Title: AN ABSORBENT ARTICLE HAVING AN EXTENDED LANDING ZONE

Abstract: Apparatus and methods of manufacturing absorbent articles suitable for use as disposable diapers or other hygiene products are provided. The absorbent article includes a substantially rectangular chassis having a front section, a rear section, and a crotch section extending between the front section and the rear section. The front section is configured to be positioned against a front of a wearer, and the rear section is configured to be positioned against a back of the wearer. A substrate is coupled to the front section of the chassis and provides a landing zone. The substrate has opposing side edges that extend beyond side edges of the front section so a portion of the substrate is positioned against sides of the wearer. A pair of fastening tabs is coupled to the rear section of the chassis and each fastening tab has a fastener that releasably engages the landing zone of the substrate.
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AN ABSORBENT ARTICLE HAVING AN EXTENDED LANDING ZONE

FIELD OF THE INVENTION

The present invention relates to absorbent articles such as diapers, training pants, and the like. More specifically, the invention relates to absorbent articles having an extended landing zone to provide extra side coverage and improved fit.

BACKGROUND OF THE INVENTION

Absorbent articles such as disposable diapers, training pants, and the like are known for their major function of absorbing and containing body exudates. Such articles are thus intended to prevent the soiling, wetting, or other contamination of clothing or other articles, such as bedding, that come in contact with the wearer.

Manufacturing such absorbent articles can be costly and can require complex machinery. While many developments have been made in the art of absorbent articles, further improvements in terms of at least one of improved fit, comfort, producibility, and visual appearance are needed.
SUMMARY OF THE INVENTION

In one aspect, the invention provides an absorbent article that includes a substantially rectangular chassis having a front section, a rear section, and a crotch section extending between the front section and the rear section. The front section is configured to be positioned against the front of a wearer, and the rear section is configured to be positioned against the back of the wearer. The absorbent article also includes a substrate coupled to the front section of the chassis. The substrate provides a landing zone and has a longitudinally extending surface terminating at opposing side edges each extending beyond side edges of the front section so at least a portion of the substrate is configured to be positioned against sides of the wearer. A pair of fastening tabs is coupled to the rear section of the chassis and the pair of fastening tabs each has a fastener configured to releaseably engage the landing zone of the substrate.

In another aspect of the invention, the invention further provides an absorbent article that includes a chassis having a front section, a rear section, and a crotch section extending between the front section and the rear section. The front section is configured to be positioned against the front of a wearer, and the rear section is configured to be positioned against the back of the wearer. The absorbent article also includes a substrate that is coupled to the front section of the chassis. The substrate provides a landing zone and has a longitudinally extending surface terminating at opposing side edges that each extend beyond side edges of the front section. At least a portion of the substrate is
configured to be positioned against sides of the wearer in a direction that forms an obtuse angle with respect to the side edges of the front section. A pair of fastening tabs is also coupled to the rear section of the chassis. The pair of fastening tabs each has a fastener configured to releaseably engage the landing zone of the substrate.

In yet another aspect of the invention, the invention provides a method of manufacturing an absorbent article. The method includes attaching a substrate having a landing zone to a front section of a chassis so that opposing side edges of the substrate extend beyond side edges of the front section of the chassis. Fastening tabs are then attached to a rear section of the chassis so that fasteners on the fastening tabs are positioned to releasably engage the landing zone of the substrate.

**BRIEF DESCRIPTION OF THE DRAWINGS**

The invention is best understood from the following detailed description when read in connection with the accompanying drawings, with like elements having the same reference numerals. This emphasizes that according to common practice, the various features of the drawings are not drawn to scale. On the contrary, the dimensions of the various features are arbitrarily expanded or reduced for clarity. Included in the drawings are the following figures:

FIG. 1 is a plain view of an absorbent article according to an embodiment of the invention;
FIG. 2 is a plain view of an absorbent article according to a second embodiment of the invention;

FIG. 3A is a plain view of a landing zone of the absorbent article shown in FIG. 1 according to an embodiment of the invention; and

FIG. 3B is a plain view of a landing zone according to another embodiment of the invention.

DETAILED DESCRIPTION OF THE INVENTION

The invention will next be described with reference to the figures. Such figures are intended to be illustrative rather than limiting and are included herewith to facilitate the explanation of exemplary features of embodiments of the present invention. The figures are not to scale, and are not intended to serve as engineering drawings.

