

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization

International Bureau

(43) International Publication Date  
08 August 2019 (08.08.2019)



(10) International Publication Number  
**WO 2019/152005 A1**

(51) International Patent Classification:

A61F 13/537 (2006.01) A61F 13/49 (2006.01)  
A61F 13/496 (2006.01)

(21) International Application Number:

PCT/US2018/016126

(22) International Filing Date:

31 January 2018 (31.01.2018)

(25) Filing Language:

English

(26) Publication Language:

English

(71) Applicant: **KIMBERLY-CLARK WORLDWIDE, INC.**

[US/US]; 2300 Winchester Road, Neenah, Wisconsin 54956 (US).

(72) Inventors: **KIM, YeonJung**; Daou Digital Square 5th flr,

23-7, JukJeon-dong, SuJi-gu, Yongin-Si, 41 16878 (KR).

**JEON, MinYoung**; Daou Digital Square 5th flr, 23-7,

JukJeon-dong, SuJi-gu, Yongin-Si, 41 16878 (KR). **TAN,**

**Caishan**; Daou Digital Square 5th flr, 23-7, JukJeon-dong,

SuJi-gu, Yongin-Si, 41 16878 (KR).

(74) Agent: **KOHTALA, Luke D.** et al.; 2300 Winchester

Road, Neenah, Wisconsin 54956 (US).

(81) Designated States (unless otherwise indicated, for every

kind of national protection available): AE, AG, AL, AM,

AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ,

CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO,  
DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN,  
HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP,  
KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME,  
MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ,  
OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA,  
SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN,  
TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every

kind of regional protection available): ARIPO (BW, GH,  
GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ,  
UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ,  
TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK,  
EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV,  
MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM,  
TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,  
KM, ML, MR, NE, SN, TD, TG).

Published:

— with international search report (Art. 21(3))

(54) Title: ABSORBENT BODY INCLUDING X-SHAPED REDUCED ABSORBENT SECTION AND ABSORBENT ARTICLES INCLUDING THE SAME

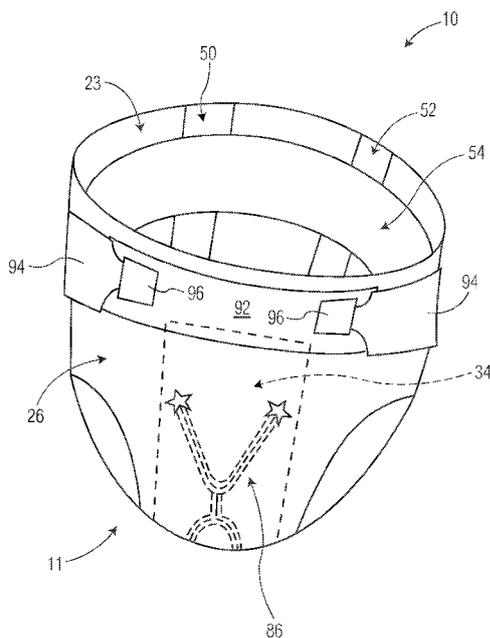


FIG. 1

(57) Abstract: Absorbent bodies including a reduced absorbent section are disclosed. The reduced absorbent section can have less absorbent material than an adjacent section of the absorbent body. The reduced absorbent section can include a rear diverging section including a first arm and a second arm. The reduced absorbent section can include a front diverging section with a third arm and a fourth arm. The reduced absorbent section can also include an intermediate section disposed between the rear diverging section and the front diverging section.



WO 2019/152005 A1

**ABSORBENT BODY INCLUDING X-SHAPED REDUCED ABSORBENT SECTION AND  
ABSORBENT ARTICLES INCLUDING THE SAME**

**TECHNICAL FIELD**

5           The present disclosure relates to absorbent bodies. More specifically, the present disclosure relates to absorbent bodies used in absorbent articles.

**BACKGROUND OF THE DISCLOSURE**

          A primary function of personal care absorbent articles is to absorb and retain body exudates such as urine, fecal material, blood, and menses with additional desired attributes including low  
10       leakage of the exudates from the absorbent article and a dry feel to the wearer of the absorbent article. By preventing leakage of the exudates from the absorbent article, the absorbent article intends to prevent the body exudates from soiling or contaminating a wearer's or caregiver's clothing or other articles, such as bedding, that can come in contact with the wearer.

          However, bulkiness of absorbent wet and dry absorbent articles can be an issue for a wearer.  
15       Babies, children, and adults may feel discomfort in standing, sitting, and in moving with an absorbent article, especially for an absorbent article having an absorbent body swollen due to retaining body exudates. This is particularly true for babies and toddlers wearing diapers and diaper pants with absorbent bodies that may exceed their natural crotch width (~3cm).

          Efforts to reduce this crotch bulk has included narrower pads, thinner pads, and more flexible  
20       pads. All three of these designs, however, have limitations that follow including possible leakages and other negative effects on the overall absorbency capability. Narrowing the absorbent body too close to the natural crotch width can greatly reduce the absorbent capacity of the absorbent body. Additionally, thinner and/or more flexible pads can also reduce absorbent capacity or can increase material and/or manufacturing costs due to advanced technological materials being used to offset the  
25       reduction of material being used. Increased costs such as these may set limitations on commercialization.

          Thus, there is a desire for improvements to absorbent bodies that allow for increased flexibility and/or movement.

**SUMMARY OF THE DISCLOSURE**

30       In one embodiment, an absorbent body can include a lateral axis and a longitudinal axis. The absorbent body can include absorbent material. The absorbent body can also include a front end

edge and a rear end edge. The rear end edge can be opposed from the front end edge. The longitudinal axis can extend through the front end edge and the rear end edge. The absorbent body can also include a pair of longitudinal side edges. The absorbent body can further include a reduced absorbent section having less absorbent material than an adjacent section of the absorbent body. The reduced absorbent section can include a rear diverging section including a first arm and a second arm. The first arm can include a first proximal end and a first distal end. The second arm can include a second proximal end and a second distal end. The first arm can be on a first side of the longitudinal axis and the second arm can be on a second side of the longitudinal axis. The first arm and the second arm can be configured such that a lateral distance between the first proximal end of the first arm and the second proximal end of the second arm is less than a lateral distance between the first distal end of the first arm and the second distal end of the second arm. The reduced absorbent section can also include a front diverging section including a third arm and a fourth arm. The third arm can include a third proximal end and a third distal end. The fourth arm can include a fourth proximal end and a fourth distal end. The third arm can be on the first side of the longitudinal axis and the fourth arm can be on the second side of the longitudinal axis. The third arm and the fourth arm can be configured such that a lateral distance between the third proximal end of the third arm and the fourth proximal end of the fourth arm is less than a lateral distance between the third distal end of the third arm and the fourth distal end of the fourth arm. The reduced absorbent section can additionally include an intermediate section disposed between the rear diverging section and the front diverging section. The intermediate section can connect the rear diverging section to the front diverging section.

In another embodiment, an absorbent body can include a lateral axis and a longitudinal axis. The absorbent body can include absorbent material. The absorbent body can also include a front end edge and a rear end edge. The rear end edge can be opposed from the front end edge. The longitudinal axis can extend through the front end edge and the rear end edge. The absorbent body can also include a pair of longitudinal side edges. The absorbent body can further include a reduced absorbent section having less absorbent material than an adjacent section of the absorbent body. The reduced absorbent section can include a rear diverging section including a first arm and a second arm. The first arm can include a first proximal end and a first distal end. The second arm can include a second proximal end and a second distal end. The first arm can be on a first side of the longitudinal axis and the second arm can be on a second side of the longitudinal axis. The first arm and the second arm can be configured such that a lateral distance between the first proximal end of the first arm and the second proximal end of the second arm is less than a lateral distance between the first distal end of the first arm and the second distal end of the second arm. The reduced absorbent section can also include a front diverging section including a third arm and a fourth arm. The third arm

can include a third proximal end and a third distal end. The fourth arm can include a fourth proximal end and a fourth distal end. The third arm can be on the first side of the longitudinal axis and the fourth arm can be on the second side of the longitudinal axis. The third arm and the fourth arm can be configured such that a lateral distance between the third proximal end of the third arm and the fourth proximal end of the fourth arm is less than a lateral distance between the third distal end of the third arm and the fourth distal end of the fourth arm. The rear diverging section and the front diverging section can be connected.

In yet another embodiment, an absorbent article can a longitudinal axis and a lateral axis. The absorbent article can also include a body-side liner, an outer cover, and an absorbent body. The absorbent body can include absorbent material and can be disposed between the body-side liner and the outer cover. The absorbent body can include a front end edge and a rear end edge. The rear end edge can be opposed from the front end edge. The longitudinal axis can extend through the front end edge and the rear end edge. The absorbent body can also include a pair of longitudinal side edges. The absorbent body can further include a reduced absorbent section having less absorbent material than an adjacent section of the absorbent body. The reduced absorbent section can include a rear diverging section including a first arm and a second arm. The first arm can include a first proximal end and a first distal end. The second arm can include a second proximal end and a second distal end. The first arm can be on a first side of the longitudinal axis and the second arm can be on a second side of the longitudinal axis. The first arm and the second arm can be configured such that a lateral distance between the first proximal end of the first arm and the second proximal end of the second arm is less than a lateral distance between the first distal end of the first arm and the second distal end of the second arm. The reduced absorbent section can also include a front diverging section including a third arm and a fourth arm. The third arm can include a third proximal end and a third distal end. The fourth arm can include a fourth proximal end and a fourth distal end. The third arm can be on the first side of the longitudinal axis and the fourth arm can be on the second side of the longitudinal axis. The third arm and the fourth arm can be configured such that a lateral distance between the third proximal end of the third arm and the fourth proximal end of the fourth arm is less than a lateral distance between the third distal end of the third arm and the fourth distal end of the fourth arm. The reduced absorbent section can be configured such that the lateral axis of the absorbent article extends through at least a portion of the reduced absorbent section.

### **BRIEF DESCRIPTION OF DRAWINGS**

A full and enabling disclosure thereof, directed to one of ordinary skill in the art, is set forth more particularly in the remainder of the specification, which makes reference to the appended figures in which:

5           FIG. 1 is front perspective view of an exemplary embodiment of an absorbent article, such as a diaper, in a fastened condition.

            FIG. 2 is a top plan view of the absorbent article of FIG. 1 in a stretched, laid flat, unfastened condition.

            FIG. 3 is a top plan view of the absorbent body of the embodiment illustrated in FIGS. 1 and 2.

10           FIG. 3A is a detailed view of a portion of the reduced absorbent section in the absorbent body from FIG. 3.

            FIG. 4 is a cross-section taken along line 4 – 4 from FIG. 2.

            FIG. 4A is a cross-section similar to FIG. 4, but includes an alternative embodiment of an absorbent body including two layers.

15           FIG. 5 is a top plan view of an alternative absorbent body.

            FIG. 6 is a top plan view of another alternative absorbent body.

            FIG. 7 is a top plan view of still another alternative absorbent body.

            Repeat use of reference characters in the present specification and drawings is intended to represent the same or analogous features or elements of the disclosure.

### 20           **DETAILED DESCRIPTION OF THE DISCLOSURE**

            In an embodiment, the present disclosure is generally directed towards an absorbent article 10 having an absorbent body 34 including a reduced absorbent section 70, 170, 270, 370. The reduced absorbent section 70, 170, 270, 370 can provide increased flexibility and/or movement for the absorbent body 34 when the wearer moves in the absorbent article 10, and thus, a more flexible,  
25           comfortable absorbent article 10. Each example is provided by way of explanation and is not meant as a limitation. For example, features illustrated or described as part of one embodiment or figure can be used on another embodiment or figure to yield yet another embodiment. It is intended that the present disclosure include such modifications and variations. Additionally, features described below with respect to the reduced absorbent section 70 in FIGS. 1-4A also apply to the alternative embodiments

reduced absorbent sections 170, 270, 370 of FIGS. 5, 6, and 7, respectively, unless otherwise stated herein.

When introducing elements of the present disclosure or the preferred embodiment(s) thereof, the articles "a", "an", "the" and "said" are intended to mean that there are one or more of the elements.

5 The terms "comprising", "including" and "having" are intended to be inclusive and mean that there may be additional elements other than the listed elements. Many modifications and variations of the present disclosure can be made without departing from the spirit and scope thereof. Therefore, the exemplary embodiments described above should not be used to limit the scope of the invention.

Definitions:

10 The term "absorbent article" refers herein to an article which may be placed against or in proximity to the body (i.e., contiguous with the body) of the wearer to absorb and contain various liquid, solid, and semi-solid exudates discharged from the body. Such absorbent articles, as described herein, are intended to be discarded after a limited period of use instead of being laundered or otherwise restored for reuse. It is to be understood that the present disclosure is applicable to various  
15 disposable absorbent articles, including, but not limited to, diapers, diaper pants, training pants, youth pants, swim pants, feminine hygiene products, including, but not limited to, menstrual pads or pants, incontinence products, medical garments, surgical pads and bandages, other personal care or health care garments, and the like without departing from the scope of the present disclosure.

The term "acquisition layer" refers herein to a layer capable of accepting and temporarily  
20 holding liquid body exudates to decelerate and diffuse a surge or gush of the liquid body exudates and to subsequently release the liquid body exudates therefrom into another layer or layers of the absorbent article.

