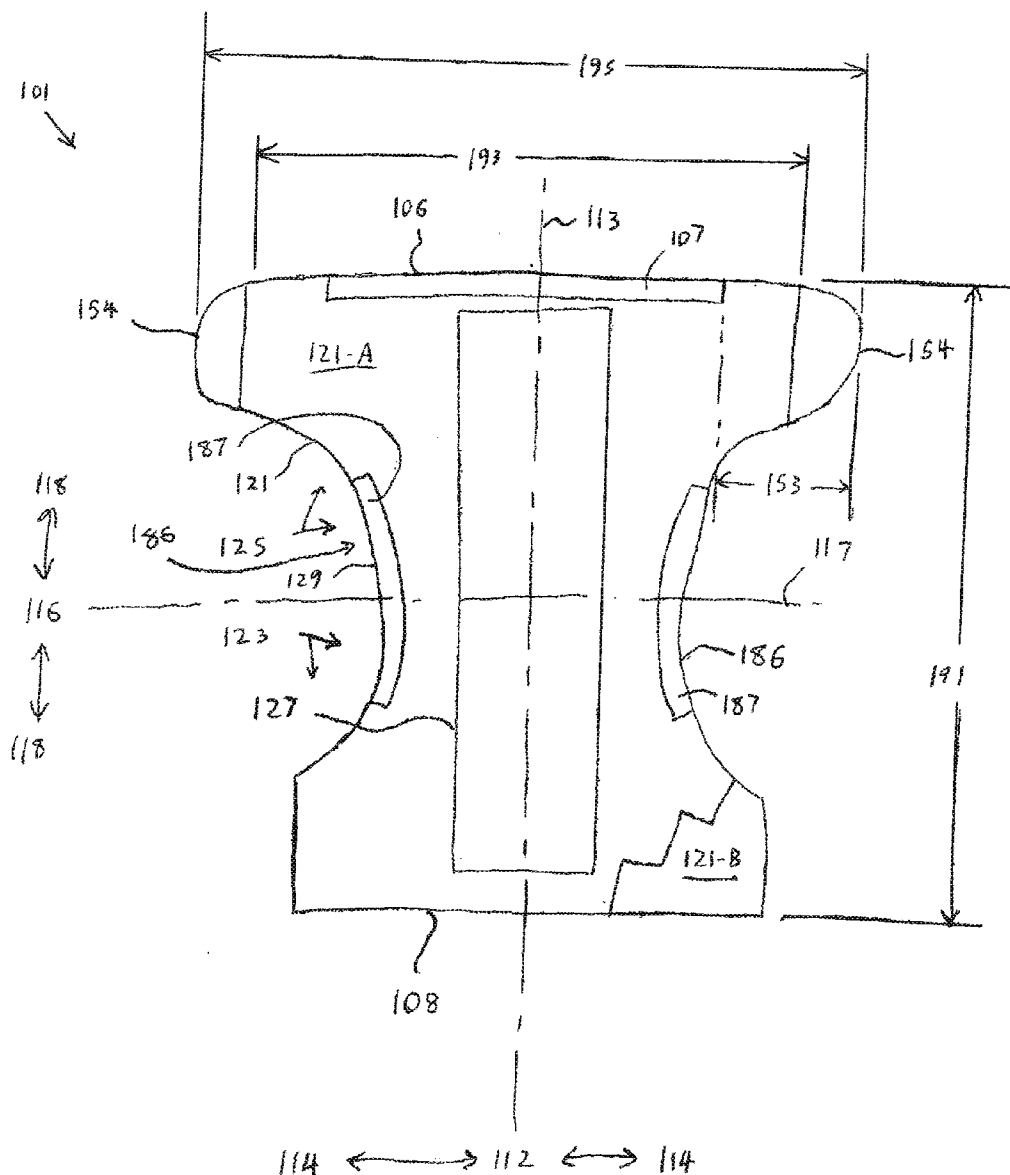




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(19) **United States**(12) **Patent Application Publication**
Roe(10) **Pub. No.: US 2010/0179502 A1**(43) **Pub. Date: Jul. 15, 2010**(54) **REUSABLE WEARABLE ABSORBENT
ARTICLES WITH ANCHORING
SUBSYSTEMS**(22) Filed: **Jan. 14, 2010****Related U.S. Application Data**(76) Inventor: **Donald Carroll Roe**, West Chester,
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Street****CINCINNATI, OH 45202 (US)**(51) **Int. Cl.**
A61F 13/45 (2006.01)(52) **U.S. Cl.** **604/385.15; 604/397**(57) **ABSTRACT**Reusable wearable absorbent articles with anchoring sub-
systems.(21) Appl. No.: **12/687,554**