Referring generally to the drawings (FIGs. 1-3B), in accordance with an exemplary embodiment, the invention provides an absorbent article 100, 200 having a chassis that includes a front section 110, 210, a rear section 120, 220, and a crotch section 130, 230 extending between the front section 110, 210 and rear section 120, 220. Front section 110, 210 is configured to be positioned against the front of a wearer, and rear section 120, 220 is configured to be positioned against the back of the wearer. Absorbent article 100, 200 also includes a substrate 155, 255, 355, 455 coupled with the front section 110, 210 of the chassis. Substrate 155, 255, 355, 455 has opposing side edges 3a, 3b that extend beyond side edges 2a, 2b of the front section 110, 210 so at least a portion
of the substrate 155, 255, 355, 455 is configured to be positioned against the sides of the wearer. A pair of fastening tabs 140, 240 is coupled to the rear section 120, 220 and each fastening tab 140, 240 has a fastener 150, 250 configured to releaseably engage a landing zone 358, 458a, 458b provided on the substrate 155, 255, 355, 455.

In another embodiment, a method of manufacturing an absorbent article 100, 200 is provided. The method includes attaching a substrate 155, 255, 355, 455 having a landing zone 358, 458a, 458b to a front section 110, 210 of a chassis so that opposing side edges 3a, 3b of the substrate 155, 255, 355, 455 extend beyond side edges 2a, 2b of the front section 110, 210 of the chassis. Fastening tabs 140, 240 are then attached to a rear section 120, 220 of the chassis so that fasteners 150, 250 on the fastening tabs 140, 240 are positioned to releaseably engage the landing zone 358, 458a, 458b of the substrate 155, 255, 355, 455.

Referring now to the drawings in detail, FIG. 1 depicts a plain view of an absorbent article 100 according to an exemplary embodiment of the present invention. Absorbent article 100 is designed to contact the wearer along the waist and crotch areas and includes a substantially rectangular chassis having a front section 110, a rear section 120, and crotch section 130. Front section 110 is configured to be positioned against the anterior or front end of a wearer, and rear section 120 is configured to be positioned on the posterior or back end of a wearer. When worn by an individual standing upright, crotch section 130 forms a lowest point on absorbent article 100 when the front section 110 and rear section 120 are positioned at the front and back of the individual, respectively. Although absorbent article 100 is illustrated in FIG. 1 as having a
substantially rectangular chassis, according to other embodiments, absorbent article 100
may have a variety of shapes and sizes. For example, absorbent article 100 may have a
substantially hour-glass shape with leg cutouts.

Absorbent article 100 includes a pair of fastening tabs 140 coupled to rear section
120. Fastening tabs 140 may be made of an elastic material so that when absorbent
article 100 is worn, the fastening tabs 140 may be stretched and attached to the front
section 110 to secure absorbent article 100 on the wearer. In an exemplary embodiment,
each tab 140 may be optionally formed from a substantially non-elastic material and may
include a portion that is rendered elastic. For instance, an elastic portion can be provided
by elasticizing an otherwise non-elastic portion of the tabs 140. This is optionally
accomplished by introducing elastic strands or filaments into or adjacent a non-elastic
material.

Fastening tabs 140 are optionally selected from a variety of textile-like films and
fabrics. Suitable fabrics include non-woven materials that are impervious to liquid, soft
and pliable. Exemplary non-woven materials include spun-bonded polypropylene,
spunbonded polyethylene, and thermally bonded webs of staple fibers, preferably
sheath/core bi-component fibers having a core of polyester or polypropylene and a sheath
of polyethylene.

As depicted in FIG. 1, each fastening tab 140 also includes a fastener 150.

Fastener 150 may be any known releasable fastener, including adhesives, co-adhesives,
tapes, buttons, and other fastening mechanisms used in the art with the complementary
fastener 150 being a receptive area (e.g., a landing zone) on substrate 155 which is
coupled to the front section 110 of absorbent article 100. It has been discovered that a fastener 150 which provides material properties such as compression modulus and stiffness within certain ranges are particularly suitable for making absorbent articles with a high level of comfort for the wearer, as well as ease of donning and doffing the product without tearing of the garment or, instead, inadvertent disengagement of the fasteners 150.

According to an embodiment, fasteners 150 may include hooks that are configured to releaseably couple to a substrate 155 having a loop-type landing zone. Alternatively, fasteners 150 may include a loop material that engages the substrate 155 that has hooks. Substrate 155 generally has a width W that is greater than the width of the chassis so that portions of substrate 155 extend beyond edges 2a, 2b of the front section 110. Thus, when a wearer wears absorbent article 100, the portions of substrate 155 that extend beyond edges 2a, 2b of the chassis may be positioned over the hips of the wearer and function as a barrier layer to provide side wetness protection. In such an embodiment, the surface of substrate 155 that contacts the wearer's skin may be liquid impermeable and the surface of substrate 155 that faces away from the wearer's skin contains the loop material to engage fasteners 150.