The term "bonded" or "coupled" refers herein to the joining, adhering, connecting, attaching, or the like, of two elements. Two elements will be considered bonded or coupled together when they are  
25 joined, adhered, connected, attached, or the like, directly to one another or indirectly to one another, such as when each is directly bonded to intermediate elements. The bonding or coupling of one element to another can occur via continuous or intermittent bonds.

The term "carded web" refers herein to a web containing natural or synthetic staple length fibers typically having fiber lengths less than about 100 mm. Bales of staple fibers can undergo an  
30 opening process to separate the fibers which are then sent to a carding process which separates and combs the fibers to align them in the machine direction after which the fibers are deposited onto a moving wire for further processing. Such webs are usually subjected to some type of bonding process

such as thermal bonding using heat and/or pressure. In addition to or in lieu thereof, the fibers may be subject to adhesive processes to bind the fibers together such as by the use of powder adhesives.

The carded web may be subjected to fluid entangling, such as hydroentangling, to further intertwine the fibers and thereby improve the integrity of the carded web. Carded webs, due to the fiber

5 alignment in the machine direction, once bonded, will typically have more machine direction strength than cross machine direction strength.

The term "film" refers herein to a thermoplastic film made using an extrusion and/or forming process, such as a cast film or blown film extrusion process. The term includes apertured films, slit films, and other porous films which constitute liquid transfer films, as well as films which do not transfer  
10 fluids, such as, but not limited to, barrier films, filled films, breathable films, and oriented films.

The term "gsm" refers herein to grams per square meter.

The term "hydrophilic" refers herein to fibers or the surfaces of fibers which are wetted by aqueous liquids in contact with the fibers. The degree of wetting of the materials can, in turn, be described in terms of the contact angles and the surface tensions of the liquids and materials involved.

15 Equipment and techniques suitable for measuring the wettability of particular fiber materials or blends of fiber materials can be provided by Cahn SFA-222 Surface Force Analyzer System, or a substantially equivalent system. When measured with this system, fibers having contact angles less than 90 are designated "wetable" or hydrophilic, and fibers having contact angles greater than 90 are designated "nonwetable" or hydrophobic.

20 The term "liquid impermeable" refers herein to a layer or multi-layer laminate in which liquid body exudates, such as urine, will not pass through the layer or laminate, under ordinary use conditions, in a direction generally perpendicular to the plane of the layer or laminate at the point of liquid contact.

The term "liquid permeable" refers herein to any material that is not liquid impermeable.

25 The term "meltblown" refers herein to fibers formed by extruding a molten thermoplastic material through a plurality of fine, usually circular, die capillaries as molten threads or filaments into converging high velocity heated gas (e.g., air) streams which attenuate the filaments of molten thermoplastic material to reduce their diameter, which can be a microfiber diameter. Thereafter, the meltblown fibers are carried by the high velocity gas stream and are deposited on a collecting surface  
30 to form a web of randomly dispersed meltblown fibers. Such a process is disclosed, for example, in U.S. Patent No. 3,849,241 to Butin et al., which is incorporated herein by reference. Meltblown fibers

are microfibers which may be continuous or discontinuous, are generally smaller than about 0.6 denier, and may be tacky and self-bonding when deposited onto a collecting surface.

The term “nonwoven” refers herein to materials and webs of material which are formed without the aid of a textile weaving or knitting process. The materials and webs of materials can have a structure of individual fibers, filaments, or threads (collectively referred to as “fibers”) which can be interlaid, but not in an identifiable manner as in a knitted fabric. Nonwoven materials or webs can be formed from many processes such as, but not limited to, meltblowing processes, spunbonding processes, carded web processes, etc.

The term “pliable” refers herein to materials which are compliant and which will readily conform to the general shape and contours of the wearer’s body.

The term “spunbond” refers herein to small diameter fibers which are formed by extruding molten thermoplastic material as filaments from a plurality of fine capillaries of a spinnerette having a circular or other configuration, with the diameter of the extruded filaments then being rapidly reduced by a conventional process such as, for example, eductive drawing, and processes that are described in U.S. Patent No. 4,340,563 to Appel et al., U.S. Patent No. 3,692,618 to Dorschner et al., U.S. Patent No. 3,802,817 to Matsuki et al., U.S. Patent Nos. 3,338,992 and 3,341,394 to Kinney, U.S. Patent No. 3,502,763 to Hartmann, U.S. Patent No. 3,502,538 to Peterson, and U.S. Patent No. 3,542,615 to Dobo et al., each of which is incorporated herein in its entirety by reference. Spunbond fibers are generally continuous and often have average deniers larger than about 0.3, and in an embodiment, between about 0.6, 5 and 10 and about 15, 20 and 40. Spunbond fibers are generally not tacky when they are deposited on a collecting surface.

The term “superabsorbent” refers herein to a water-swallowable, water-insoluble organic or inorganic material capable, under the most favorable conditions, of absorbing at least about 15 times its weight and, in an embodiment, at least about 30 times its weight, in an aqueous solution containing 0.9 weight percent sodium chloride. The superabsorbent materials can be natural, synthetic and modified natural polymers and materials. In addition, the superabsorbent materials can be inorganic materials, such as silica gels, or organic compounds, such as cross-linked polymers.

The term “thermoplastic” refers herein to a material which softens and which can be shaped when exposed to heat and which substantially returns to a non-softened condition when cooled.

The term “user” or “caregiver” refers herein to one who fits an absorbent article, such as, but not limited to, a diaper, diaper pant, training pant, youth pant, incontinent product, or other absorbent

article about the wearer of one of these absorbent articles. A user and a wearer can be one and the same person.

Absorbent Article:

Referring to FIGS. 1 and 2, a non-limiting illustration of an absorbent article 10, for example, a  
5 diaper, is illustrated. Other embodiments of the absorbent article could include training pants, youth pants, adult incontinence garments, and feminine hygiene articles. While the embodiments and illustrations described herein may generally apply to absorbent articles manufactured in the product longitudinal direction, which is hereinafter called the machine direction manufacturing of a product, it should be noted that one of ordinary skill in the art could apply the information herein to absorbent  
10 articles manufactured in the latitudinal direction of the product, which hereinafter is called the cross direction manufacturing of a product, without departing from the spirit and scope of the disclosure.

The absorbent article 10 illustrated in FIGS. 1 and 2 can include a chassis 11. The absorbent article 10 can include a front waist region 12, a rear waist region 14, and a crotch region 16 disposed between the front waist region 12 and the rear waist region 14 and interconnecting the front and rear  
15 waist regions, 12, 14, respectively. The front waist region 12 can be referred to as the front end region, the rear waist region 14 can be referred to as the rear end region, and the crotch region 16 can be referred to as the intermediate region.

As illustrated in FIG. 2, the absorbent article 10 can have a pair of longitudinal side edges 18, 20, and a pair of opposite waist edges, respectively designated front waist edge 22 and rear waist  
20 edge 24. The front waist region 12 can be contiguous with the front waist edge 22 and the rear waist region 14 can be contiguous with the rear waist edge 24. The longitudinal side edges 18, 20 can extend from the front waist edge 22 to the rear waist edge 24. The longitudinal side edges 18, 20 can extend in a direction parallel to the longitudinal direction 30 for their entire length, such as for the absorbent article 10 illustrated in FIG. 2. In other embodiments, the longitudinal side edges 18, 20 can  
25 be curved between the front waist edge 22 and the rear waist edge 24.

The front waist region 12 can include the portion of the absorbent article 10 that, when worn, is positioned at least in part on the front of the wearer while the rear waist region 14 can include the portion of the absorbent article 10 that, when worn, is positioned at least in part on the back of the wearer. The crotch region 16 of the absorbent article 10 can include the portion of the absorbent  
30 article 10 that, when worn, is positioned between the legs of the wearer and can partially cover the lower torso of the wearer. The waist edges, 22 and 24, of the absorbent article 10 are configured to encircle the waist of the wearer and together define a central waist opening 23 (as labeled in FIG. 1)

for the waist of the wearer. Portions of the longitudinal side edges 18, 20 in the crotch region 16 can generally define leg openings for the legs of the wearer when the absorbent article 10 is worn.

The absorbent article 10 can include an outer cover 26 and a bodyside liner 28. The outer cover 26 and the bodyside liner 28 can form a portion of the chassis 11. In an embodiment, the  
5 bodyside liner 28 can be bonded to the outer cover 26 in a superposed relation by any suitable means such as, but not limited to, adhesives, ultrasonic bonds, thermal bonds, pressure bonds, or other conventional techniques. The outer cover 26 can define a length in a longitudinal direction 30, and a width in the lateral direction 32, which, in the illustrated embodiment, can coincide with the length and width of the absorbent article 10. As illustrated in FIG. 2, the absorbent article 10 can have a  
10 longitudinal axis 29 extending in the longitudinal direction 30 and a lateral axis 31 extending in the lateral direction 32.

The chassis 11 can include an absorbent body 34. The absorbent body 34 can be disposed between the outer cover 26 and the bodyside liner 28. The absorbent body 34 can have a pair  
15 longitudinal side edges, 36 and 38, which, in an embodiment, can form portions of the longitudinal side edges, 18 and 20, respectively, of the absorbent article 10. The absorbent body 34 can have a first end edge 40 that is opposite a second end edge 42, respectively, which, in an embodiment, can form portions of the waist edges, 22 and 24, respectively, of the absorbent article 10. In some embodiments, the first end edge 40 can be in the front waist region 12 and can be referred to as a front end edge 40 of the absorbent body 34. In some embodiments, the second end edge 42 can be in  
20 the rear waist region 14 and can be referred to as a rear end edge 42 of the absorbent body 34. In an embodiment, the absorbent body 34 can have a length and width that are the same as or less than the length and width of the absorbent article 10. The bodyside liner 28, the outer cover 26, and the absorbent body 34 can form part of an absorbent assembly 44. The absorbent assembly 44 can also include a fluid transfer layer 46 (shown in FIG. 4) and a fluid acquisition layer 48 (shown in FIG. 4)  
25 between the bodyside liner 28 and the absorbent body 34. In some embodiments, if a fluid transfer layer 46 is present, the acquisition layer 48 can be between the bodyside liner 28 and the fluid transfer layer 46 as is known in the art. The absorbent assembly 44 can also include a spacer layer (not shown) disposed between the absorbent body 34 and the outer cover 26 as is known in the art. The absorbent assembly 44 can include other components in some embodiments. It is also contemplated  
30 that some embodiments may not include a fluid transfer layer 46, and/or an acquisition layer 48, and/or a spacer layer.

The absorbent article 10 can be configured to contain and/or absorb liquid, solid, and semi-solid body exudates discharged from the wearer. In some embodiments, a pair of containment flaps

50, 52 can be configured to provide a barrier to the lateral flow of body exudates. In some embodiments, the absorbent article 10 can include a waist containment member 54. The waist containment member 54 can be disposed in the rear waist region 14 of the absorbent article 10. Although not depicted herein, it is contemplated that the waist containment member 54 can be additionally or alternatively disposed in the front waist region 12 of the absorbent article 10.

The absorbent article 10 can further include leg elastic members 60, 62 as are known to those skilled in the art. The leg elastic members 60, 62 can be attached to the outer cover 26 and/or the bodyside liner 28 along the opposite longitudinal side edges, 18 and 20, and positioned in the crotch region 16 of the absorbent article 10. The leg elastic members 60, 62 can be parallel to the longitudinal axis 29 as shown in FIG. 2 or can be curved as is known in the art. The leg elastic members 60, 62 can provide elasticized leg cuffs.

Additional details regarding each of these elements of the absorbent article 10 described herein can be found below and with reference to the Figures 1 through 7.

Outer cover:

15 The outer cover 26 and/or portions thereof can be breathable and/or liquid impermeable. The outer cover 26 and/or portions thereof can be elastic, stretchable, or non-stretchable. The outer cover 26 may be constructed of a single layer, multiple layers, laminates, spunbond fabrics, films, meltblown fabrics, elastic netting, microporous webs, bonded-carded webs or foams provided by elastomeric or polymeric materials. In an embodiment, for example, the outer cover 26 can be constructed of a microporous polymeric film, such as polyethylene or polypropylene.

In an embodiment, the outer cover 26 can be a single layer of a liquid impermeable material, such as a polymeric film. In an embodiment, the outer cover 26 can be suitably stretchable, and more suitably elastic, in at least the lateral direction 32 of the absorbent article 10, 410. In an embodiment, the outer cover 26 can be stretchable, and more suitably elastic, in both the lateral 32 and the longitudinal 30 directions. In an embodiment, the outer cover 26 can be a multi-layered laminate in which at least one of the layers is liquid impermeable. In some embodiments, the outer cover 26 can be a two layer construction, including an outer layer 26a and an inner layer 26b (each shown in FIG. 4) which can be bonded together such as by a laminate adhesive. Suitable laminate adhesives can be applied continuously or intermittently as beads, a spray, parallel swirls, or the like, but it is to be understood that the inner layer can be bonded to the outer layer by other bonding methods, including, but not limited to, ultrasonic bonds, thermal bonds, pressure bonds, or the like.

The outer layer 26a of the outer cover 26 can be any suitable material and may be one that provides a generally cloth-like texture or appearance to the wearer. An example of such material can be a 100% polypropylene bonded-carded web with a diamond bond pattern available from Sandler A.G., Germany, such as 30 gsm Sawabond 4185® or equivalent. Another example of material  
5 suitable for use as an outer layer 26a of an outer cover 26 can be a 20 gsm spunbond polypropylene non-woven web. The outer layer 26a may also be constructed of the same materials from which the bodyside liner 28 can be constructed as described herein.