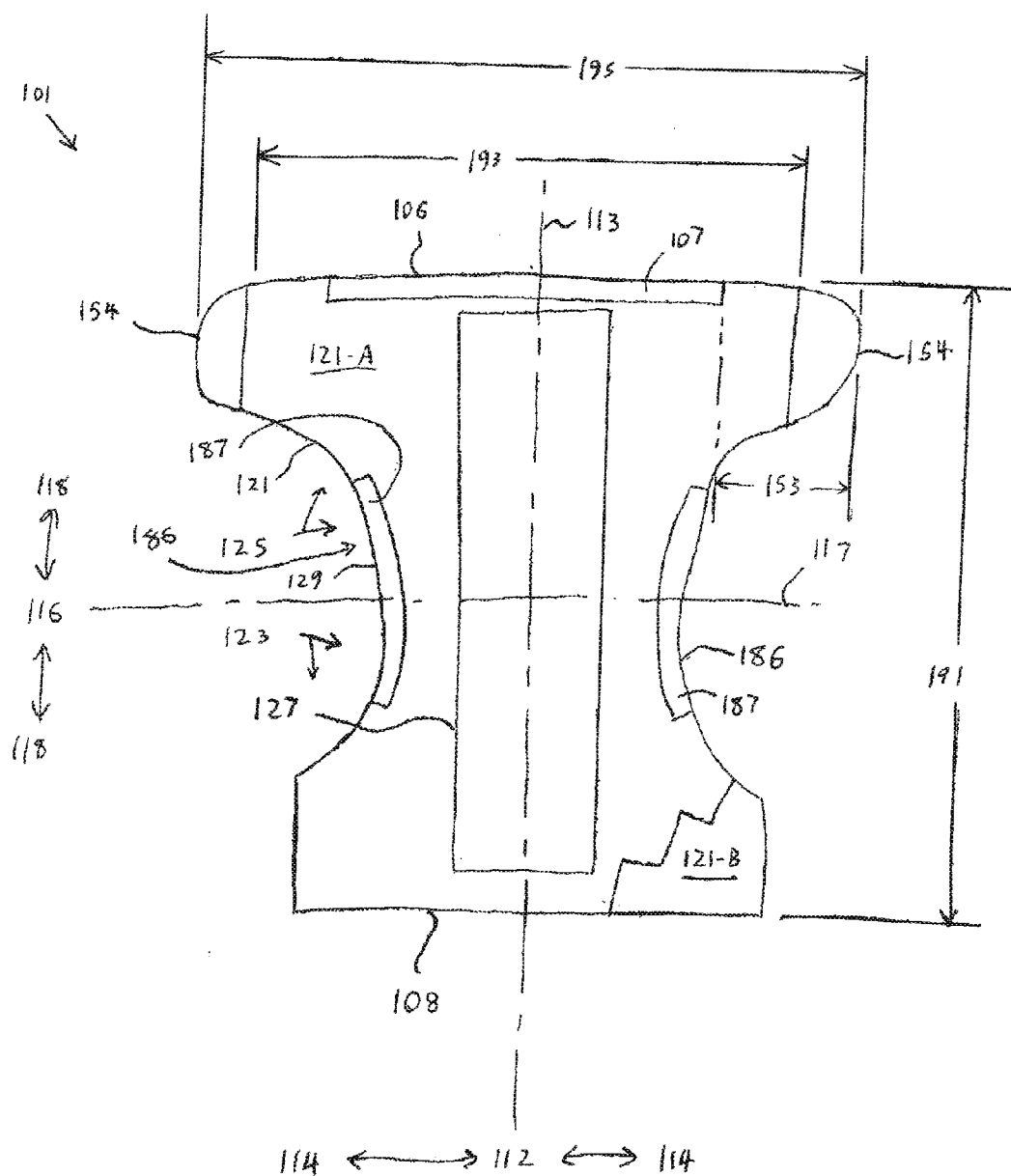


Fig. 1

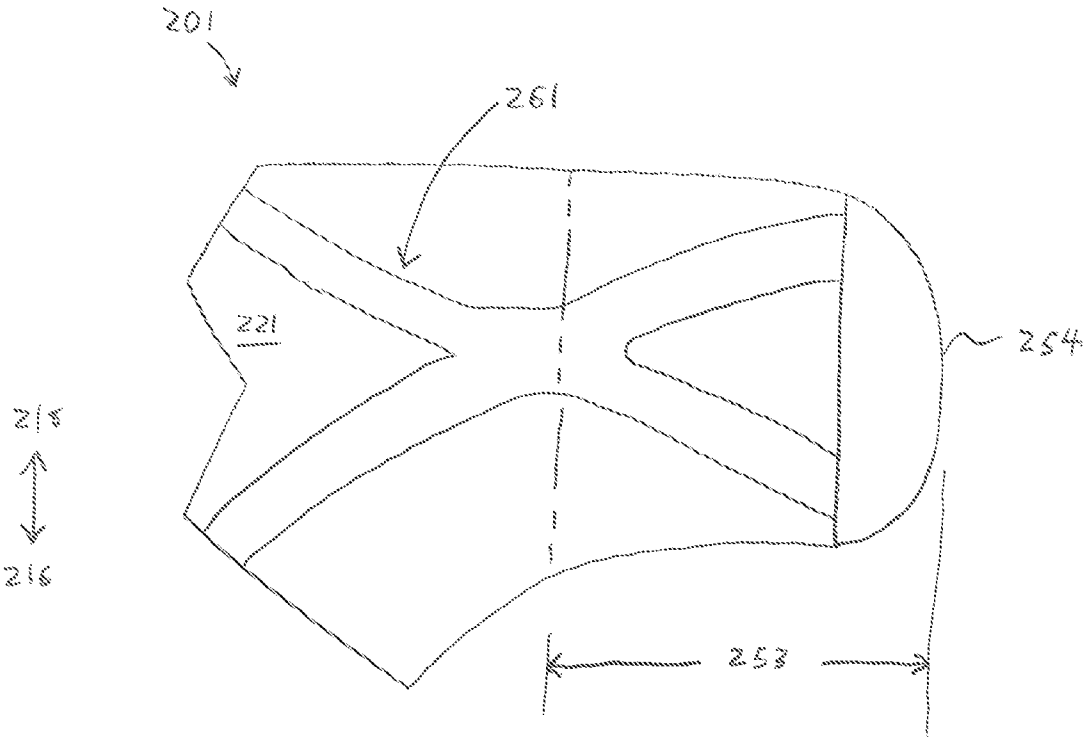


Fig. 2

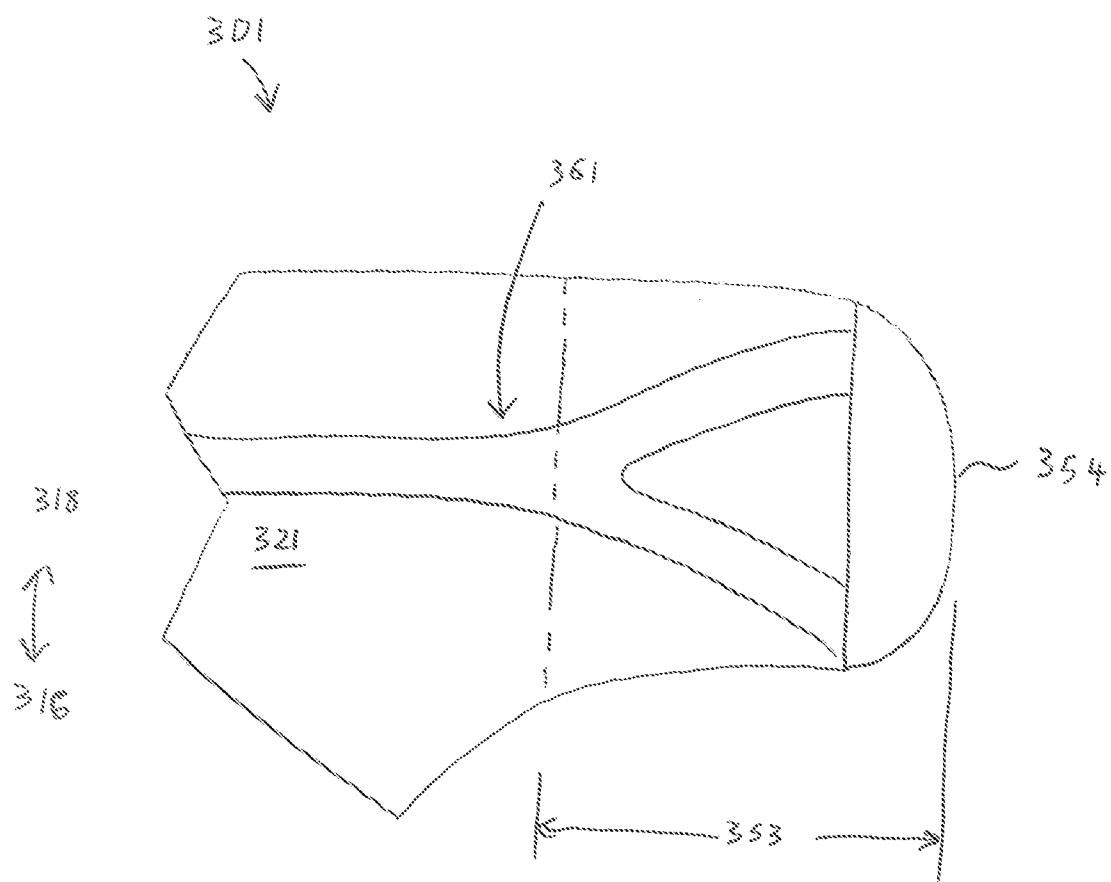
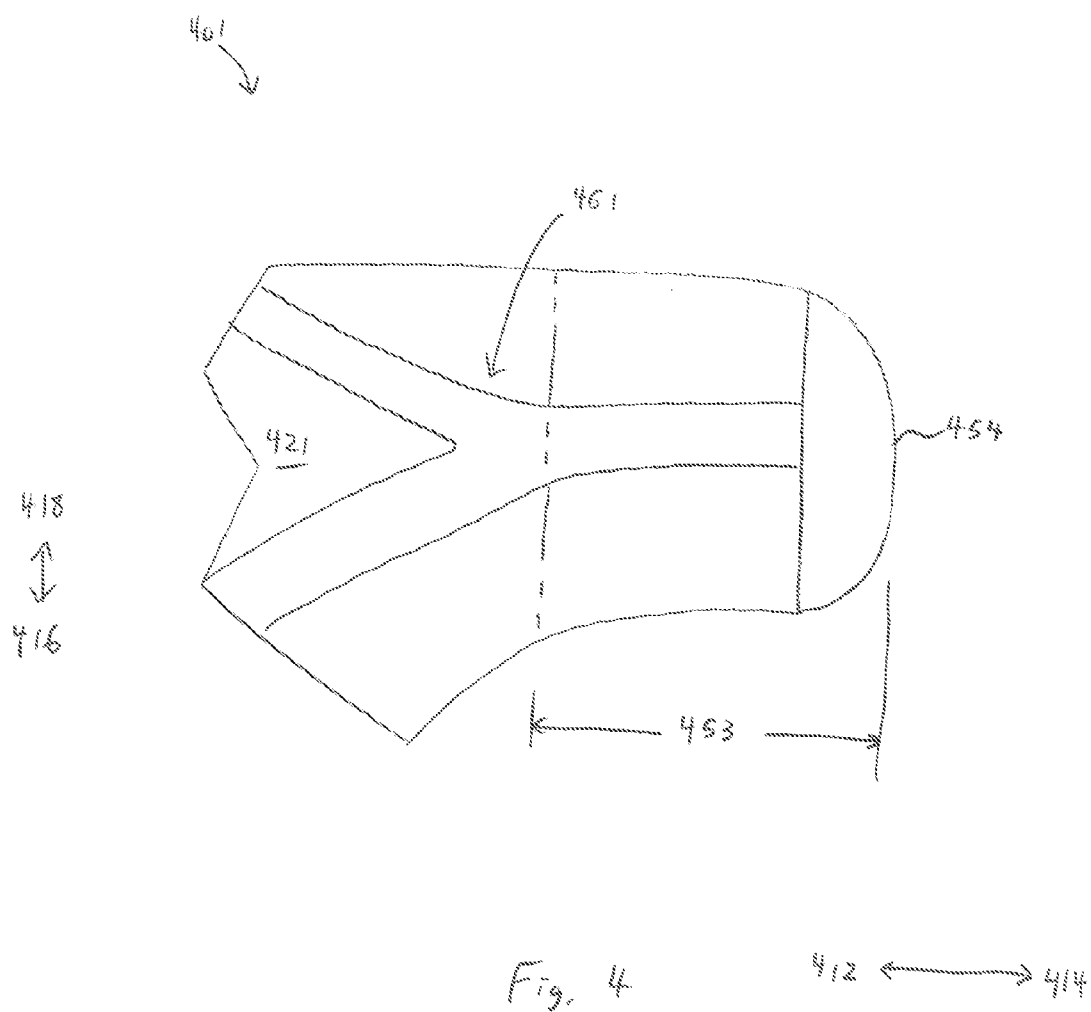