According to an embodiment, the substrate 155 may have a heavier basis weight compared to traditional diaper chassis (40 gsm or less) so the substrate 155 will be more durable and tear resistant. For example, substrate 155 may have a basis weight of 50 gsm or greater. Other basis weights may be used so long as substrate 155 is substantially tear resistant.
As seen with respect to the embodiment of the absorbent article 100 shown in FIG. 1, absorbent article 100 also includes an absorbent core 160. Absorbent core 160 may be of any shape, but is typically a rectangular member that is centered in the chassis and positioned in crotch section 130. Absorbent core 160 is interposed between a liquid permeable topsheet and a liquid impermeable substrate layer (not shown). In use, the topsheet is arranged to face toward the body of the user (i.e. against the skin of the wearer) and the substrate layer is arranged facing away from the skin of the wearer.

Absorbent core 160 is configured to receive liquid through the topsheet so that liquid is trapped between the topsheet and liquid impermeable substrate layer to prevent soiling of the wearer's clothes.

In order to enable liquid to quickly and efficiently pass through the topsheet and into the absorbent core 160 for trapping therein, the topsheet is preferably liquid permeable. In particular, the topsheet may be selected from a variety of textile-like films and fabrics. Suitable fabrics include non-woven materials that are pervious to liquid, soft and pliable. Preferred non-woven materials include spun-bonded polypropylene, spunbonded polyethylene, and thermally bonded webs of staple fibers, preferably polypropylene shape or sheath/core bi-component fibers having a core of polyester or polypropylene and a sheath of polyethylene.

Absorbent core 160 may be made of any suitable absorbent material, as well as combinations of different types of absorbent materials. For example, the absorbent core 160 may be formed of a mixture of pulp fluff and superabsorbent polymer (SAP) wrapped in a liquid permeable tissue wrap (not shown). Examples of SAP include
polyacrylamides, polyvinyl alcohol, polyacrylates, various grafted starches, and the like. A desired super absorbent material is a cross-linked polysodium acrylate, which can be purchased from BASF Corporation of Portsmouth, VA, under the trademark ASAP® 2260. The super absorbent materials can be in various geometric forms, such as various shaped particles, fibers, foams, and layers. The fluff and SAP are present, for example, in a ratio such as about 11 grams of SAP to 16 grams of fluff for a size 4 diaper, and have a core density, for example, in a range such as about 0.14 to 0.22 grams per cubic centimeter. The amount of each absorbent material and SAP/fluff ratio depends on factors including the size of the article, e.g., "Small", "Medium", "Large" or "Extra Large."

Absorbent core 160 may be of any shape and may be a single, integral absorbent structure, or can comprise a plurality of individual separate absorbent structures and/or absorbent materials that are operably assembled together. It may also include an air-laid non-woven web that contains super-absorbent particles and/or super-absorbent fibers, polymeric binder and cellulose pulp fibers.

Referring now to FIG. 2, an absorbent article 200 according to yet another embodiment is illustrated. Absorbent article 200 includes a substrate 255 that is coupled to front section 210 and has opposing side edges 3a, 3b that extend beyond side edges 2a, 2b of front section 210. Portions of the substrate 255 that extend beyond side edges 2a, 2b of front section 210 are angled with respect to the side edge 2a, 2b of the chassis. For example, upper edges 4a and lower edges 4b of substrate 255 are angled to conform
to the hip contours of the wearer when absorbent article 200 is worn, thereby providing added comfort when positioned against the sides of the wearer.

According to an embodiment, a pair of fastening tabs 240 are positioned at an angle \( \theta \) that corresponds to the angle \( \alpha \) of the upper edge 4a or lower edge 4b of the substrate 255 so that the fasteners 250 are appropriately angled to engage portions of the substrate 255 that extend beyond side edges 2a, 2b of the front section 210. Thus, the angle \( \alpha \) of the upper edge 4a or lower edge 4b of landing zone 255 and the angle \( \theta \) of fastening tabs 240 provide improved fit when absorbent article 200 is worn.