The liquid impermeable inner layer 26b of the outer cover 26 (or the liquid impermeable outer cover 26 where the outer cover 26 is of a single-layer construction) can be either vapor permeable  
10 (i.e., "breathable") or vapor impermeable. The liquid impermeable inner layer 26b (or the liquid impermeable outer cover 26 where the outer cover 26 is of a single-layer construction) can be manufactured from a thin plastic film. The liquid impermeable inner layer 26b (or the liquid impermeable outer cover 26 where the outer cover 26 is of a single-layer construction) can inhibit liquid body exudates from leaking out of the absorbent article 10 and wetting articles, such as bed  
15 sheets and clothing, as well as the wearer and caregiver.

In some embodiments, where the outer cover 26 is of a single layer construction, it can be embossed and/or matte finished to provide a more cloth-like texture or appearance. The outer cover 26 can permit vapors to escape from the absorbent article 10 while preventing liquids from passing through. A suitable liquid impermeable, vapor permeable material can be composed of a microporous  
20 polymer film or a non-woven material which has been coated or otherwise treated to impart a desired level of liquid impermeability.

#### Absorbent Body:

The absorbent body 34 can be suitably constructed to be generally compressible, conformable, pliable, non-irritating to the wearer's skin and capable of absorbing and retaining liquid  
25 body exudates. The absorbent body 34 can be manufactured in a wide variety of sizes and shapes (for example, rectangular, trapezoidal, T-shape, I-shape, hourglass shape, etc.) and from a wide variety of materials. The size and the absorbent capacity of the absorbent body 34 should be compatible with the size of the intended wearer (infants to adults) and the liquid loading imparted by the intended use of the absorbent article 10. The absorbent body 34 can have a length and width that  
30 can be less than or equal to the length and width of the absorbent article 10. The absorbent body 34 can have a longitudinal axis 35 and a lateral axis 37. In some embodiments, the longitudinal axis 35 of the absorbent body 34 can be co-linear with the longitudinal axis 29 of the absorbent article 10, as illustrated in FIG. 2. In some embodiments, the lateral axis 37 of the absorbent body 34 can be co-

linear with the lateral axis 31 of the absorbent article 10, as also illustrated in FIG. 2. However, it is contemplated that the longitudinal axis 35 and/or the lateral axis 37 of the absorbent body 34 need not be co-linear (or even parallel) with the respective longitudinal axis 29 and/or lateral axis 31 of the absorbent article 10. The longitudinal axis 35 of the absorbent body 34 can extend through the front end edge 40 of the absorbent body 34 and the rear end edge 42 of the absorbent body 34.

The absorbent body 34 includes absorbent material. In an embodiment, the absorbent body 34 can be composed of a web material of hydrophilic fibers, cellulosic fibers (e.g., wood pulp fibers), natural fibers, synthetic fibers, woven or nonwoven sheets, scrim netting or other stabilizing structures, superabsorbent material, binder materials, surfactants, selected hydrophobic and hydrophilic materials, pigments, lotions, odor control agents or the like, as well as combinations thereof. In an embodiment, the absorbent body 34 can be a matrix of cellulosic fluff and superabsorbent material. In an embodiment, the absorbent body 34 may be constructed of a single layer of materials, or in the alternative, may be constructed of two or more layers of materials (as will be described with respect to FIG. 4A, below).

Various types of wettable, hydrophilic fibers can be used in the absorbent body 34. Examples of suitable fibers include natural fibers, cellulosic fibers, synthetic fibers composed of cellulose or cellulose derivatives, such as rayon fibers; inorganic fibers composed of an inherently wettable material, such as glass fibers; synthetic fibers made from inherently wettable thermoplastic polymers, such as particular polyester or polyamide fibers, or composed of nonwetable thermoplastic polymers, such as polyolefin fibers which have been hydrophilized by suitable means. The fibers may be hydrophilized, for example, by treatment with a surfactant, treatment with silica, treatment with a material which has a suitable hydrophilic moiety and is not readily removed from the fiber, or by sheathing the nonwetable, hydrophobic fiber with a hydrophilic polymer during or after formation of the fiber. Suitable superabsorbent materials can be selected from natural, synthetic, and modified natural polymers and materials. The superabsorbent materials can be inorganic materials, such as silica gels, or organic compounds, such as cross-linked polymers. In an embodiment, the absorbent body 34 can be free of superabsorbent material.

If a spacer layer is present, the absorbent body 34 can be disposed on the spacer layer and superposed over the outer cover 26. The spacer layer can be bonded to the outer cover 26, for example, by adhesive. In some embodiments, a spacer layer may not be present and the absorbent body 34 can directly contact the outer cover 26 and can be directly bonded to the outer cover 26. However, it is to be understood that the absorbent body 34 may be in contact with, and not bonded with, the outer cover 26 and remain within the scope of this disclosure. In an embodiment, the outer

cover 26 can be composed of a single layer and the absorbent body 34 can be in contact with the  
singer layer of the outer cover 26. In some embodiments, at least a portion of a layer, such as but not  
limited to, a fluid transfer layer 46 and/or a spacer layer, can be positioned between the absorbent  
body 34 and the outer cover 26. The absorbent body 34 can be bonded to the fluid transfer layer 46  
5 and/or the spacer layer.

As best illustrated in FIGS. 2 and 3, the absorbent body 34 can include a reduced absorbent  
section 70. The reduced absorbent section 70 can include less absorbent material than an adjacent  
section 71 of the absorbent body 34. In some embodiments, the reduced absorbent section 70 can  
include a rear diverging section 72 and a front diverging section 74. In preferred embodiments, the  
10 reduced absorbent section 70 can also include an intermediate section 76. The intermediate section  
76 can be disposed between the rear diverging section 72 and the front diverging section 74. In some  
embodiments, the reduced absorbent section 70 can generally be configured in an "X-shape", as will  
become evident in further discussion below.

As illustrated in FIG. 3, the rear diverging section 72 can include a first arm 78 and a second  
15 arm 80. The first arm 78 can include a proximal end 78a and a distal end 78b. The second arm 80  
can include a proximal end 80a and a distal end 80b. In a preferred embodiment, the distal end 78b of  
the first arm 78 and the distal end 80b of the second arm 80 can be rounded, as illustrated in FIG. 3.  
However, it is contemplated that the distal ends 78b, 80b, of the first and second arms 78, 80,  
respectively, can be configured in other fashions without departing from the scope of this disclosure.  
20 The first arm 78 can be on a first side 35a of the longitudinal axis 35 of the absorbent body 34. The  
second arm 80 can be on a second side 35b of the longitudinal axis 35 of the absorbent body 34. The  
first arm 78 and the second arm 80 can be configured such that a lateral distance between the  
proximal end 78a of the first arm 78 and the proximal end 80a of the second arm 80 is less than a  
lateral distance between the distal end 78b of the first arm 78 and the distal end 80b of the second arm  
25 80 (the lateral distances being measured in a direction parallel to the lateral axis 37 of the absorbent  
body 34). In other words, the first arm 78 and the second arm 80 can be configured to generally  
diverge from one another as the arms 78, 80 extend from their respective proximal ends 78a, 80a  
towards their respective distal ends 78b, 80b.

The front diverging section 74 can include a third arm 82 and a fourth arm 84. The third arm  
30 82 can include a proximal end 82a and a distal end 82b. The fourth arm 84 can include a proximal end  
84a and a distal end 84b. In a preferred embodiment, the distal end 82b of the third arm 82 and the  
distal end 84b of the fourth arm 84 can be rounded, as illustrated in FIG. 3. It is contemplated,  
however, that the distal ends 82b, 84b of the third and fourth arms 82, 84, respectively, can be

configured in other fashions without departing from the scope of this disclosure. The third arm 82 can be on a first side 35a of the longitudinal axis 35 of the absorbent body 34. The fourth arm 84 can be on a second side 35b of the longitudinal axis 35 of the absorbent body 34. The third arm 82 and the fourth arm 84 can be configured such that a lateral distance between the proximal end 82a of the third arm 82 and the proximal end 84a of the fourth arm 84 is less than a lateral distance between the distal end 82b of the third arm 82 and the distal end 84b of the fourth arm 84 (the lateral distances being measured in a direction parallel to the lateral axis 37 of the absorbent body 34). In other words, the third arm 82 and the fourth arm 84 can be configured to generally diverge from one another as the arms 82, 84 extend from their respective proximal ends 82a, 84a towards their respective distal ends 82b, 84b.

The reduced absorbent section 70 can include a length L and a width W. As depicted in FIG. 2, the length L can be measured as the largest dimension of the reduced absorbent section 70 in a direction parallel to the longitudinal axis 35 of the absorbent body 34. The length L can range depending on the size of the absorbent body 34, but in some embodiments, can range from about 50mm to about 500mm, and more preferably from about 75mm to about 400mm, and even more preferably from about 100mm to about 350mm. The width W can be measured as the largest dimension of the reduced absorbent section 70 in a direction parallel to the lateral axis 37 of the absorbent body 34. The width W can range depending on the size of the absorbent body 34, but in some embodiments, the width W can range from about 20mm to about 500mm, and more preferably from about 25mm to about 100mm, and even more preferably from about 30mm to about 75mm.

As illustrated in the embodiment depicted in FIGS. 2-3, one or more of the first arm 78, the second arm 80, the third arm 82, and the fourth arm 84 can be configured to be shaped as a linear segment(s). The first arm 78 and the second arm 80 can diverge from one another as defined by an angle  $\alpha$  formed between the first arm 78 and the second arm 80. In preferred embodiments, the angle  $\alpha$  can range from about 15° to about 90°, more preferably from about 20° to about 75°, and more preferably from about 25° to about 60°. In preferred embodiments, the angle  $\alpha$  is less than 90°. The third arm 80 and the fourth arm 84 can diverge from one another as defined by an angle  $\beta$  formed between the third arm 80 and the fourth arm 84. In preferred embodiments, the angle  $\beta$  can range from about 15° to about 90°, more preferably from about 20° to about 75°, and more preferably from about 25° to about 60°. In preferred embodiments, the angle  $\beta$  is less than 90°. The rear diverging section 72 can be configured to be a mirror image of the front diverging section 74 such that the angle  $\alpha$  can be substantially equal to the angle  $\beta$ , in some embodiments. However, it is also contemplated that the angle  $\alpha$  can be different than the angle  $\beta$  in some embodiments.

The arms 78, 80, 82, 84 of the reduced absorbent section 70 can have a thickness T, as being measured in the two-dimensional plane defined by the longitudinal axis 35 and the lateral axis 37 of the absorbent body 34 and in a direction normal to a direction they are extending in (a thickness T of the second arm 80 being depicted in FIG. 3A). The thickness T can range from about 2mm to about 50mm, and more preferably from about 5mm to about 25mm. The thickness T of each arm 78, 80, 82, 84 can be equal to one another, or the thickness T of one or more arms 78, 80, 82, 84 can be different from one another. The thickness T of each arm 78, 80, 82, 84 can be consistent along the length of each respective arm 78, 80, 82, 84, or one or more arms 78, 80, 82, 84 can be configured to have a varying thickness T along its respective length.

In some embodiments, the rear diverging section 72 and the front diverging section 74 of the reduced absorbent section 70 can be connected to one another. As illustrated in FIGS. 2 and 3, some embodiments can include an intermediate section 76. The intermediate section 76 of the reduced absorbent section 70 of the absorbent body 34 can be disposed between the rear diverging section 72 and the front diverging section 74. In some embodiments, the intermediate section 76 can connect the rear diverging section 72 and the front diverging section 74. The intermediate section 76 can range in length LL, as measured in a direction parallel to the longitudinal axis 35 of the absorbent body 34 (as depicted in FIG. 2), from about 5mm to about 200mm. In preferred embodiments where the absorbent body 34 is configured for an absorbent article 10, such as a diaper, the length LL of the intermediate section 76 can range from about 5mm to about 50mm, and more preferably, from about 5mm to about 20mm. The intermediate section 76 can include a thickness (not labeled for purposes of clarity) that can be the same or different than the thickness T of one or more of the arms 78, 80, 82, 84 of the reduced absorbent section 70.

In the embodiment illustrated in FIGS. 2-3A, the rear diverging section 72 can include a rear curved section 73. The rear curved section 73 can connect the first arm 78 to the second arm 80. The rear curved section 73 can be connected to the intermediate section 76. The front diverging section 74 can include a front curved section 75. The front curved section 75 can connect the third arm 82 to the fourth arm 84. The front curved section 75 can also be connected to the intermediate section 76. As illustrated in the detailed view of FIG. 3A, the rear curved section 73 can be configured such that it includes four inflection points 77 in its curvature. As illustrated in FIG. 3A, the four inflection points 77 shown along axis 73x of the rear curved section 73 provide for a shape allowing the rear curved section 73 to smoothly connect the first arm 78, the second arm 80, and the intermediate section 76 along their respective axes 78x, 80x, and 76x. The front curved section 75 can be configured in a similar manner such that it also includes four inflection points in its shape.