Fig. 3



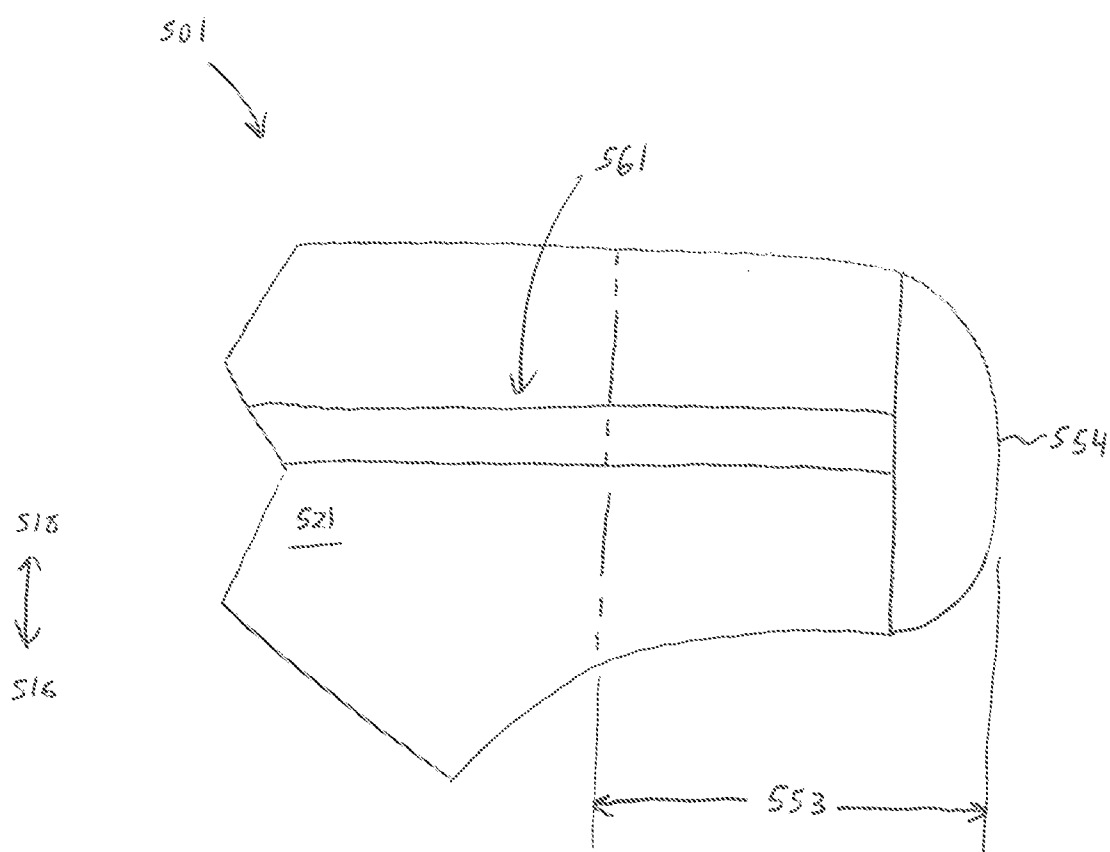
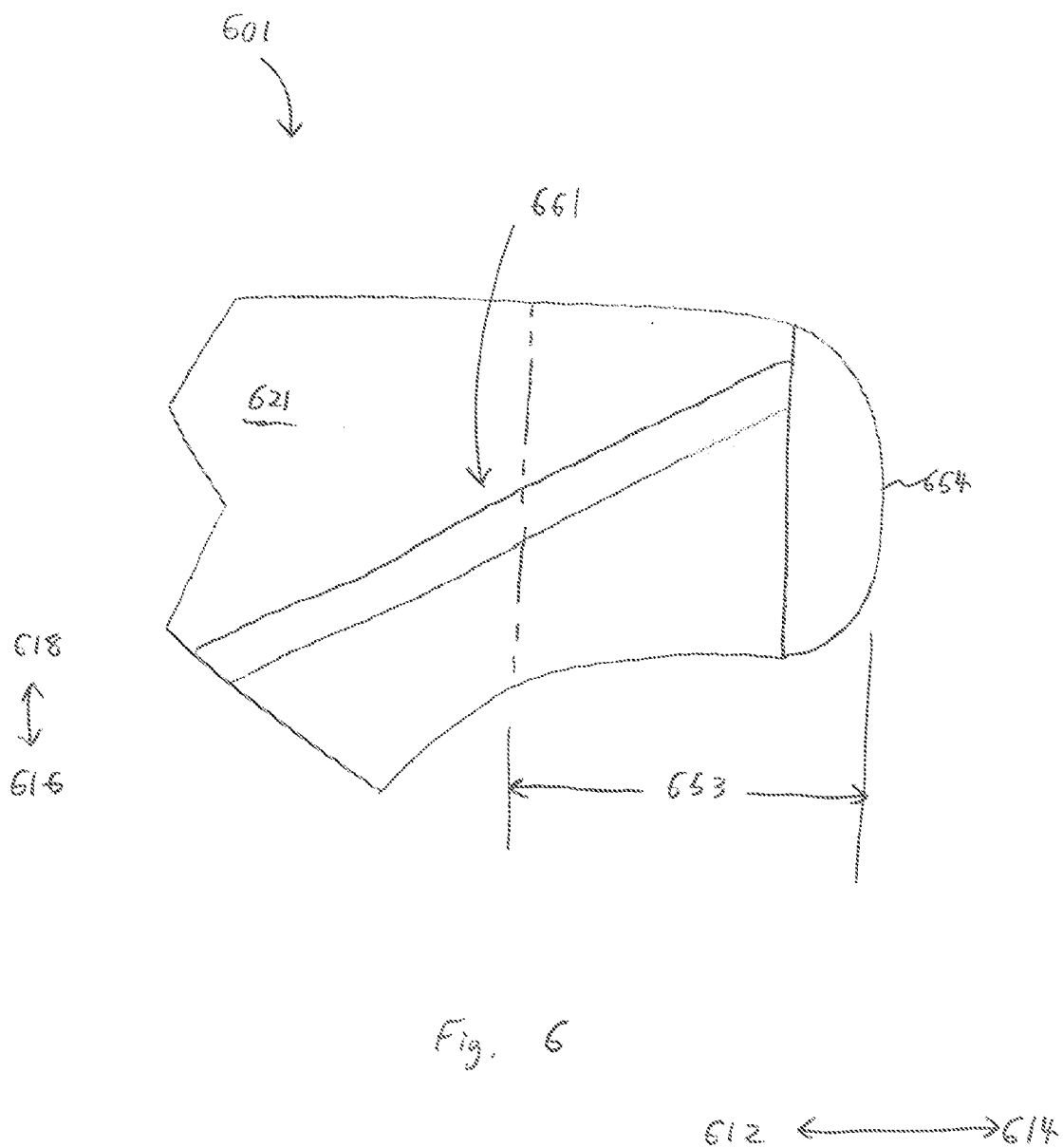