According to another embodiment, the angle \( \theta \) of the fastening tabs 240 and/or angle \( \alpha \) of substrate 255 may be obtuse thereby preventing sag when the absorbent article 200 is worn. For example, the angle \( \theta \) of fastening tabs 240 and angle \( \alpha \) of the substrate 255 may be greater than 90°. In other embodiments, the angle \( \theta \) of fastening tabs 240 and angle \( \alpha \) of substrate 255 may be different from each other. It is contemplated that as the angle \( \theta \) of the fastening tabs 240 and angle \( \alpha \) of the substrate 255 decreases, absorbent article 200 is less prone to sag. Accordingly, a substrate 255 having portions that extend beyond side edges 2a, 2b of the chassis that are positioned at an angle with respect to the side edges 2a, 2b increases the ease of wearing the absorbent article 200 and ultimately works as a system to create better fit on a wearer.

According to an embodiment, substrate 255 is coupled to the front section 210 of the absorbent article 200 such that edges 3a, 3b of the substrate 255 extend beyond the side edges 2a, 2b of the chassis. The substrate 255 is generally positioned in a horizontal direction (e.g., longitudinal direction) such as the machine direction MD so that a
substantial portion of the substrate 255 is coupled to the front section 210 or rear section 220 of the chassis. Fastening tabs 250 may be coupled to the absorbent article 200 at a location opposite of the substrate 255 in a vertical direction such as in the cross-direction CD transverse to the machine direction MD. According to an exemplary embodiment, fastening tabs 250 and substrate 255 may be attached to absorbent article 200 using conventional manufacturing techniques such as heat bonding, ultrasonic bonding, gluing, or pressure bonding. Other bonding or fastening methods may also be used.

Referring now to FIG. 3A, a perspective view of a substrate 355 that may be used with absorbent article 100, 200 (FIGs. 1 and 2) is illustrated. According to an embodiment, substrate 355 can be made by laminating different types of materials together so the substrate 355 provides a landing zone 358 to engage fasteners 150, 250 (FIGs. 1 and 2). The landing zone 358 may include loop or hook material and the outer portions 352a, 352b of the substrate 355 may be loopless or hookless. For example, the loop material of the landing zone 358 can be extruded on top of a base substrate 355 made of non-woven based materials, thereby providing loop material over the entire area of the substrate 355 or in predetermined areas of the substrate 355. Exemplary non-woven materials for the substrate 355 can include spun-bonded polypropylene, spunbonded polyethylene, and thermally bonded webs of staple fibers, preferably sheath/core bi-component fibers having a core of polyester or polypropylene and a sheath of polyethylene. It is contemplated that other materials can also be used.

According to an embodiment, landing zone 358 which is provided on substrate 355 may have a continuous length, as defined by edges 5a, 5b, that is equal to or less than
width the chassis. Alternatively, edges 5a, 5b of the landing zone 358 may extend beyond side edges 2a, 2b (FIGs. 1 and 2) of the chassis. The substrate 355 may be liquid impermeable so the substrate 355 can function as a barrier layer against liquid. Alternatively, the substrate 355 may be breathable and allow the passage of air and/or vapor through the outer portions 352a, 352b of the substrate 355. According to an embodiment, outer sections 352a, 352b of the substrate 355 may extend beyond edges 2a, 2b (FIGs. 1 and 2) of the front section 110, 210 of the absorbent article 200 chassis thereby providing added comfort and protect the sides of a wearer against wetness. Additionally, an absorbent article 100, 200 having an extended substrate 355 simplifies manufacturing complexity and decreases production costs.

According to yet another embodiment, the entire surface of substrate 355 may be printed with indicia prior to extrusion of loop or hook material onto the substrate 355. Indicia can also be printed in specific areas of the substrate 355 such as the area defined by the landing zone 358 or outer portions 352a, 352b of the substrate 355, for example, to identify regions of the substrate 355 for that are used for particular purposes. For example, indicia that is printed within the landing zone 358 region of the substrate 355 can indicate the function and location of loop material to be used for engaging the fasteners 250 (FIG. 2) when the absorbent article 200 is worn by a wearer. Similarly, areas of substrate 355 that do not have indicia may indicate the sections of the substrate 355 that function as the liquid impermeable barrier layer.

Referring now to FIGs. 1, 2, and 3B, a substrate 455 of absorbent article 100, 200 according to yet another embodiment is illustrated. Substrate 455 may have multiple
sections that alternate between loops 458a, 458b and non-loop material 452a, 452b, 452c.