The reduced absorbent section 70 can be located within the absorbent body 34 in various positions. For purposes of referring to where the reduced absorbent section 70 is disposed within the absorbent body 34, the reduced absorbent section 70 is shown as having a lateral axis 79, as labeled in FIGS. 3 and 3A. In preferred embodiments, the reduced absorbent section 70 can be located closer to the front end edge 44 of the absorbent body 34 than to the rear end edge 42 of the absorbent body 34 such that a longitudinal distance between the front end edge 44 and the lateral axis 79 of the reduced absorbent section 70 is less than a longitudinal distance between the rear end edge 42 and the lateral axis 79 of the reduced absorbent section 70. The reduced absorbent section 70 can be disposed within the absorbent body 34 such that a lateral axis 79 of the reduced absorbent section 70 (as labeled in FIGS. 3 and 3A) is disposed in front of a lateral axis 37 of the absorbent body 34. In some embodiments, the lateral axis 79 of the reduced absorbent section 70 can be disposed in front of a lateral axis 31 of the absorbent article 10 such that the lateral axis 79 of the reduced absorbent section 70 is located closer to the front waist edge 22 of the absorbent article 10 than it is to the rear waist edge 24 of the absorbent article 10. Although in some embodiments the lateral axis 79 of the reduced absorbent section 70 can be located in front of the lateral axis 37 of the absorbent body 34 and/or the lateral axis 31 of the absorbent article 10, the reduced absorbent section 70 can still be configured such that the lateral axis 31 of the absorbent article 10 extends through at least a portion of the reduced absorbent section 70 of the absorbent body 34.

Of course, it is also contemplated that the reduced absorbent section 70 can be disposed in the absorbent body 34 such that the lateral axis 79 of the reduced absorbent section 70 is co-linear with the lateral axis 37 of the absorbent body 34 and/or the lateral axis 31 of the absorbent article 10. It is also contemplated that the reduced absorbent section 70 can be disposed within the absorbent body 34 such that the lateral axis 79 of the reduced absorbent section 70 is located behind the lateral axis 37 of the absorbent body 34 and/or the lateral axis 31 of the absorbent article 10.

In some embodiments, the reduced absorbent section 70 can be free from absorbent material. In other words, in such embodiments, the reduced absorbent section 70 can be a void of the absorbent material that forms that adjacent section 71 of the absorbent body 34. As shown in the cross-sectional image of FIG. 4, the reduced absorbent section 70 can be free from absorbent material as the third arm 82 and fourth arm 84 of the front diverging section 74 do not include any absorbent material.

However, in other embodiments, it is contemplated that the reduced absorbent section 70 can include some absorbent material, but less absorbent material than an adjacent section 71 of the absorbent body 34. As an example, the absorbent body 34 can be formed of a single layer of absorbent material, but have less absorbent material in the reduced absorbent section 70 than in an

adjacent 71 of the absorbent body 34. In some embodiments, such as the alternative embodiment depicted in the cross-sectional view of FIG. 4A, the absorbent body 34 can include more than one layer (e.g., layers 34a, 34b) and the reduced absorbent section 70 can be formed by removing absorbent material in the location of the reduced absorbent section 70 from one layer 34a (or initially forming that layer 34a without absorbent material in the reduced absorbent section 70), but such that absorbent material exists either above and/or below the reduced absorbent section 70 in one or more adjacent layers (e.g., layer 34b below layer 34a) of the absorbent body 34.

Various alternative embodiments in configurations of reduced absorbent sections 170, 270, 370 are illustrated in FIGS. 5-7. Unless stated otherwise, the reduced absorbent sections 170, 270, 370 in FIGS. 5, 6, and 7, respectively, are the same as described above for the embodiments depicted in FIGS. 1-4A. Turning to FIG. 5 first, the reduced absorbent section 170 can be configured such that the rear diverging section 72 does not include a rear curved section 73 and the front diverging section 74 does not include a front curved section 75. In this embodiment, the first arm 78 and the second arm 80 of the rear diverging section connect to one another and the intermediate section 76. Similarly, the third arm 82 and the fourth arm 84 connect to one another and the intermediate section 76.

As illustrated in FIG. 6, the reduced absorbent section 270 of the absorbent body 34 is configured such that the first arm 78, the second arm 80, the third arm 82, and the fourth arm 84 are shaped as arcuate segments. This provides an alternative configuration as compared to the reduced absorbent sections 70, 170 described above where the first arm 78, second arm 80, third arm 82, and fourth arm 84 are configured as linear segments.

The reduced absorbent section 370 of the absorbent body 34 of FIG. 7 shows that the reduced absorbent section 370 can include an intermediate section 76 that is separate from the rear diverging section 72 and the front diverging section 74. In other words, the rear diverging section 72, the front diverging section 74, and the intermediate section 76 are all separate components of the reduced absorbent section 70 of the absorbent body 34 of FIG. 7.

The absorbent article 10 can include features that help accentuate the reduced absorbent section 70, 170, 270, 370 and/or provide a user and/or wearer with an indication that a reduced absorbent section 70 is present in the absorbent body 34. For example, the absorbent article 10 can include graphics 86 visible from the outside of the absorbent article 10 that are registered to the reduced absorbent section 70, 170, 270, 370. As illustrated in FIG. 1, these graphics 86 can include printed graphics on the outer cover 26 that are visible from the outside of the absorbent article 10. The graphics 86 that can be registered to the reduced absorbent section 70, 170, 270, 370 can include shapes such as line segments, lines, stars, and/or other shapes, alphanumeric characters, or images

to help provide a user and/or a wearer of the presence of the reduced absorbent section 70, 170, 270, 370. Such graphics 86 can also be configured such that they are visible when viewing from the inside of the absorbent article 10 (or when viewing the body facing surface 55 of the bodyside liner 28). Additionally or alternatively, the absorbent article 10 can be configured such that the bodyside liner 28 is printed, embossed, or otherwise marked to indicate the presence and shape of the reduced absorbent section 70, 170, 270, 370 of the absorbent body 34. In another aspect, a portion of the absorbent material in the reduced absorbent section 70, 170, 270, 370 or another layer of material between the absorbent body 34 and the outer cover 26 in the reduced absorbent section 70, 170, 270, 370 can be colored to help indicate to a user or wearer the presence and shape of the reduced absorbent section 70, 170, 270, 370 from the inside of the absorbent article 10.

The reduced absorbent section 70, 170, 270, 370 can provide additional flexibility of the absorbent body 34 by allowing for easier creasing or folding of the absorbent body 34 in a shape that matches the natural movement patterns of a wearer. This benefit is present when the absorbent body 34 is dry, but is especially noticeable as the absorbent body 34 intakes an insult of body exudates and the absorbent materials of the absorbent body 34 expand to absorb the body exudates. The components of the reduced absorbent section 70, 170, 270, 370 provide creases or guides in the absorbent body 34 where the absorbent body 34 can naturally bend with the movement of the wearer, matching the pivot points of a wearer's movement patterns, such as in running, walking, and/or crawling.

The reduced absorbent section 70, 170, 270, 370 of the absorbent body 34 can provide the additional benefit of enhanced body exudate transmission throughout the absorbent body 34, thus providing enhanced efficiency of the absorbent body 34.

The reduced absorbent section 70, 170, 270, 370 can be formed in various ways. For example, the reduced absorbent section 70, 170, 270, 370 can be formed by forming the absorbent body 34 with absorbent materials only in the adjacent section 71 of the absorbent body 34. Alternatively, the reduced absorbent section 70, 170, 270, 370 can be formed by pressure bonding or ultrasonic bonding the absorbent body 34 to reduce absorbent material in the area of the reduced absorbent section 70, 170, 270, 370. Another method of forming the reduced absorbent section 70, 170, 270, 370 can be to remove absorbent material in the area of the reduced absorbent section 70, 170, 270, 370 after the absorbent body 34 has been formed. For example, absorbent material may mechanically be cut out from the absorbent body 34 or a slitting process may be used to remove absorbent material after forming the absorbent body 34.

Bodyside liner:

The bodyside liner 28 of the absorbent article 10 can overlay the absorbent body 34 and the outer cover 26 and can be configured to receive insults of exudates from the wearer and can isolate the wearer's skin from liquid waste retained by the absorbent body 34. The bodyside liner 28 can from  
5 at least a part of the body facing surface 19 of the chassis 11.

In various embodiments, a fluid transfer layer 46 can be positioned between the bodyside liner 28 and the absorbent body 34 (as shown in FIG. 4). In various embodiments, an acquisition layer 48 can be positioned between the bodyside liner 28 and the absorbent body 34 or a fluid transfer layer 46, if present (as shown in FIG. 4). In various embodiments, the bodyside liner 28 can be bonded to the  
10 acquisition layer 48, or to the fluid transfer layer 46 if no acquisition layer 48 is present, via adhesive and/or by a point fusion bonding. The point fusion bonding may be selected from ultrasonic, thermal, pressure bonding, and combinations thereof.

In an embodiment, the bodyside liner 28 can extend beyond the absorbent body 34 and/or a fluid transfer layer 46, if present, and/or an acquisition layer 48, if present, and/or a spacer layer, if  
15 present, to overlay a portion of the outer cover 26 and can be bonded thereto by any method deemed suitable, such as, for example, by being bonded thereto by adhesive, to substantially enclose the absorbent body 34 between the outer cover 26 and the bodyside liner 28. In some embodiments, the bodyside liner 28 and the outer cover 26 may be of the same dimensions in width and length. In some embodiments, however, the bodyside liner 28 may be narrower than the outer cover 26 and/or shorter  
20 than the outer cover 26. In some embodiments, the length of the bodyside liner 28 can range from 50%-100% of the length of the absorbent article 10 as measured in a direction parallel to the longitudinal axis 29. In some embodiments, the bodyside liner 28 can be of greater width than the outer cover 26. It is also contemplated that the bodyside liner 28 may not extend beyond the absorbent body 34 and/or may not be secured to the outer cover 26. In some embodiments, the  
25 bodyside liner 28 can wrap at least a portion of the absorbent body 34, including wrapping around both longitudinal edges 36, 38 of the absorbent body 34, and/or one or more of the end edges 40, 42. It is further contemplated that the bodyside liner 28 may be composed of more than one segment of material.

The bodyside liner 28 can be of different shapes, including rectangular, hourglass, or any  
30 other shape. The bodyside liner 28 can be suitably compliant, soft feeling, and non-irritating to the wearer's skin and can be the same as or less hydrophilic than the absorbent body 34 to permit body exudates to readily penetrate through to the absorbent body 34 and provide a relatively dry surface to the wearer.

The bodyside liner 28 can be manufactured from a wide selection of materials, such as synthetic fibers (for example, polyester or polypropylene fibers), natural fibers (for example, wood or cotton fibers), a combination of natural and synthetic fibers, porous foams, reticulated foams, apertured plastic films, or the like. Examples of suitable materials include, but are not limited to, rayon, wood, cotton, polyester, polypropylene, polyethylene, nylon, or other heat-bondable fibers, polyolefins, such as, but not limited to, copolymers of polypropylene and polyethylene, linear low-density polyethylene, and aliphatic esters such as polylactic acid, finely perforated film webs, net materials, and the like, as well as combinations thereof.

Various woven and non-woven fabrics can be used for the bodyside liner 28. The bodyside liner 28 can include a woven fabric, a nonwoven fabric, a polymer film, a film-fabric laminate or the like, as well as combinations thereof. Examples of a nonwoven fabric can include spunbond fabric, meltblown fabric, coform fabric, carded web, bonded-carded web, bicomponent spunbond fabric, spunlace, or the like, as well as combinations thereof. The bodyside liner 28 need not be a unitary layer structure, and thus, can include more than one layer of fabrics, films, and/or webs, as well as combinations thereof. For example, the bodyside liner 28 can include a support layer and a projection layer that can be hydroentangled. The projection layer can include hollow projections, such as those disclosed in U.S. Patent No. 9,474,660 invented by Kirby, Scott S.C. et al., and as depicted in FIG. 8.

For example, the bodyside liner 28 can be composed of a meltblown or spunbond web of polyolefin fibers. Alternatively, the bodyside liner 28 can be a bonded-carded web composed of natural and/or synthetic fibers. The bodyside liner 28 can be composed of a substantially hydrophobic material, and the hydrophobic material can, optionally, be treated with a surfactant or otherwise processed to impart a desired level of wettability and hydrophilicity. The surfactant can be applied by any conventional means, such as spraying, printing, brush coating or the like. The surfactant can be applied to the entire bodyside liner 28 or it can be selectively applied to particular sections of the bodyside liner 28.

In an embodiment, a bodyside liner 28 can be constructed of a non-woven bicomponent web. The non-woven bicomponent web can be a spunbonded bicomponent web, or a bonded-carded bicomponent web. An example of a bicomponent staple fiber includes a polyethylene/polypropylene bicomponent fiber. In this particular bicomponent fiber, the polypropylene forms the core and the polyethylene forms the sheath of the fiber. Fibers having other orientations, such as multi-lobe, side-by-side, end-to-end may be used without departing from the scope of this disclosure. In an embodiment, a bodyside liner 28 can be a spunbond substrate with a basis weight from about 10 or 12

to about 15 or 20 gsm. In an embodiment, a bodyside liner 28 can be a 12 gsm spunbond-meltblown-spunbond substrate having 10% meltblown content applied between the two spunbond layers.