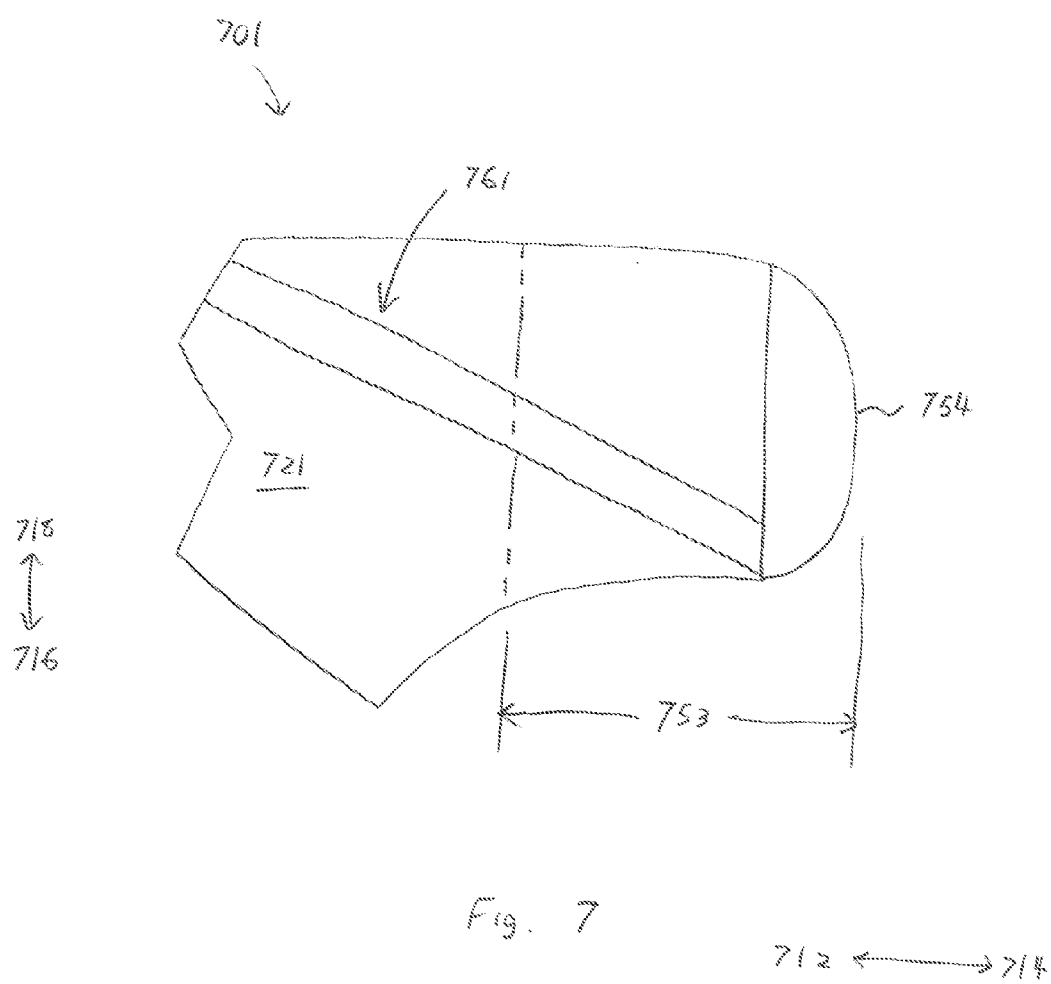
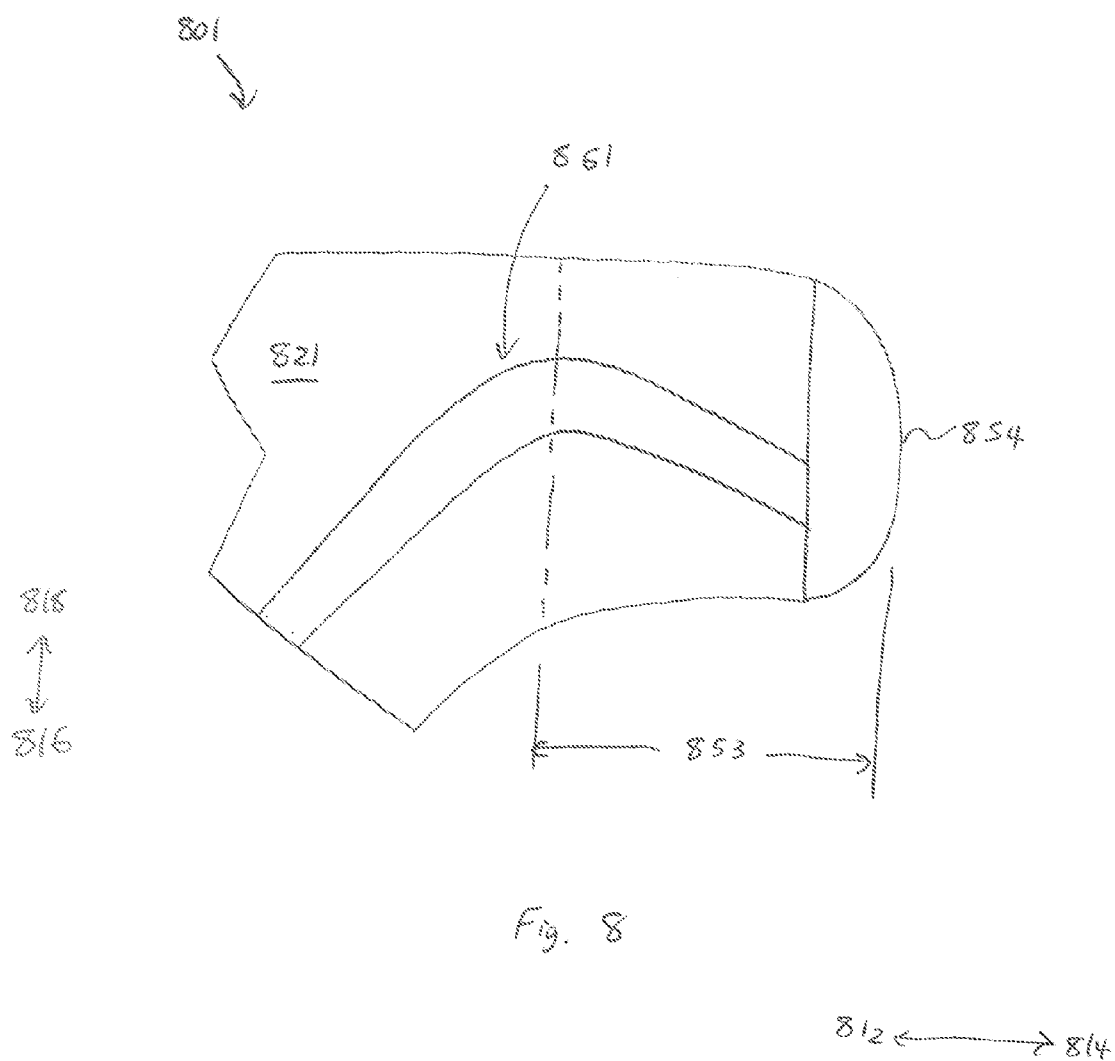
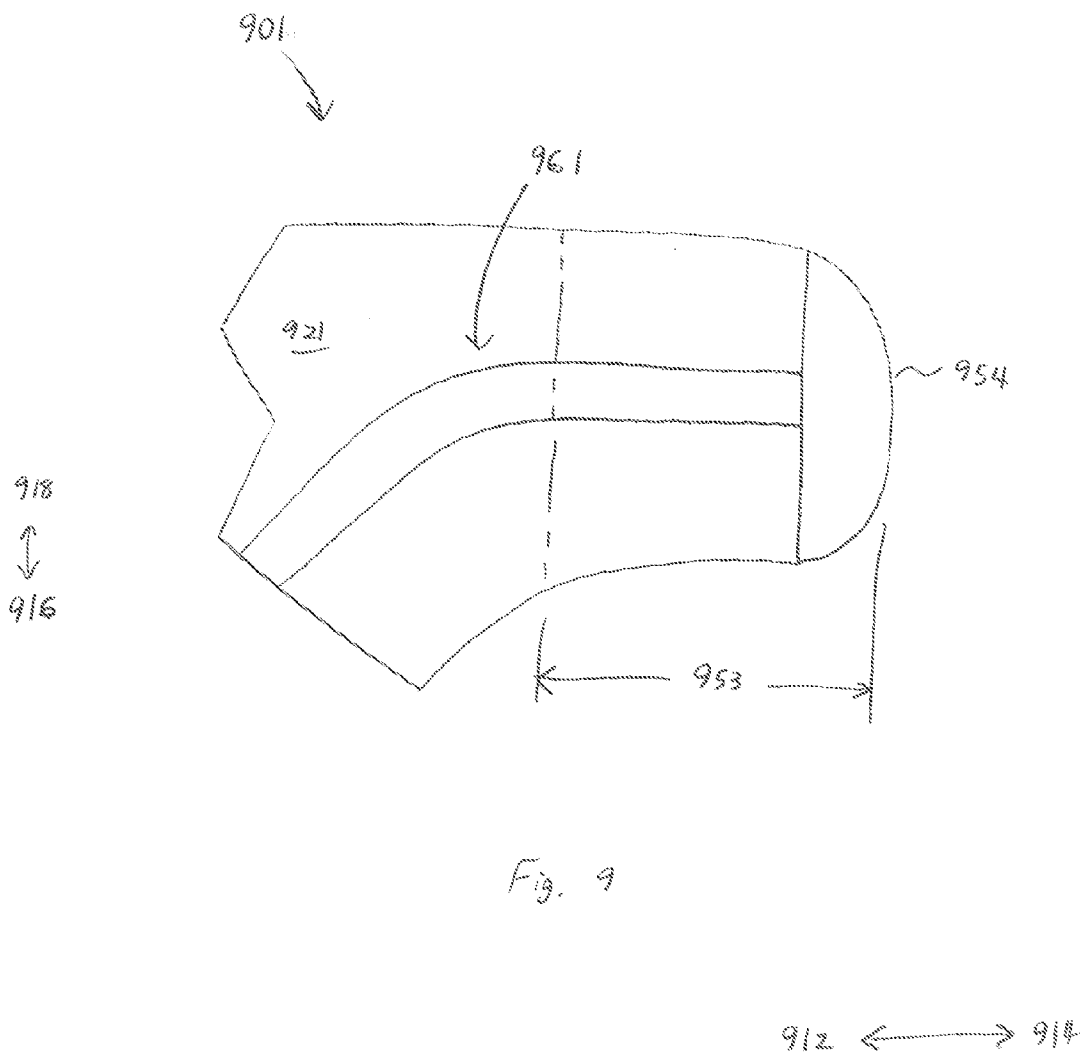