As described above, the loop material may be attached to the base substrate 455 by an extrusion process. It is contemplated that other manufacturing techniques for providing loop material or hook material of the landing zone 458a, 458b onto substrate 455 may also be used. For example, loop material of landing zone 458a, 458b can be attached to the substrate 455 by heat bonding, ultrasonic bonding, gluing, or pressure bonding. As described above, indicia may also be printed in alternating patterns on the substrate 455 prior to attaching the loop or hook material onto the substrate 455, thereby indicating functional regions of the substrate 455 that are used to couple to fasteners 150, 250 (FIGs. 1 and 2). Thus, indicia in conjunction with the extended substrate 455 of the absorbent article 100, 200 increases the ease of use and ultimately works as a system to create better fit and prevent sag on a wearer.

Although the present invention has been particularly described in conjunction with specific embodiments, it is evident that many alternatives, modifications, and variations will be apparent to those skilled in the art. It is therefore contemplated that the appended claims will embrace any such alternatives, modifications, and variations as falling within the true scope and spirit of the present invention.
What is Claimed:

1. An absorbent article comprising:

   a substantially rectangular chassis having a front section, a rear section, and a crotch section extending between the front section and the rear section, the front section being configured to be positioned against a front of a wearer, and the rear section being configured to be positioned against a back of the wearer;

   a substrate coupled to the front section of the chassis, the substrate having a longitudinally extending surface terminating at opposing side edges each extending beyond side edges of the front section so at least a portion of the substrate is configured to be positioned against sides of the wearer, the substrate providing a landing zone; and

   a pair of fastening tabs coupled to the rear section of the chassis, the pair of fastening tabs each having a fastener configured to releaseably engage the landing zone of the substrate.

2. The absorbent article of claim 1, wherein the landing zone comprises a loop material and the fastener comprises hooks positioned to engage the loop material.

3. The absorbent article of claim 2, wherein the substrate has a basis weight greater than 50 gsm.

4. The absorbent article of claim 2, wherein the substrate comprises plural landing zone sections defined by alternating sections of the loop material and a loopless material.
5. The absorbent article of claim 4, wherein portions of the substrate that extend beyond side edges of the front section comprise the loopless material.

6. The absorbent article of claim 4, wherein the loopless material comprises a nonwoven material.

7. The absorbent article of claim 1, wherein portions of the substrate that extend beyond side edges of the front section are substantially straight.

8. The absorbent article of claim 1, further comprising an absorbent core coupled to the crotch section of the chassis.

9. An absorbent article comprising:

   a chassis having a front section, a rear section, and a crotch section extending between the front section and the rear section, the front section being configured to be positioned against a front of a wearer, and the rear section being configured to be positioned against a back of the wearer;

   a substrate coupled to the front section of the chassis, the substrate having a longitudinally extending surface terminating at opposing side edges each extending beyond side edges of the front section so at least a portion of the substrate is configured to be positioned against sides of the wearer in a direction that forms an obtuse angle with respect to the side edges of the front section, the substrate providing a landing zone; and

   a pair of fastening tabs coupled to the rear section of the chassis, the pair of fastening tabs each having a fastener configured to releaseably engage the landing zone of the substrate.
10. The absorbent article of claim 9, wherein the pair of fastening tabs are coupled to the rear section of the chassis at an obtuse angle with respect to a respective side edge of the rear section of the chassis.

11. The absorbent article of claim 9, wherein the landing zone comprises a loop material and the fastener comprises hooks to engage the loop material.

12. The absorbent article of claim 11, wherein the substrate has a basis weight greater than 50 gsm.

13. The absorbent article of claim 11, wherein the substrate comprises plural landing zone sections defined by alternating sections of the loop material and a loopless material.

14. The absorbent article of claim 13, wherein portions of the substrate that extend beyond side edges of the front section comprises the loopless material.

15. The absorbent article of claim 13, wherein the loopless material comprises a nonwoven material.

16. The absorbent article of claim 9, further comprising an absorbent core coupled to the crotch section.

17. A method of manufacturing an absorbent article comprising the steps of:
attaching a substrate having a landing zone to a front section of a chassis so that opposing side edges of the substrate extend beyond side edges of the front section of the chassis; and

attaching fastening tabs to a rear section of the chassis so that fasteners on the
fastening tabs are positioned to releasably engage the landing zone of the substrate.

18. The method of claim 17, further comprising the step of orienting each portion of the substrate that extends beyond a side edge of the front section in a direction that forms an obtuse angle with respect to the respective side edge of the front section.

19. The method of claim 18, further comprising the step of orienting each of the fastening tabs at an obtuse angle with respect to a respective side edge of the rear section of the chassis prior to attaching the fastening tabs to the rear section of the chassis.