Although the outer cover 26 and bodyside liner 28 can include elastomeric materials, it is contemplated that the outer cover 26 and the bodyside liner 28 can be composed of materials which are generally non-elastomeric. In an embodiment, the bodyside liner 28 can be stretchable, and more suitably elastic. In an embodiment, the bodyside liner 28 can be suitably stretchable and more suitably elastic in at least the lateral or circumferential direction of the absorbent article 10. In other aspects, the bodyside liner 28 can be stretchable, and more suitably elastic, in both the lateral and the longitudinal directions 32, 30, respectively.

#### Containment Flaps:

In an embodiment, the absorbent article 10 can include a pair of containment flaps 50, 52. The containment flaps 50, 52 can be formed separately from the absorbent chassis 11 and attached to the chassis 11 or can be formed integral to the chassis 11. In some embodiments, the containment flaps 50, 52 can be secured to the chassis 11 of the absorbent article 10 in a generally parallel, spaced relation with each other laterally inward of the leg openings to provide a barrier against the flow of body exudates. One containment flap 50 can be on a first side of the longitudinal axis 29 and the other containment flap 52 can be on a second side of the longitudinal axis 29. In an embodiment, the containment flaps 50, 52 can extend generally in a longitudinal direction 30 from the front waist region 12 of the absorbent article 10 through the crotch region 16 to the rear waist region 14 of the absorbent article 10. In some embodiments, the containment flaps 50, 52 can extend in a direction substantially parallel to the longitudinal axis 29 of the absorbent article 10, however, in other embodiments, the containment flaps 50, 52 can be curved, as is known in the art.

In embodiments where the containment flaps 50, 52 are coupled to the chassis 11, the containment flaps 50, 52 can be bonded to the bodyside liner 28, the outer cover 26, or another layer, such as a spacer layer, if present, with a barrier adhesive, as is known in the art. Of course, the containment flaps 50, 52 can be bonded to other components of the chassis 11 and can be bonded with other suitable means other than a barrier adhesive. For example, the containment flaps 50, 52 can be bonded to the bodyside liner 28, the outer cover 26, or another layer with pressure bonding, thermal bonding, or ultrasonic bonding. The containment flaps 50, 52 can be constructed of a fibrous material which can be similar to the material forming the bodyside liner 28. Other conventional materials, such as polymer films, can also be employed.

As illustrated in FIG. 4, the containment flaps 50, 52 can each include a base portion 64 and a projection portion 66. The base portion 64 can be bonded to the chassis 11, for example, to the

bodyside liner 28 or the outer cover 26 as mentioned above. The base portion 64 could be bonded to other components of the chassis 11. The projection portion 66 can be configured to extend away from the body facing surface 19 of the chassis 11 (such as the body facing surface 55 of the bodyside liner 28) at least in the crotch region 16 when the absorbent article 10 is in a relaxed configuration, as  
5 illustrated in FIG. 4.

It is contemplated that the containment flaps 50, 52 can be of various configurations and shapes, and can be constructed by various methods. For example, the containment flaps 50, 52 of FIGS. 2 and 4 depict a vertical containment flap 50, 52 that can be tacked down in both the front and rear waist regions 12, 14 where the projection portion 66 of each containment flap 50, 52 is tacked  
10 down to the bodyside liner 28 towards the longitudinal axis 29 of the absorbent article 10. However, it is contemplated that the containment flaps 50, 52 can be tacked down where the projection portion 66 of each of the containment flaps 50, 52 is folded back upon itself and coupled to itself and the bodyside liner 28 in a "C-shape" configuration, as is known in the art and described in U.S. Patent No. 5,895,382 to Robert L. Popp et al. As yet another alternative, it is contemplated that the containment  
15 flaps 50, 52 could be constructed in a "T-shape" configuration, such as described in U.S. Patent Application Serial No. 13/900,134 by Robert L. Popp et al., which published as U.S. Patent Application Publication 2014/0350504. Such a configuration can also include the projection portions 66 being tacked down in either or both of the front and rear waist regions 12, 14, respectively. Of course, other configurations of containment flaps 50, 52 can be used in the absorbent article 10 and still remain  
20 within the scope of this disclosure.

The containment flaps 50, 52 can include one or more flap elastic members 68, such as the two flap elastic strands depicted in FIG. 4. Suitable elastic materials for the flap elastic members 68 can include sheets, strands or ribbons of natural rubber, synthetic rubber, or thermoplastic elastomeric materials. Of course, while two elastic members 68 are shown in each containment flap 50, 52, it is  
25 contemplated that the containment flaps 50, 52 can be configured with one or three or more elastic members 68. Alternatively or additionally, the containment flaps 50, 52 can be composed of a material exhibiting elastic properties itself.

The flap elastic members 68, as illustrated in FIG. 2, can have two strands of elastomeric material extending longitudinally in the projection portion 66 of the containment flaps 50, 52, in  
30 generally parallel, spaced relation with each other. The flap elastic members 68 can be within the containment flaps 50, 52 while in an elastically contractible condition such that contraction of the strands gathers and shortens the projection portions 66 of the containment flaps 50, 52 in the longitudinal direction 30. As a result, the elastic members 68 can bias the projection portions 66 of the

containment flaps 50, 52 to extend away from the body facing surface 45 of the absorbent assembly 44 in a generally upright orientation of the containment flaps 50, 52, especially in the crotch region 16 of the absorbent article 10, when the absorbent article 10 is in a relaxed configuration. Such an upright orientation of the projection portion 66 of containment flap 50 and the projection portion 66 of containment flap 52 is illustrated in FIG. 4, where the absorbent article 10 is in a relaxed configuration.

During manufacture of the containment flaps 50, 52 at least a portion of the elastic members 68 can be bonded to the containment flaps 50, 52 while the elastic members 68 are elongated. The percent elongation of the elastic members 68 can be, for example, about 110% to about 350%. In one embodiment, the elastic members 68 can be coated with adhesive while elongated to a specified length prior to attaching to the elastic members 68 to the containment flaps 50, 52. In this exemplary method of bonding the elastic members 68 to the containment flaps 50, 52, the portion of the elastic members 68 not coated with adhesive, will retract after the elastic members 68 and the absorbent article 10 are cut in manufacturing to form an individual absorbent article 10. As noted above, the relaxing of the elastic members 68 when the absorbent article 10 is in a relaxed condition can cause each containment flap 50, 52 to gather and cause the projection portion 66 of each containment flap 50, 52 to extend away from the body facing surface 19 of the chassis 11 (e.g., the body facing surface 45 of the absorbent assembly 44 or the body facing surface 55 of the bodyside liner 28), as depicted in FIG. 4.

#### Leg Elastics:

Leg elastic members 60, 62 can be secured to the outer cover 26, such as by being bonded thereto by laminate adhesive, generally laterally inward of the longitudinal side edges, 18 and 20, of the absorbent article 10. The leg elastic members 60, 62 can form elasticized leg cuffs that further help to contain body exudates. In an embodiment, the leg elastic members 60, 62 may be disposed between inner and outer layers (not shown) of the outer cover 26 or between other layers of the absorbent article 10, for example, between the base portion 64 of each containment flap 50, 52 and the bodyside liner 28, between the base portion 64 of each containment flap 50, 52 and the outer cover 26, or between the bodyside liner 28 and the outer cover 26. The leg elastic members 60, 62 can be one or more elastic components near each longitudinal side edge 18, 20. For example, the leg elastic members 60, 62 as illustrated herein in FIG. 2 each include two elastic strands. A wide variety of elastic materials may be used for the leg elastic members 60, 62. Suitable elastic materials can include sheets, strands or ribbons of natural rubber, synthetic rubber, or thermoplastic elastomeric materials. The elastic materials can be stretched and secured to a substrate, secured to a gathered substrate, or secured to a substrate and then elasticized or shrunk, for example, with the application of

heat, such that the elastic retractive forces are imparted to the substrate. Additionally, it is contemplated that the leg elastic members 60, 62 can be formed with the containment flaps 50, 52, and then attached to the chassis 11 in some embodiments. Of course, the leg elastic members 60, 62 can be omitted from the absorbent article 10 without departing from the scope of this disclosure.

5           Waist Containment Member:

In an embodiment, the absorbent article 10 can have one or more waist containment members 54. FIGS. 1 and 2 illustrate a preferred embodiment of a waist containment member 54 on an absorbent article 10, such as a diaper where the waist containment member 54 can be disposed in the rear waist region 14. In some embodiments, the waist containment member 54 can be disposed in the front waist region 12. The waist containment member 54 can be disposed on the body facing surface 45 of the absorbent assembly 44. In some embodiments, such as in embodiments illustrated in FIGS. 1 and 2, the waist containment member 54 can be disposed on the body facing surface 55 of the bodyside liner 28. Additionally, in the absorbent article 410 in FIGS. 9 and 10, the waist containment member 54 can be disposed on the rear waist panel 15. The waist containment member 54 can be coupled to the chassis 11 such that a portion of the waist containment member 54 is free to move with respect to the chassis 11 and can form a pocket to help contain body exudates.

The waist containment member 54 can be comprised of a variety of materials. In a preferred embodiment, the waist containment member 54 can be comprised of a spunbond-meltblown-spunbond ("SMS") material. However it is contemplated that the waist containment member 54 can be comprised of other materials including, but not limited to, a spunbond-film-spunbond ("SFS"), a bonded carded web ("BCW"), or any non-woven material. In some embodiments, the waist containment member 54 can be comprised of a laminate of more than one of these exemplary materials, or other materials. In some embodiments, the waist containment member 54 can be comprised of a liquid impermeable material. In some embodiments, the waist containment member 54 can be comprised of a material coated with a hydrophobic coating. In some embodiments, the waist containment member 54 can include an elastic material to provide additional fit and containment properties to the absorbent article 10. In such an embodiment, suitable elastic materials can include, but are not limited to, sheets, strands or ribbons of natural rubber, synthetic rubber, or thermoplastic elastomeric polymers. The elastic materials can be stretched and bonded to a substrate, bonded to a gathered substrate, or bonded to a substrate and then elasticized or shrunk, for example, with the application of heat, such that elastic retractive forces are imparted to the substrate. It is to be understood, however, that the waist containment member 54 may be omitted from the absorbent article without departing from the scope of this disclosure.

### Fastening System:

In an embodiment, the absorbent article 10 can include a fastening system. The fastening system can include one or more back fasteners 91 and one or more front fasteners 92. The embodiments shown in FIGS. 1 and 2 depict an embodiment with one front fastener 92. Portions of the fastening system may be included in the front waist region 12, rear waist region 14, or both.

The fastening system can be configured to secure the absorbent article 10 about the waist of the wearer in a fastened condition as shown in FIG. 1 and help maintain the absorbent article 10 in place during use. In an embodiment, the back fasteners 91 can include one or more materials bonded together to form a composite ear as is known in the art. For example, the composite fastener may be composed of a stretch component 94, a nonwoven carrier or hook base 96, and a fastening component 98, as labeled in FIG. 2.

### Embodiments

Embodiment 1: An absorbent body including a lateral axis and a longitudinal axis, the absorbent body comprising: absorbent material; a front end edge; a rear end edge, the rear end edge opposed from the front end edge, the longitudinal axis extending through the front end edge and the rear end edge; a pair of longitudinal side edges; and a reduced absorbent section having less absorbent material than an adjacent section of the absorbent body, the reduced absorbent section comprising: a rear diverging section including a first arm and a second arm, the first arm including a first proximal end and a first distal end, the second arm including a second proximal end and a second distal end, the first arm being on a first side of the longitudinal axis and the second arm being on a second side of the longitudinal axis, the first arm and the second arm configured such that a lateral distance between the first proximal end of the first arm and the second proximal end of the second arm is less than a lateral distance between the first distal end of the first arm and the second distal end of the second arm; a front diverging section including a third arm and a fourth arm, the third arm including a third proximal end and a third distal end, the fourth arm including a fourth proximal end and a fourth distal end, the third arm being on the first side of the longitudinal axis and the fourth arm being on the second side of the longitudinal axis, the third arm and the fourth arm configured such that a lateral distance between the third proximal end of the third arm and the fourth proximal end of the fourth arm is less than a lateral distance between the third distal end of the third arm and the fourth distal end of the fourth arm; and an intermediate section disposed between the rear diverging section and the front diverging section, the intermediate section connecting the rear diverging section to the front diverging section.

Embodiment 2: The absorbent body of embodiment 1, wherein the reduced absorbent section is free from absorbent material.

Embodiment 3: The absorbent body of embodiment 1 or 2, wherein the rear diverging section further includes a rear curved section, the rear curved section connecting the first arm to the second arm and being connected to the intermediate section.

5 Embodiment 4: The absorbent body of any one of the preceding embodiments, wherein the rear curved section comprises an axis including four inflection points.

Embodiment 5: The absorbent body of any one of the preceding embodiments, wherein the front diverging section further includes a front curved section, the front curved section connecting the third arm to the fourth arm and being connected to the intermediate section.

10 Embodiment 6: The absorbent body of any one of the preceding embodiments, wherein the first arm, the second arm, the third arm, and the fourth arm are each configured to be shaped as a linear segment.

Embodiment 7: The absorbent body of embodiment 6, wherein an angle formed between the first arm and the second arm of the rear diverging section is between about 20° and about 90°, and wherein an angle formed between the third arm and the fourth arm of the front diverging section is between about  
15 20° and about 90°.

Embodiment 8: The absorbent body of any one of the embodiments, wherein a longitudinal length of the intermediate section is between about 5mm to about 200mm.