Fig. 5









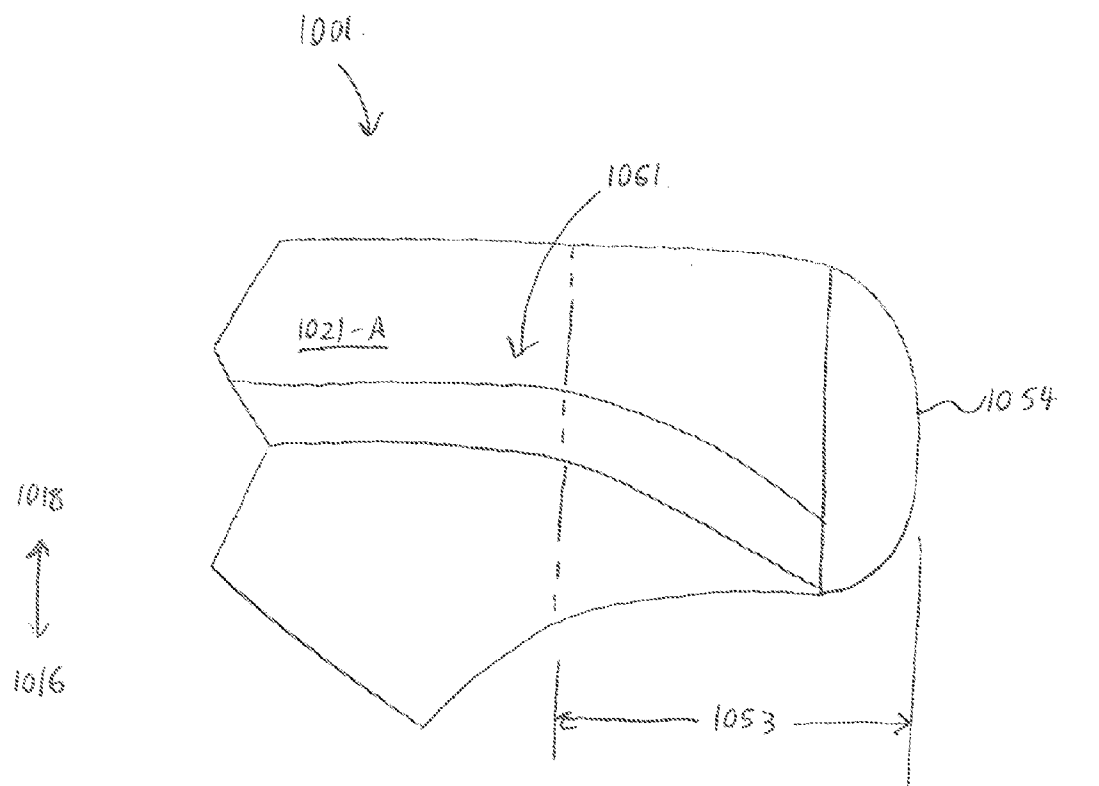


Fig. 10

REUSABLE WEARABLE ABSORBENT ARTICLES WITH ANCHORING SUBSYSTEMS

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. provisional patent application 61/144,883 filed Jan. 15, 2009, the substance of which is hereby incorporated by reference.

