderzoek naar de Stand van de Techniek

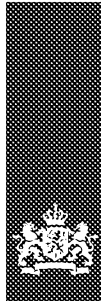
#### Octrooiaanvraag 2020902

Het aanhangsel bevat een opgave van elders gepubliceerde octrooiaanvragen of octrooien (zogenaamde leden van dezelfde octrooifamilie), die overeenkomen met octrooigeschriften genoemd in het rapport. De opgave is samengesteld aan de hand van gegevens uit het computerbestand van het Europees Octroobureau per 2 mei 2019. De juistheid en volledigheid van deze opgave wordt noch door het Europees Octroobureau, noch door Octrooicentrum Nederland gegarandeerd; de gegevens worden verstrekt voor informatiedoeleinden.

In het rapport genoemd octrooigeschrift		Datum van publicatie	Overeenkomende octrooigeschriften		Datum van publicatie
US 2015065973	A1	05-03-2015	CA 2922316	A1	05-03-2015
			CA 2922614	A1	05-03-2015
			CA 2922874	A1	05-03-2015
			CL 2016000443	A1	28-10-2016
			CL 2016000444	A1	28-10-2016
			CL 2016000445	A1	28-10-2016
			CN 105473113	A	06-04-2016
			CN 105491985	A	13-04-2016
			CN 105530902	A	27-04-2016
			CN 105555242	A	04-05-2016
			EP 3038578	A1	06-07-2016
			EP 3038579	A1	06-07-2016
			EP 3038580	A1	06-07-2016
			EP 3038581	A1	06-07-2016
			JP 2016530961	A	06-10-2016
			JP 2016532507	A	20-10-2016
			JP 2016532508	A	20-10-2016
			JP 2016533822	A	04-11-2016
			JP 2018118053	A	02-08-2018
			JP 6279738	B2	14-02-2018
			JP 6279739	B2	14-02-2018
			JP 6334705	B2	30-05-2018
			MX 2016002608	A	17-06-2016
			MX 2016002609	A	28-06-2016
			MX 2016002610	A	14-06-2016
			RU 2016102964	A	03-10-2017
			RU 2016102965	A	03-10-2017
			RU 2016103317	A	29-09-2017
			RU 2649546	C2	03-04-2018
			RU 2649741	C2	04-04-2018
			RU 2653406	C2	08-05-2018
			US 2015065976	A1	05-03-2015
			US 2018008482	A1	11-01-2018
			US 2018161217	A1	14-06-2018
			US 9789011	B2	17-10-2017
			WO 2015031225	A1	05-03-2015
			WO 2015031229	A1	05-03-2015
			WO 2015031243	A1	05-03-2015



In het rapport genoemd octrooigeschrift		Datum van publicatie	Overeenkomende octrooigeschriften		Datum van publicatie
			WO 2015031256	A1	05-03-2015
EP 3403630	A1	21-11-2018	BE 1025430	A1	19-02-2019
			BE 1025526	A1	29-03-2019
			CZ 32539	U1	20-02-2019
			CZ 32580	U1	27-02-2019
			CZ 32729	U1	03-04-2019
			DE 202017007022	U1	14-03-2019
			DE 202018002370	U1	17-09-2018
			DE 202018002372	U1	16-08-2018
			DE 202018002381	U1	21-08-2018
			EP 3403626	A1	21-11-2018
			EP 3403627	A1	21-11-2018
			EP 3403628	A1	21-11-2018
			EP 3403629	A1	21-11-2018
			EP 3403631	A1	21-11-2018
			EP 3403632	A1	21-11-2018
			EP 3453368	A1	13-03-2019
			EP 3466387	A1	10-04-2019
			ES 1214600	U	21-06-2018
			ES 1214601	U	21-06-2018
			ES 1223224	U	17-01-2019
			FR 3066106	A1	16-11-2018
			NL 2020902	A	20-11-2018
			NL 2020903	A	20-11-2018
			NL 2020925	A	20-11-2018
			NL 2022344	A	18-02-2019
			PL 425517	A1	19-11-2018
			PL 425519	A1	19-11-2018
			PL 425534	A1	19-11-2018
			RU 188209	U1	03-04-2019
			WO 2018210751	A1	22-11-2018
			WO 2018210752	A1	22-11-2018
			WO 2018210753	A1	22-11-2018
			WO 2018210754	A1	22-11-2018
			WO 2018210756	A1	22-11-2018
			WO 2018210757	A1	22-11-2018
			WO 2018210758	A1	22-11-2018
			WO 2019048397	A1	14-03-2019
			WO 2019072765	A1	18-04-2019



## SCHRIFTELIJKE OPINIE

### Octrooiaanvraag 2020902

Indieningsdatum: 9 mei 2018	Vorrangsdatum: 15 mei 2017; 27 juli 2017; 11 september 2017; 25 oktober 2017; 25 oktober 2017; 26 oktober 2017
Classificatie van het onderwerp <sup>1</sup> : A61F13/49; A61F13/534	Aanvrager: Drylock Technologies NV
Deze schriftelijke opinie bevat een toelichting op de volgende onderdelen:	
<input checked="" type="checkbox"/> Onderdeel I	Basis van de schriftelijke opinie
<input checked="" type="checkbox"/> Onderdeel II	Voorrang
<input type="checkbox"/> Onderdeel III	Vaststelling nieuwheid, inventiviteit en industriële toepasbaarheid niet mogelijk
<input type="checkbox"/> Onderdeel IV	De aanvraag heeft betrekking op meer dan één uitvinding
<input checked="" type="checkbox"/> Onderdeel V	Gemotiveerde verklaring ten aanzien van nieuwheid, inventiviteit en industriële toepasbaarheid
<input checked="" type="checkbox"/> Onderdeel VI	Andere geciteerde documenten
<input type="checkbox"/> Onderdeel VII	Overige gebreken
<input checked="" type="checkbox"/> Onderdeel VIII	Overige opmerkingen
	De bevoegde ambtenaar: Dr. R. Boers  <b>Octroioentrum Nederland</b> onderdeel van Rijksdienst voor Ondernemend Nederland

<sup>1</sup> Gedefinieerd volgens International Patent Classification (IPC).