Embodiment 9: The absorbent body of any one of the preceding embodiments, wherein the absorbent body forms part of an absorbent article, the absorbent article comprising a body-side liner and an outer  
20 cover, the absorbent body being disposed between the body-side liner and the outer cover.

Embodiment 10: The absorbent body of embodiment 9, wherein a lateral axis of the reduced absorbent section is disposed in front of a lateral axis of the absorbent article.

Embodiment 11: The absorbent body of embodiment 9 or 10, wherein the absorbent article includes graphics disposed on the outer cover, at least some of the graphics being registered with the reduced  
25 absorbent section of the absorbent body.

Embodiment 12: An absorbent body including a lateral axis and a longitudinal axis, the absorbent body comprising: absorbent material; a front end edge; a rear end edge, the rear end edge opposed from the front end edge, the longitudinal axis extend through the front end edge and the rear end edge; a pair of longitudinal side edges; and a reduced absorbent section having less absorbent material than  
30 an adjacent section of the absorbent body, the reduced absorbent section comprising: a rear diverging section including a first arm and a second arm, the first arm including a first proximal end and a first

distal end, the second arm including a second proximal end and a second distal end, the first arm being on a first side of the longitudinal axis and the second arm being on a second side of the longitudinal axis, the first arm and the second arm configured such that a lateral distance between the first proximal end of the first arm and the second proximal end of the second arm is less than a lateral distance between the first distal end of the first arm and the second distal end of the second arm; and a front diverging section including a third arm and a fourth arm, the third arm including a third proximal end and a third distal end, the fourth arm including a fourth proximal end and a fourth distal end, the third arm being on the first side of the longitudinal axis and the fourth arm being on the second side of the longitudinal axis, the third arm and the fourth arm configured such that a lateral distance between the third proximal end of the third arm and the fourth proximal end of the fourth arm is less than a lateral distance between the third distal end of the third arm and the fourth distal end of the fourth arm; wherein the rear diverging section and the front diverging section are connected.

Embodiment 13: The absorbent body of embodiment 12, wherein the reduced absorbent section further comprises an intermediate section disposed between the rear diverging section and the front diverging section, the intermediate section connecting the rear diverging section to the front diverging section.

Embodiment 14: The absorbent body of embodiment 12 or 13, wherein the reduced absorbent section is free from absorbent material.

Embodiment 15: The absorbent body of embodiment 13 or 14, wherein the rear diverging section further includes a rear curved section, the rear curved section connecting the first arm to the second arm and being connected to the intermediate section.

Embodiment 16: The absorbent body of any one of embodiments 13-15, wherein the front diverging section further includes a front curved section, the front curved section connecting the third arm to the fourth arm and being connected to the intermediate section.

Embodiment 17: The absorbent body of any one of embodiments 12-16, wherein the first arm, the second arm, the third arm, and the fourth arm are each configured to be shaped as a linear segment.

Embodiment 18: The absorbent body of any one of embodiments 12-17, wherein the absorbent body forms part of an absorbent article, the absorbent article comprising a body-side liner and an outer cover, the absorbent body being disposed between the body-side liner and the outer cover.

Embodiment 19: An absorbent article including a longitudinal axis and a lateral axis, the absorbent article comprising: a body-side liner; an outer cover; and an absorbent body including absorbent material being disposed between the body-side liner and the outer cover, the absorbent body

comprising: a front end edge; a rear end edge, the rear end edge opposed from the front end edge; a pair of longitudinal side edges; and a reduced absorbent section having less absorbent material than an adjacent section of the absorbent body, the reduced absorbent section comprising: a rear diverging section including a first arm and a second arm, the first arm including a first proximal end and a first distal end, the second arm including a second proximal end and a second distal end, the first arm being on a first side of the longitudinal axis and the second arm being on a second side of the longitudinal axis, the first arm and the second arm configured such that a lateral distance between the first proximal end of the first arm and the second proximal end of the second arm is less than a lateral distance between the first distal end of the first arm and the second distal end of the second arm; and a front diverging section including a third arm and a fourth arm, the third arm including a third proximal end and a third distal end, the fourth arm including a fourth proximal end and a fourth distal end, the third arm being on the first side of the longitudinal axis and the fourth arm being on the second side of the longitudinal axis, the third arm and the fourth arm configured such that a lateral distance between the third proximal end of the third arm and the fourth proximal end of the fourth arm is less than a lateral distance between the third distal end of the third arm and the fourth distal end of the fourth arm; wherein the reduced absorbent section is configured such that the lateral axis of the absorbent article extends through at least a portion of the reduced absorbent section.

Embodiment 20: The absorbent article of embodiment 19, wherein the reduced absorbent section further comprises an intermediate section disposed between the rear diverging section and the front diverging section, the intermediate section being separate from at least one of the rear diverging section and the front diverging section.

All documents cited in the Detailed Description are, in relevant part, incorporated herein by reference; the citation of any document is not to be construed as an admission that it is prior art with respect to the present invention. To the extent that any meaning or definition of a term in this written document conflicts with any meaning or definition of the term in a document incorporated by references, the meaning or definition assigned to the term in this written document shall govern.

While particular embodiments of the present invention have been illustrated and described, it would be obvious to those skilled in the art that various other changes and modifications can be made without departing from the spirit and scope of the invention. It is therefore intended to cover in the appended claims all such changes and modifications that are within the scope of this invention.

**WHAT IS CLAIMED IS:**

1. An absorbent body including a lateral axis and a longitudinal axis, the absorbent body comprising:
  - absorbent material;
  - a front end edge;
  - 5 a rear end edge, the rear end edge opposed from the front end edge, the longitudinal axis extending through the front end edge and the rear end edge;
  - a pair of longitudinal side edges; and
  - a reduced absorbent section having less absorbent material than an adjacent section of the absorbent body, the reduced absorbent section comprising:
    - 10 a rear diverging section including a first arm and a second arm, the first arm including a first proximal end and a first distal end, the second arm including a second proximal end and a second distal end, the first arm being on a first side of the longitudinal axis and the second arm being on a second side of the longitudinal axis, the first arm and the second arm configured such that a lateral distance between the first proximal end of
    - 15 the first arm and the second proximal end of the second arm is less than a lateral distance between the first distal end of the first arm and the second distal end of the second arm;
    - a front diverging section including a third arm and a fourth arm, the third arm including a third proximal end and a third distal end, the fourth arm including a fourth proximal end and a fourth distal end, the third arm being on the first side of the longitudinal
    - 20 axis and the fourth arm being on the second side of the longitudinal axis, the third arm and the fourth arm configured such that a lateral distance between the third proximal end of the third arm and the fourth proximal end of the fourth arm is less than a lateral distance between the third distal end of the third arm and the fourth distal end of the fourth arm;
    - and
    - 25 an intermediate section disposed between the rear diverging section and the front diverging section, the intermediate section connecting the rear diverging section to the front diverging section.
2. The absorbent body of claim 1, wherein the reduced absorbent section is free from absorbent material.

3. The absorbent body of claim 1, wherein the rear diverging section further includes a rear curved section, the rear curved section connecting the first arm to the second arm and being connected to the intermediate section.
4. The absorbent body of claim 3, wherein the rear curved section comprises an axis including four inflection points.
5. The absorbent body of claim 1, wherein the front diverging section further includes a front curved section, the front curved section connecting the third arm to the fourth arm and being connected to the intermediate section.
6. The absorbent body of claim 1, wherein the first arm, the second arm, the third arm, and the fourth arm are each configured to be shaped as a linear segment.
7. The absorbent body of claim 6, wherein an angle formed between the first arm and the second arm of the rear diverging section is between about 20° and about 90°, and wherein an angle formed between the third arm and the fourth arm of the front diverging section is between about 20° and about 90°.
8. The absorbent body of claim 1, wherein a longitudinal length of the intermediate section is between about 5mm to about 200mm.
9. The absorbent body of claim 1, wherein the absorbent body forms part of an absorbent article, the absorbent article comprising a body-side liner and an outer cover, the absorbent body being disposed between the body-side liner and the outer cover.
10. The absorbent body of claim 9, wherein a lateral axis of the reduced absorbent section is disposed in front of a lateral axis of the absorbent article.
11. The absorbent body of claim 9, wherein the absorbent article includes graphics disposed on the outer cover, at least some of the graphics being registered with the reduced absorbent section of the absorbent body.
12. An absorbent body including a lateral axis and a longitudinal axis, the absorbent body comprising:
  - absorbent material;
  - a front end edge;
  - a rear end edge, the rear end edge opposed from the front end edge, the longitudinal axis extend through the front end edge and the rear end edge;
  - a pair of longitudinal side edges; and

a reduced absorbent section having less absorbent material than an adjacent section of the absorbent body, the reduced absorbent section comprising:

5 a rear diverging section including a first arm and a second arm, the first arm including a first proximal end and a first distal end, the second arm including a second proximal end and a second distal end, the first arm being on a first side of the longitudinal axis and the second arm being on a second side of the longitudinal axis, the first arm and the second arm configured such that a lateral distance between the first proximal end of the first arm and the second proximal end of the second arm is less than a lateral distance between the first distal end of the first arm and the second distal end of the second arm;  
10 and

a front diverging section including a third arm and a fourth arm, the third arm including a third proximal end and a third distal end, the fourth arm including a fourth proximal end and a fourth distal end, the third arm being on the first side of the longitudinal axis and the fourth arm being on the second side of the longitudinal axis, the third arm and the fourth arm configured such that a lateral distance between the third proximal end of the third arm and the fourth proximal end of the fourth arm is less than a lateral distance between the third distal end of the third arm and the fourth distal end of the fourth arm;

wherein the rear diverging section and the front diverging section are connected.

13. The absorbent body of claim 12, wherein the reduced absorbent section further comprises an  
20 intermediate section disposed between the rear diverging section and the front diverging section, the intermediate section connecting the rear diverging section to the front diverging section.
14. The absorbent body of claim 12, wherein the reduced absorbent section is free from absorbent material.
15. The absorbent body of claim 13, wherein the rear diverging section further includes a rear curved  
25 section, the rear curved section connecting the first arm to the second arm and being connected to the intermediate section.
16. The absorbent body of claim 13, wherein the front diverging section further includes a front curved section, the front curved section connecting the third arm to the fourth arm and being connected to the intermediate section.
- 30 17. The absorbent body of claim 12, wherein the first arm, the second arm, the third arm, and the fourth arm are each configured to be shaped as a linear segment.

18. The absorbent body of claim 12, wherein the absorbent body forms part of an absorbent article, the absorbent article comprising a body-side liner and an outer cover, the absorbent body being disposed between the body-side liner and the outer cover.

19. An absorbent article including a longitudinal axis and a lateral axis, the absorbent article comprising:

5

a body-side liner;

an outer cover; and

an absorbent body including absorbent material being disposed between the body-side liner and the outer cover, the absorbent body comprising:

10

a front end edge;

a rear end edge, the rear end edge opposed from the front end edge;

a pair of longitudinal side edges; and

a reduced absorbent section having less absorbent material than an adjacent section of the absorbent body, the reduced absorbent section comprising:

15

a rear diverging section including a first arm and a second arm, the first arm including a first proximal end and a first distal end, the second arm including a second proximal end and a second distal end, the first arm being on a first side of the longitudinal axis and the second arm being on a second side of the longitudinal axis, the first arm and the second arm configured such that a lateral distance between the first proximal end of the first arm and the second proximal end of the second arm is less than a lateral distance between the first distal end of the first arm and the second distal end of the second arm;

20

and

a front diverging section including a third arm and a fourth arm, the third arm including a third proximal end and a third distal end, the fourth arm including a fourth proximal end and a fourth distal end, the third arm being on the first side of the longitudinal axis and the fourth arm being on the second side of the longitudinal axis, the third arm and the fourth arm configured such that a lateral distance between the third proximal end of the third arm and the fourth proximal end of the fourth arm is less than a lateral distance between the third distal end of the third arm and the fourth distal end of the fourth arm;

25

30

wherein the reduced absorbent section is configured such that the lateral axis of the absorbent article extends through at least a portion of the reduced absorbent section.

20. The absorbent article of claim 19, wherein the reduced absorbent section further comprises an intermediate section disposed between the rear diverging section and the front diverging section, the intermediate section being separate from at least one of the rear diverging section and the front diverging section.