FIELD

[0002] In general, embodiments of the present disclosure relate to wearable absorbent articles. In particular, embodiments of the present disclosure relate to reusable wearable absorbent articles with anchoring subsystems.

BACKGROUND

[0003] Wearable absorbent articles include reusable diapers and reusable incontinence undergarments. A wearable absorbent article can receive and contain bodily waste while being worn by a wearer. Such articles can be made with various materials in a number of configurations. The design of a wearable absorbent article can affect the way that the article fits on a wearer. Unfortunately, some wearable absorbent articles fit wearers poorly. As an example, some wearable absorbent articles can sag or slip down on a wearer. A wearable absorbent article that sags or slips down on a wearer can feel uncomfortable, look unattractive, and perform poorly as the article tends to leak.

BRIEF DESCRIPTION OF THE DRAWINGS

[0004] FIG. 1 illustrates a plan view of an inside of a front fastenable wearable absorbent article with a reusable outer cover.

[0005] FIG. 2 illustrates a side ear of a front fastenable wearable absorbent article with a reusable outer cover, wherein the side ear includes an anchoring subsystem.

[0006] FIG. 3 illustrates a side ear of a front fastenable wearable absorbent article with a reusable outer cover, wherein the side ear includes an anchoring subsystem.

[0007] FIG. 4 illustrates a side ear of a front fastenable wearable absorbent article with a reusable outer cover, wherein the side ear includes an anchoring subsystem.

[0008] FIG. 5 illustrates a side ear of a front fastenable wearable absorbent article with a reusable outer cover, wherein the side ear includes an anchoring subsystem.

[0009] FIG. 6 illustrates a side ear of a front fastenable wearable absorbent article with a reusable outer cover, wherein the side ear includes an anchoring subsystem.

[0010] FIG. 7 illustrates a side ear of a front fastenable wearable absorbent article with a reusable outer cover, wherein the side ear includes an anchoring subsystem.

[0011] FIG. 8 illustrates a side ear of a front fastenable wearable absorbent article with a reusable outer cover, wherein the side ear includes an anchoring subsystem.

[0012] FIG. 9 illustrates a side ear of a front fastenable wearable absorbent article with a reusable outer cover, wherein the side ear includes an anchoring subsystem.

[0013] FIG. 10 illustrates a side ear of a front fastenable wearable absorbent article with a reusable outer cover, wherein the side ear includes an anchoring subsystem.

DETAILED DESCRIPTION

[0014] Embodiments of the present disclosure include wearable absorbent articles with anchoring subsystems that fit wearers well. The wearable absorbent articles can be configured as reusable wearable absorbent articles or as disposable wearable absorbent articles. The designs of these articles help prevent the articles from sagging or slipping down on a wearer. As a result, the wearable absorbent articles of the present disclosure can feel comfortable, look attractive, and perform well as the articles tend to stay in place on wearers and not leak.

[0015] Absorbent articles include products for sanitary protection, for hygienic use, and the like. Some absorbent articles are wearable. A wearable absorbent article is configured to be worn on or around a lower torso of a body of a wearer. Examples of wearable absorbent articles include diapers, training pants, and incontinence undergarments.

[0016] A wearable absorbent article can include an absorbent core. Throughout the present disclosure, the term absorbent core refers to a part of a wearable absorbent article configured to absorb bodily exudates received into the article from a body of a wearer. An absorbent core can be configured in various ways, as will be understood by one of ordinary skill in the art. An absorbent core can include one or more absorbent materials, such as wood pulp and/or superabsorbent particles, and may include one or more additional compositions, materials, or structures for receiving, containing, storing, and/or treating bodily waste, as known in the art. Further, an absorbent core may include one or more of compositions such as lotions, perfumes, and sensates, on an outer surface and/or within the assembly. An absorbent core can be configured as a bucket-shaped absorbent core, a removable absorbent core, a replaceable absorbent core, etc. An absorbent core can be part of an absorbent core assembly, comprising one or more layers such as a liquid-permeable topsheet, an acquisition layer, a distribution layer, a storage layer, and a liquid impermeable backsheet. An absorbent core assembly may also include one or more of various structures, such as barrier leg cuffs, a feces containment compartment, a wetness indicator, fasteners for retaining the core within an article, disposal tapes, etc.

[0017] In various embodiments, an absorbent core can be configured as described in U.S. application Ser. Nos. 12/141,122; 12/141,124; 12/141,126; 12/141,128; 12/141,130; 12/141,132; 12/141,134; 12/141,141; 12/141,143; and 12/141,146, each of which is hereby incorporated by reference. These applications generally describe absorbent core constructions that minimize or eliminate the need for and inclusion of airfelf or other forms of cellulose fiber in combination with super absorbent particles.

[0018] A wearable absorbent article can also include an outer cover. Throughout the present disclosure, the term outer cover refers to a part of a wearable absorbent article forming an outer surface of the article (sometimes referred to as a backsheet), extending beyond the edges of the absorbent core, usually covering a significant portion of the buttocks of the wearer, and generally shaped to resemble the appearance of an undergarment. An outer cover can be configured in various

ways, as described herein. In various embodiments, an outer cover can coincide with and/or define a chassis of a wearable absorbent article.

[0019] Some absorbent articles are disposable. A disposable absorbent article is configured to be disposed of after a single use (e.g., not intended to be reused, restored, or laundered). Examples of disposable absorbent articles include disposable diapers, disposable training pants, disposable incontinence undergarments, as well as feminine care pads and liners.

[0020] Some absorbent articles are reusable. The term reusable, as used herein, means that a referenced material, component, or all of an absorbent article is configured to be restored and/or reused for more than one usage cycle (e.g. a diaper change). In some reusable absorbent articles, part, or parts, or substantially all, or all of the articles may be launderable or laundering resistant, as defined and described herein. As an example, a wearable absorbent article can include an outer cover that is launderable or laundering resistant. In other reusable absorbent articles, part, or parts, or substantially all, or all of the articles may not be launderable or may not be laundering resistant. For example, an absorbent article can be configured as a reusable absorbent article by using materials, such as nonwovens, that are used in disposable articles, such as diapers.

[0021] In various embodiments, a reusable outer cover can be configured to perform various functions, which provide various benefits to a wearer of the article and/or to a care giver for the wearer. In various embodiments, a reusable outer cover can be configured to provide liquid impermeability, which can help the absorbent article contain bodily waste. In various embodiments, a reusable outer cover can be configured to provide vapor permeability (e.g. breathability), which can help the wearer maintain healthy skin. In various embodiments, a reusable outer cover can be configured to be elastically extensible, inelastically extensible, and/or inextensible, in one or more particular directions. In various embodiments, at least a portion of a reusable outer cover, such as a portion of an inner layer, may be absorbent to control minor leakage events from the absorbent core.

[0022] Specifically, part, or parts, or substantially all, or all of a reusable outer cover thereof can be configured to extend and relax to particular degrees, while the article is being applied to a wearer, while the article is being worn by a wearer, and while the article is containing bodily waste. A reusable outer cover can be configured to extend easily while the article is being applied to a wearer, to help facilitate application. A reusable outer cover can also be configured to extend adequately while the article is being worn, to help accommodate the wearer's movement while provide a conforming fit. A reusable outer cover can further be configured to relax (i.e. contract), properly with sufficient tension to provide sustained fit while the article is being worn, and to help support the absorbent core. It is contemplated that any reusable outer cover disclosed herein can be used with any embodiment of a wearable absorbent article disclosed herein.