# Schriftelijke Opinie

Octrooiaanvraag 2020902

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## Onderdeel I Basis van de schriftelijke opinie

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Deze schriftelijke opinie is opgesteld op basis van de op 31 juli 2018 ingediende conclusies.

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## Onderdeel II Voorrang

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Het controleren van de voorrang maakt geen deel uit van het reguliere onderzoek naar de stand van de techniek. Deze schriftelijke opinie is daarom opgesteld zonder dat onderzocht is of de ingeroepen voorrang geldig is, tenzij hieronder anders is aangegeven.

---

## Onderdeel V Gemotiveerde verklaring ten aanzien van nieuwheid, inventiviteit en industriële toepasbaarheid

---

### 1. Verklaring

Nieuwheid	Ja: conclusie(s)	8-13
	Nee: conclusie(s)	1-7, 14, 15
Inventiviteit	Ja: conclusie(s)	-
	Nee: conclusie(s)	8-13
Industriële toepasbaarheid	Ja: conclusie(s)	1-15
	Nee: conclusie(s)	-

### 2. Literatuur en toelichting

In het rapport betreffende het onderzoek naar de stand van de techniek worden de volgende publicaties genoemd:

D1: US 2015/0065973 A (PROCTER & GAMBLE) 5 maart 2015

D1 openbaart een absorberend voorwerp omvattende, zoals algemeen gangbaar, een vloeistofdoorlaatbaar bovenvel, een vloeistofondoorlaatbaar ondervel, een absorberende kern, gepositioneerd tussen deze twee vellen (zie paragraaf [0037]), omvattende een absorberend materiaal tussen een bovenste en een onderste kernwikkel (zie paragraaf [0041]). De absorberende kern bevat kanalen die bijvoorbeeld de vorm van de onderhavige 1<sup>e</sup> t/m 4<sup>e</sup> langwerpige bevestigingszones hebben (zie figuur 37) en gevormd zijn door de bovenste kernwikkel met de onderste kernwikkel met elkaar te verbinden (in de onderhavige aanvraag een "bevestigingszone genoemd"; zie paragraaf [0086]).

Figuur 37 laat verder zien dat de afstand tussen de 2 bevestigingszones aan de achterkant (aangegeven door de letter B) groter is dan de afstand tussen de 2 bevestigingszones aan de voorkant

## Schriftelijke Opinie

Octrooiaanvraag 2020902

(aangegeven door de letter F). Hoewel de beschrijving van D1 hier verder niet op ingaat, zal een deskundige dit verschil in het figuur herkennen omdat hij weet heeft van de anatomie van het menselijke lichaam. Dat hierbij het verschil in de afstand tussen deze bevestigingszones vervolgens meer dan 5% moet zijn, omdat de anatomie van het menselijke lichaam dit met zich meebrengt, zal hij impliciet meelesen.

De materie van conclusies 1-7 wordt daarmee niet nieuw bevonden.

De maatregelen van de overige conclusies zijn ofwel bekend uit D1 of liggen binnen het bereik van de deskundige om zulke keuzes te maken, bijvoorbeeld op basis van de anatomie van het menselijke lichaam. Bovendien wordt in de onderhavige aanvraag niet aangegeven of de in de conclusies gemaakte keuzes bijzondere keuzes zijn. Willekeurige keuzes kunnen geen inventiviteit met zich meebrengen. Zo de conclusies 8-15 nog nieuw zijn, wordt deze materie niet inventief bevonden.

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### Onderdeel VI    **Andere geciteerde documenten**

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De volgende andere geciteerde openbaarmakingen worden genoemd:

D2:    EP 3403630 A (DRYLOCK TECH NV) 21 november 2018

Er is geconstateerd dat de huidige aanvraag [deels] betrekking heeft op hetzelfde onderwerp als de Europese aanvraag gepubliceerd onder nummer EP 3403630, op naam van dezelfde aanvrager, waarbij de dag van indiening of in voorkomend geval de voorrangsdatum van de beide aanvragen dezelfde is. In art. 77 Row 1995 is bepaald dat in dat geval het op de huidige aanvraag te verlenen octrooi, voor zover het betrekking heeft op dezelfde uitvinding als het Europese octrooi dat voort kan komen uit deze Europese aanvraag, geen rechtsgevolgen meer zal hebben vanaf het moment dat het Europese octrooi in Nederland van kracht is geworden en een eventuele oppositieprocedure is afgerond.

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### Onderdeel VIII    **Overige opmerkingen**

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De volgende opmerkingen met betrekking tot de duidelijkheid van de conclusies, beschrijving en figuren, of met betrekking tot de vraag of de conclusies nawerkbaar zijn, worden gemaakt:

Onduidelijk is wat er bedoeld wordt met de dubbele paren verwijzingscijfers (zoals 130a, 130b en verderop 130b, 130a). Dit zorgt voor onduidelijkheid in de conclusies.

Verdere voorkeuren binnen conclusies zijn niet beperkend voor de betreffende conclusies.