5

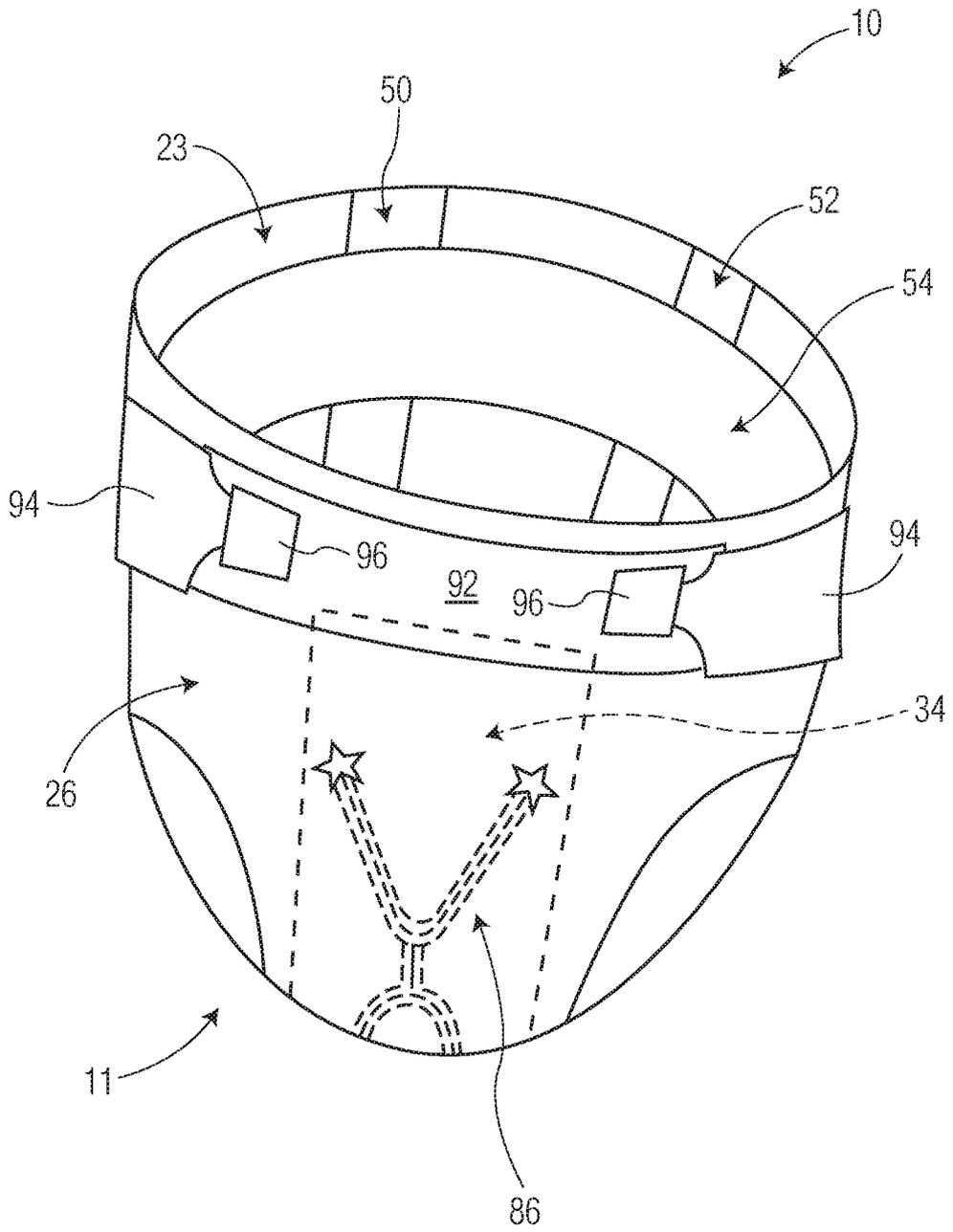


FIG. 1



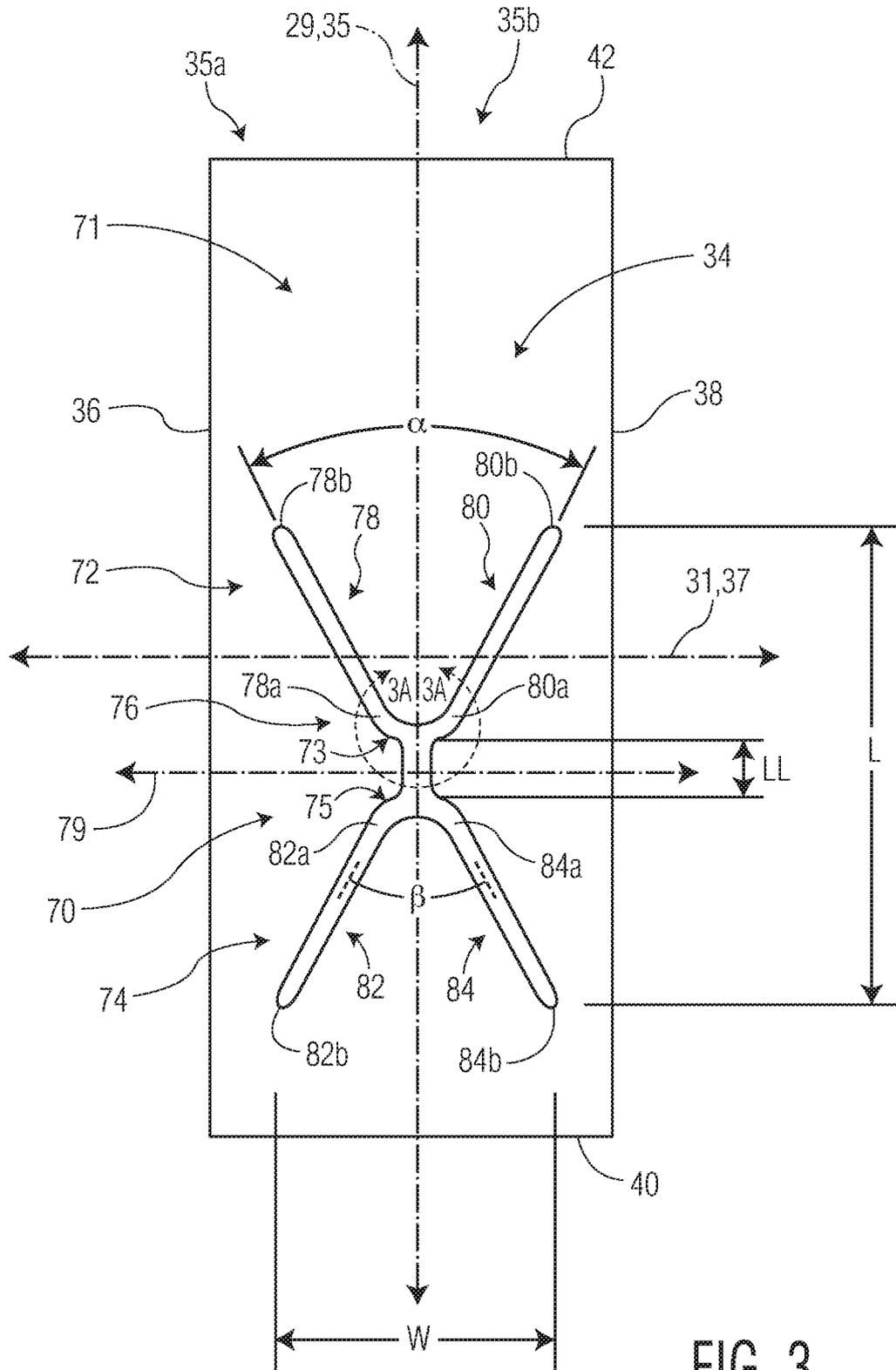


FIG. 3

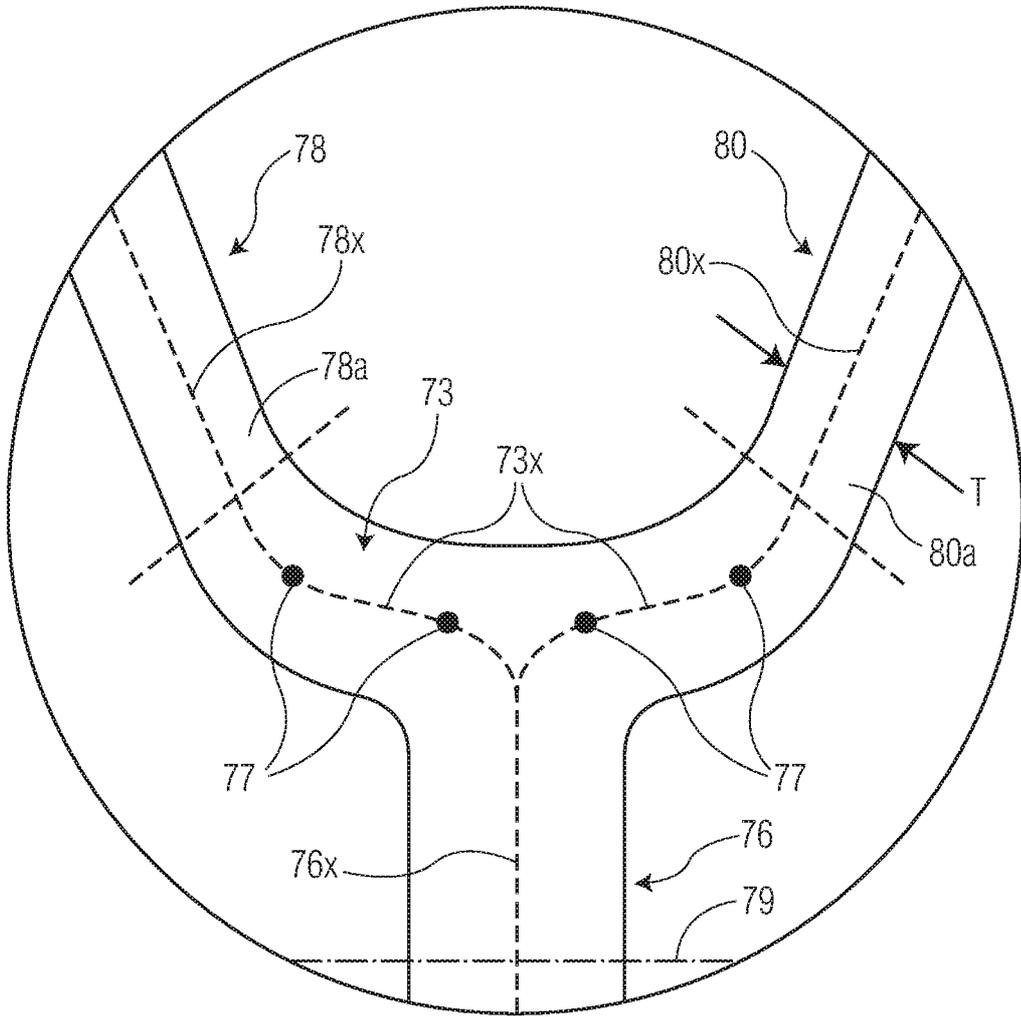


FIG. 3A



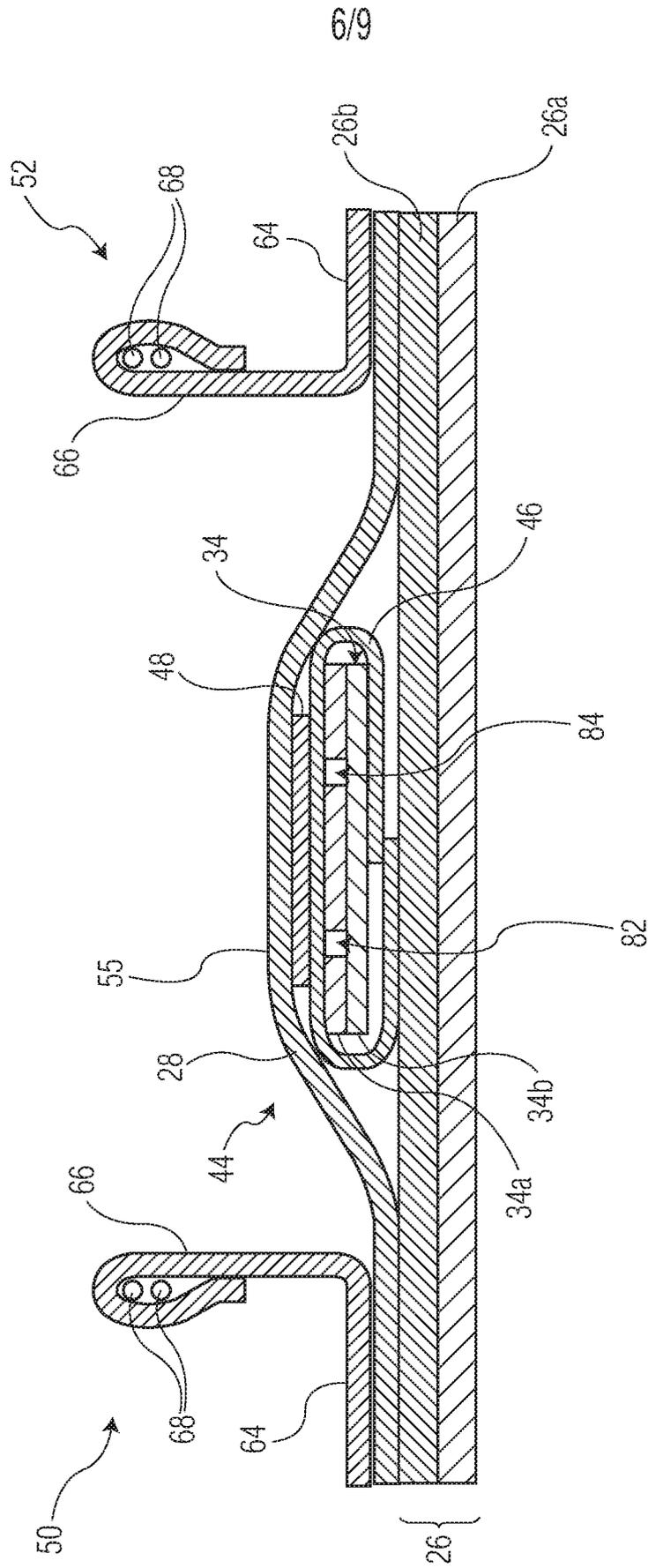


FIG. 4A

7/9

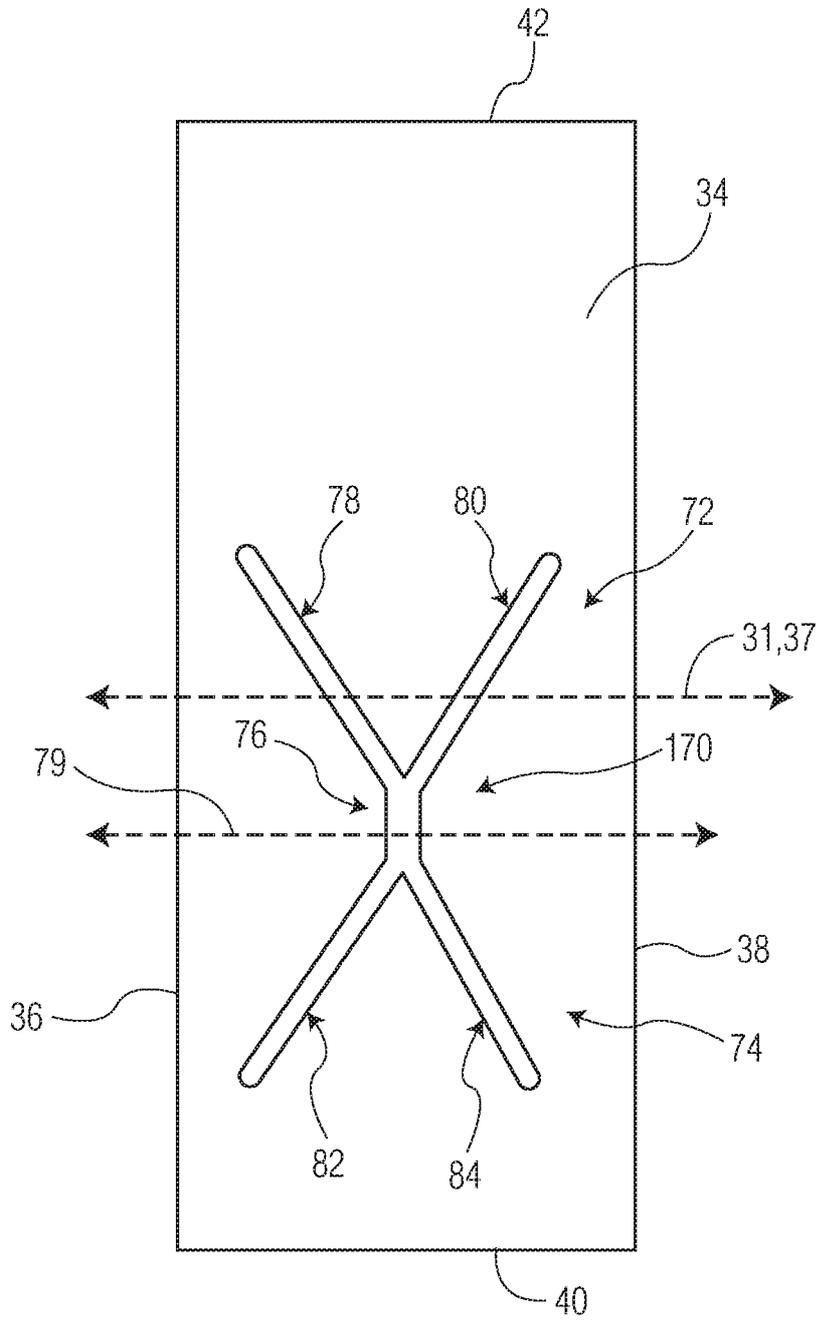


FIG. 5

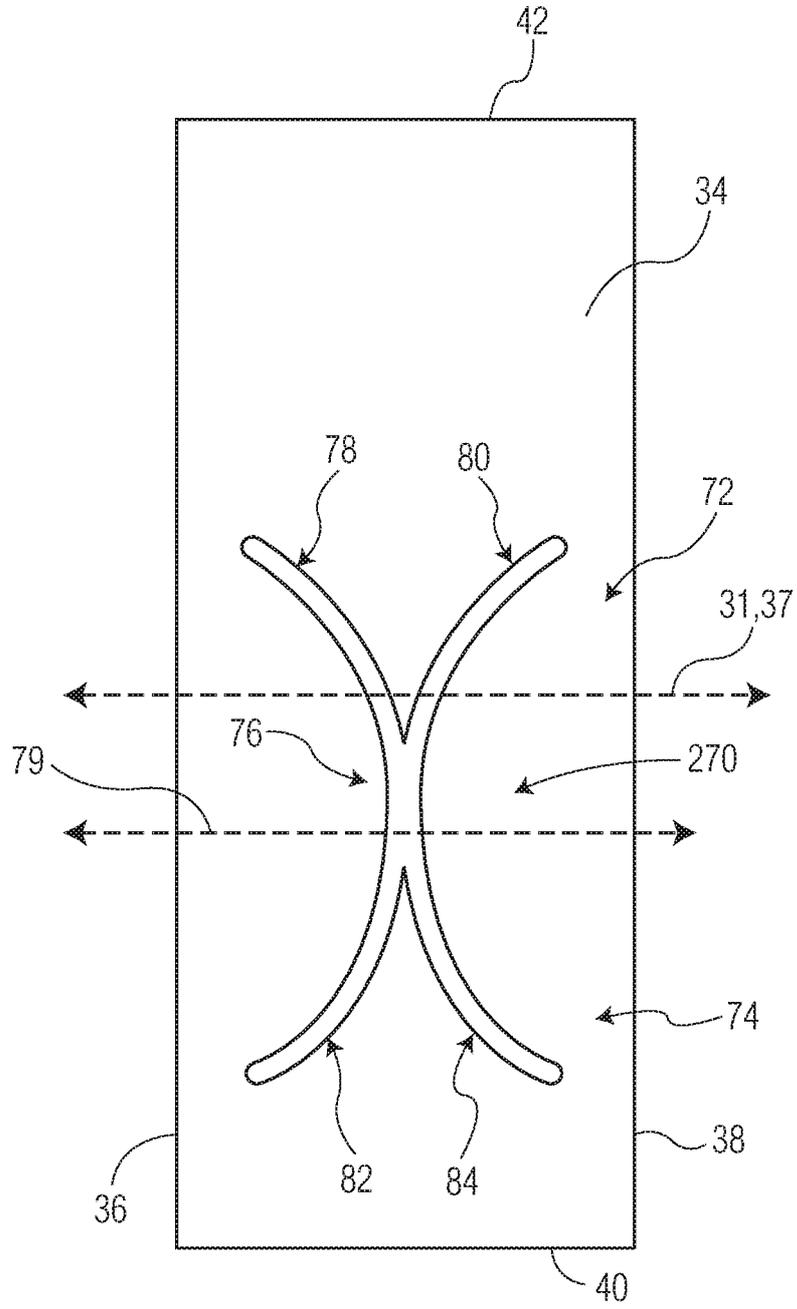


FIG. 6

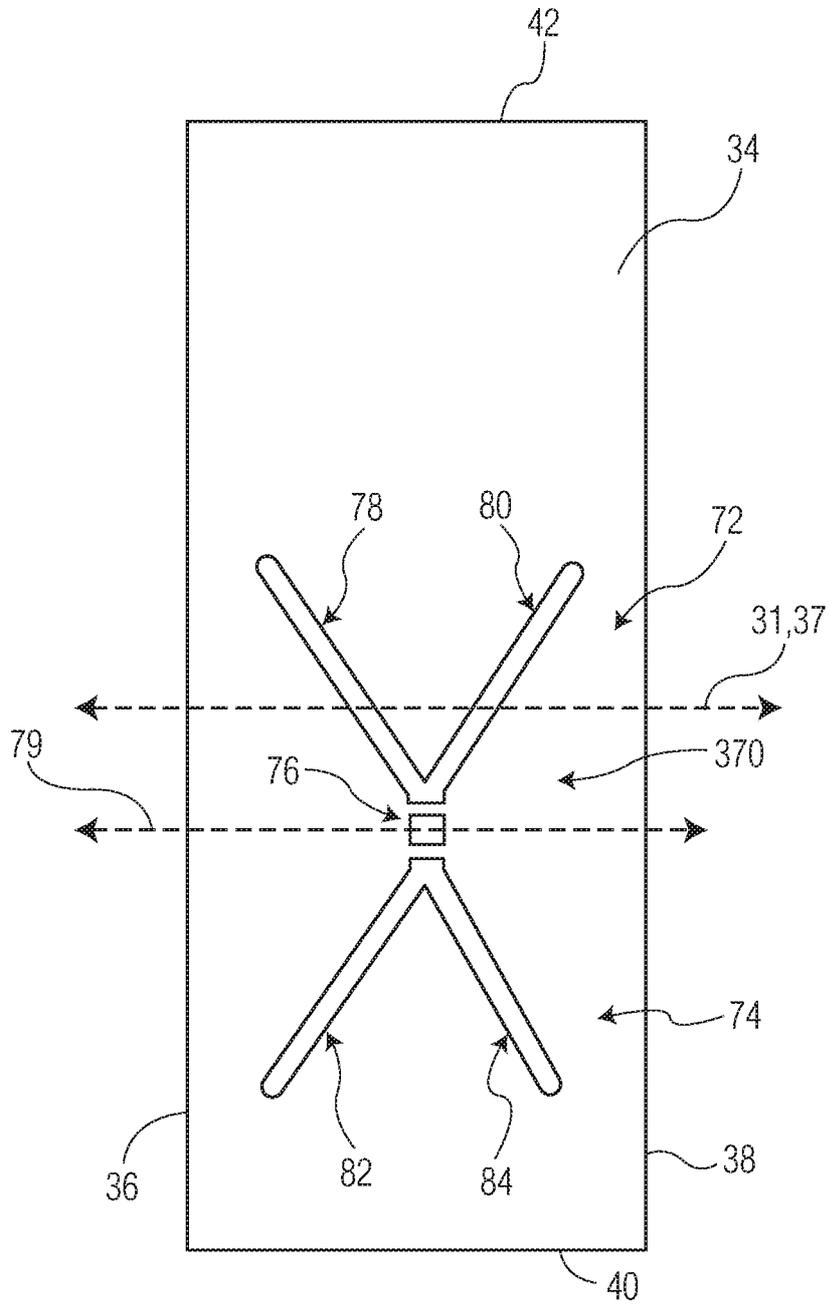


FIG. 7

**A. CLASSIFICATION OF SUBJECT MATTER****A61F 13/537(2006.01)i, A61F 13/496(2006.01)i, A61F 13/49(2006.01)i**

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

**B. FIELDS SEARCHED**Minimum documentation searched (classification system followed by classification symbols)  
A61F 13/537; A61F 13/15; A61F 13/20; A61F 13/49; A61F 13/496Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
Korean utility models and applications for utility models  
Japanese utility models and applications for utility modelsElectronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
eKOMPASS(KIPO internal) & Keywords: absorbent article, absorbent body, reduced absorbent section, x-shape, graphic**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2005-0143703 A1 (PERSSON, C.) 30 June 2005 See paragraphs [0019]-[0051]; figures 1-4.	1-20
A	US 2004-0030313 A1 (WATANABE, M. et al.) 12 February 2004 See the whole document.	1-20
A	US 2016-0317364 A1 (KIMBERLY-CLARK WORLDWIDE, INC.) 03 November 2016 See the whole document.	1-20
A	US 6680421 B1 (RAVO, B.) 20 January 2004 See the whole document.	1-20
A	US 2006-0058766 A1 (MUELLER, J. et al.) 16 March 2006 See the whole document.	1-20

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

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