[0023] The term launderable, as used herein, means that a referenced material, component, or all of an absorbent article is configured to withstand a large number (e.g. at least 10, in some embodiments up to 50, in other embodiments more than 50) of cycles of machine washing and machine drying (as defined by AATCC Test Method 124-2001 as described herein), without significant degradation to the appearance or performance of the article that would render it unsuitable for

its intended functionality and/or use. As used herein, the term "wash" or "wash cycle" refers to a cycle of machine washing and machine drying, as described above. Since hand-washing and line-drying are typically much less stressful on an absorbent article than machine washing and machine drying, it is expected that a material, component, or article that is machine washable and machine dryable, should also be hand-washable and hand-dryable for at least as many cycles. As an example, a reusable wearable absorbent article can include an outer cover that is launderable. Launderable articles are designed to be suitable for use after many washings, similar to types of clothing. As an example, a launderable outer cover can be configured as described in US non-provisional patent application entitled "Reusable Outer Covers for Wearable Absorbent Articles," filed on Jan. 14, 2010 under attorney docket number 112566, which is incorporated herein by reference.

[0024] The term laundering resistant, as used herein, means that a referenced material, or component, or all of an absorbent article is configured to withstand a small number (e.g. at least one, in some embodiments up to 5, in other embodiments more than 5) of cycles of machine washing and drying (as defined by AATCC Test Method 124-2001 and as described herein), without significant degradation to the appearance or performance of the article that would render it unsuitable for its intended functionality and/or use. As an example, a reusable wearable absorbent article can include an outer cover that is laundering resistant. Laundering resistant articles generally experience degradation after fewer laundering cycles than launderable articles. For example, a laundering resistant material may experience significant degradation in appearance or performance after 5 or 10 wash cycles. As an example, a laundering resistant outer cover can be configured as described in US non-provisional patent application entitled "Reusable Outer Covers for Wearable Absorbent Articles," filed on Jan. 14, 2010 under attorney docket number 112566, which is incorporated herein by reference.

[0025] FIG. 1 illustrates a plan view of an inside (wearer-facing side) of a front fastenable wearable absorbent article 101. While the present disclosure refers to front fastenable wearable absorbent articles, the present disclosure also contemplates alternate embodiments of wearable absorbent articles, as described herein, wherein the wearable absorbent articles are rear-fastenable or side-fastenable. Thus, each embodiment of a wearable absorbent article of the present disclosure that is described as front fastenable can also be configured to be rear fastenable, as will be understood by one of ordinary skill in the art.

[0026] In FIG. 1, a longitudinal centerline 113 and a lateral centerline 117 provide lines of reference for referring to relative locations of parts of the wearable absorbent article 101. When a first part is nearer to the longitudinal centerline 113 than a second part, the first part can be considered laterally inboard 112 to the second part. Similarly, the second part can be considered laterally outboard 114 from the first part. When a third part is nearer to the lateral centerline 117 than a fourth part, the third part can be considered longitudinally inboard 116 to the fourth part. Similarly, the fourth part can be considered longitudinally outboard 118 from the third part. FIG. 1 includes arrows indicating relative directions for laterally inboard 112, laterally outboard 114, longitudinally inboard 116, and longitudinally outboard 118, with respect to the wearable absorbent article 101. Throughout the present disclosure, unless otherwise stated, a reference to a longitudinal

dimension, measurement, line, or direction refers to a dimension, measurement, line, or direction substantially or completely parallel to the longitudinal centerline 113, and a reference to a lateral dimension, measurement, line, or direction refers to a dimension, measurement, line, or direction substantially or completely parallel to the lateral centerline 117.

[0027] The wearable absorbent article 101 includes an outer cover 121, defining the outermost edges of the article 101. The outer cover 121 includes an inner layer 121-A and an outer layer 121-B; in FIG. 1, the inner layer 121-A is shown as partially broken away to show the outer layer 121-B. The outer cover 121 also includes a front 123, and a back 125. It is contemplated that, in various embodiments, the outer cover 121 can be configured as any reusable outer cover disclosed herein, including a launderable outer cover and/or a laundering resistant outer cover.

[0028] The front 123 is a portion of the wearable absorbent article 101 disposed generally proximate to and/or below the belly of a wearer, when the wearable absorbent article 101 is worn by the wearer. A reference to the “front” can mean the front itself, part, or parts, or substantially all, or all of an element in the front, and/or a disposition in the front, depending on the context of the reference. The back 125 is a portion of the wearable absorbent article 101 disposed generally proximate to and/or below the back of a wearer, when the wearable absorbent article 101 is worn by the wearer. A reference to the “back” can mean the back itself, part, or parts, or substantially all, or all of an element in the back, and/or a disposition in the back, depending on the context of the reference. The lateral centerline 117 of the wearable absorbent article 101 forms a boundary between the front 123 and the back 125. The front and back terminology described above is used for wearable absorbent articles throughout the present disclosure, unless otherwise indicated. The wearable absorbent article 101 also includes an absorbent core 127 extending from the front 123 to the back 125.

[0029] The outer cover 121 also includes a back waist edge 106 and a back elastic waist band 107. The back elastic waist band 107 is disposed proximate to the back waist edge 106 and extends laterally across a portion of the back 125. The outer cover 121 also includes a front waist edge 108. In various embodiments, an outer cover can include a front elastic waist band disposed proximate to a front waist edge and extending laterally across a portion of the front. The outer cover 121 also includes longitudinal sides with leg cuff portions 186, which at least partially encircle a leg of a wearer when the article 101 is worn. Leg elastic bands 187 are disposed proximate to the leg cuff portions 186 and extend longitudinally to a portion of the front 123 and a portion of the back 125.

[0030] The outer cover 121 further includes a side 152, a side ear 153, and fasteners 154. The side 152 is disposed in the back 125, laterally outboard from a narrowest portion of the outer cover 121. Although the side 152 is illustrated as to the right of the longitudinal centerline 113, the outer cover 121 also includes another side, of the same configuration, to the left of the longitudinal centerline 113. The side 152 includes the side ear 153, which is the portion of the outer cover 121 laterally extending outward from the longitudinal side of the outer cover 121, as illustrated by the phantom line, which is provided for reference. In various embodiments, part, or parts, or substantially all, or all of a side ear may be formed by a portion of an outer cover or may be formed by a separate element attached to an outer cover. The outer cover 121

includes a second side ear as part of the other side. Each of the side ears 153 includes a fastener 154, for fastening the back 125 to the front 123. Each of the side ears 153 can be configured to include an anchoring subsystem, as described in the embodiments of FIGS. 2-10.

[0031] The outer cover 121 includes an overall longitudinal length 191 measured along the longitudinal centerline from the back waist edge 106 to the front waist edge 108. The outer cover 121 also includes an overall lateral width of the back waist region 193, measured across the widest portion of the back 125. The outer cover 121 further includes a lateral width between fasteners 195 measured between the farthest laterally inboard points along the edges of the fasteners 154 on the back ears 154 of the outer cover 121. The dimensions 191, 193, and 195 are the dimensions measured in the test methods, described herein. Analogous dimensions can be similarly located in an outer cover for a pant-type wearable absorbent article, as will be understood by one of skill in the art.

[0032] When a wearable absorbent article is placed on a wearer, the article is placed in an initial position with respect to the wearer. The location of this initial position can depend on a number of factors, such as the size of the article, the shape of the wearer's body, and the manner in which the article is placed on the wearer. For example, an initial position of a fastenable diaper can depend in part on a location at which the diaper is fastened around a wearer. However, as a wearable absorbent article is worn by a wearer, a number of forces can act upon the article.