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

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

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

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

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

"&amp;" document member of the same patent family

Date of the actual completion of the international search

03 December 2018 (03.12.2018)

Date of mailing of the international search report

**02 January 2019 (02.01.2019)**

Name and mailing address of the ISA/KR

International Application Division  
Korean Intellectual Property Office  
189 Cheongsa-ro, Seo-gu, Daejeon, 35208, Republic of Korea

Facsimile No. +82-42-481-8578

Authorized officer

HAN, Inho

Telephone No. +82-42-481-3362



**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No.

**PCT/US2018/016126**

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2005-0143703 A1	30/06/2005	US 7780643 B2	24/08/2010
US 2004-0030313 A1	12/02/2004	CN 1473554 A	11/02/2004
		EP 1388334 A1	11/02/2004
		EP 1388334 B1	16/03/2005
		JP 2004-065848 A	04/03/2004
		JP 3878085 B2	07/02/2007
		KR 10-0877382 B1	07/01/2009
		KR 10-2004-0014240 A	14/02/2004
		US 7015370 B2	21/03/2006
US 2016-0317364 A1	03/11/2016	CN 107072843 A	18/08/2017
		US 9675499 B2	13/06/2017
		WO 2016-085462 A1	02/06/2016
US 6680421 B1	20/01/2004	None	
US 2006-0058766 A1	16/03/2006	CA 2580369 A1	23/03/2006
		CN 101010053 A	01/08/2007
		CN 101010053 B	18/07/2012
		EP 1788998 A1	30/05/2007
		JP 2008-512203 A	24/04/2008
		JP 4647661 B2	09/03/2011
		KR 10-0865953 B1	30/10/2008
		KR 10-2007-0041783 A	19/04/2007
		US 8016803 B2	13/09/2011
		WO 2006-031639 A1	23/03/2006