[0033] Some of these forces can tend to move the article on the wearer. Throughout the present disclosure, the term “load” refers to a force that tends to move a wearable absorbent article out of place on a wearer. First, a wearable absorbent article can experience various loads from placement of the article on a wearer. As an example, some pretension forces from fastening the article can drive the article downward. Second, a wearable absorbent article can experience various loads from the article's environment. A wearer's clothes can pull on the article, for example. Third, a wearable absorbent article can experience various loads from a wearer's movements. For example, as a wearer changes positions or moves about, the wearer's body can push against parts of the article or create dynamic forces in the article. Fourth, the force of gravity can move a wearable absorbent article down on a wearer. The article can experience a significant load from the force of gravity, due to a mass of the article as well as a mass of any bodily waste contained by the article. These loads, can act upon a wearable absorbent article, tending to move the article on a wearer.

[0034] However, other forces acting upon a wearable absorbent article can tend to hold the article in place on a wearer. First, a wearable absorbent article can experience various holding forces from placement of the article on a wearer. As an example, other pretension forces from fastening the article can drive the article upward. Second, parts of a wearable absorbent article can experience friction forces from contact with a wearer's skin. For example, the article can experience a friction force where a waistband of the article wraps around and against the wearer's waist. Third, parts of a wearable absorbent article can experience reaction forces from contact with various external anatomical features on a wearer's body. As an example, the article can experience reaction forces where the article contacts protruding portions of the wearer's hips. In this example, the reaction forces react against the force of gravity by pushing up on the article. These holding

forces can act upon a wearable absorbent article, tending to hold the article in place on a wearer.

[0035] As some forces tend to move a wearable absorbent article down on a wearer and other forces tend to hold the article up on the wearer, part or all of the article may or may not move, depending on whether or not such forces are balanced. If the forces tending to hold the article up can equal the forces tending to move the article down, then the article can hold in place on the wearer. If the forces tending to move the article down are greater than the forces tending to hold the article up, then part or all of the article can move out of place and down on the wearer. Sometimes, forces can move down part or all of wearable absorbent article, resulting in sagging and/or slipping.

[0036] However, embodiments of the present disclosure can help prevent wearable absorbent articles from sagging and/or slipping down on a wearer. A wearable absorbent article can include an anchoring subsystem. In various embodiments, an anchoring subsystem can be configured to collect at least some of the loads acting upon the article. The anchoring subsystem can also be configured to anchor itself to a body of a wearer. In this way, the anchoring subsystem can balance at least some of the collected loads with holding forces obtained from the anchoring. By balancing the collected loads with the obtained holding forces, the anchoring subsystem can at least assist in holding the wearable absorbent article in place on a wearer.

[0037] An anchoring subsystem can be configured to collect loads acting upon a wearable absorbent article, to anchor itself to a body of a wearer, and to balance the collected loads with holding forces obtained from the anchoring. Throughout the present disclosure, the term “anchored” refers to a configured relationship between part or all of an anchoring subsystem in a wearable absorbent article and part or all of a body of a wearer, while the article is worn by the wearer. Where an element of an anchoring subsystem is anchored to a portion of a body of a wearer, at least part of the element is in direct and/or indirect contact with the portion of the body and the anchoring subsystem is configured to at least reduce and/or prevent relative movement between the element and the portion, while the article is worn by the wearer.

[0038] An anchoring subsystem can be anchored to a body of a wearer with one or more elements of the anchoring subsystem configured to contact various parts of a body of a wearer. For example, an anchoring subsystem can be at least partially anchored by wrapping one or more anchoring subsystem elements at least partway around a front, back, and/or side of a body of a wearer, thus creating friction and/or reaction forces.

[0039] A part of the body with a relatively smaller radius of curvature can, in some embodiments, provide greater friction forces, since an element can tend to wrap around such parts more tightly. This is due to the physics of a flexible material that is wrapped around a curved surface and placed under tension. In this scenario, as a tensile force places the flexible material under tension, the flexible material exerts a normal force perpendicular to and inward on the curved surface. According to the basic Capstan formula, the normal force is proportional to the tensile force divided by the radius of the curved surface. Thus, at a given tensile force as the radius becomes smaller the normal force becomes larger.

[0040] Also as an example, an anchoring subsystem can be at least partially anchored by setting one or more anchoring subsystem elements on, around, and/or above protruding por-

tions of a body of a wearer, thus creating friction and/or reaction forces. A part of the body with a relatively larger horizontal protrusion can, in some embodiments, provide greater reaction forces, since an element can tend to hang and/or ride on such parts more securely.

[0041] In order to collect loads, anchor itself to a body of a wearer, and balance various forces, an anchoring subsystem can be configured to include one or more anchoring subsystem elements. In some embodiments, an anchoring subsystem element can be an elongated element configured to carry tension. Anchoring subsystem elements can follow various pathways on external surfaces of a body of a wearer of the wearable absorbent article in which the anchoring subsystem is included. The shapes of these external surfaces can affect the shapes of the pathways. The shapes of the pathways can, in turn, affect configurations of anchoring subsystem elements.

[0042] Many external surfaces on human bodies include curved shapes, such as a curve around a hip of a human body. Different human bodies can include different curves as bodies have various sizes and shapes. In some embodiments, part or all of an anchoring subsystem element that follows a curved pathway can be a geodesic.

[0043] The term geodesic relates to a theoretical element with mathematical properties described by curved geometries. In this theoretical context, a geodesic is a curved line on a curved surface, wherein the curved line appears to travel straight, without turning to the left or to the right, when viewed from that curved surface. In other words, a geodesic can be thought of as a line pulled taut on a frictionless curved surface. On a flat surface, the shortest distance between two points is a straight line. On a curved surface, the shortest distance between two points is a geodesic. More information on geodesics and their mathematical properties can be found in texts on differential geometry and the theory of general relativity, for example Barrett O'Neill, *Elementary Differential Geometry* Ch. 7 (Academic Press 2006); and James Foster & David J. Nightingale, *A Short Course in General Relativity* Ch. 2.1 (Springer Science and Business Media 2006).

[0044] Part or all of an anchoring subsystem element can be configured as a geodesic. While, throughout the present disclosure, anchoring subsystem elements are described as geodesics, these descriptions are intended to mean that such anchoring subsystem elements are configured as close approximations to theoretical geodesic elements. Real world elements cannot behave exactly like theoretical geodesic elements since real world elements always have at least some thickness, always experience at least some friction, and are always subject to at least some small non-axial outside forces, as will be understood by one of ordinary skill in the art.

[0045] Part or all of an anchoring subsystem element can be configured as a geodesic as the element follows various convex curved pathways on external surfaces of a body of a wearer. An anchoring subsystem element that is loaded in tension (e.g., axial loading) can be configured as a geodesic, since the tension can conform the element to the convex curved pathway. When a point load is added to an anchoring subsystem element that is a geodesic, at an angle other than in-line with the geodesic, that point load deforms the original geodesic, dividing the original geodesic into two new geodesics in the anchoring subsystem element.

[0046] Similarly, when an anchoring subsystem element, configured in tension as a geodesic, passes over a concave portion of a generally convex external surface of a human

body, the element bridges the concave portion, separating the anchoring subsystem element into two geodesics on either convex side of the concave portion. Further, the bridging portion of the anchoring subsystem element is also a geodesic, since it is a straight line in space.

[0047] When an anchoring subsystem element that is a geodesic is subjected to a load distributed along at least a portion of the length of the element, at an angle other than in-line with the geodesic, the element no longer behaves as a geodesic, and instead begins to act in a manner referred to herein as “geometric anchoring.” An anchoring subsystem can include one or more anchoring subsystem elements, at least some of which can be configured as geodesics.

[0048] One kind of anchoring subsystem element is a side anchoring member (SAM). A SAM is one or more physical, tension-carrying elements and/or areas disposed along a defined SAM pathway in an anchoring subsystem of a wearable absorbent article. A SAM has two defined ends, a middle between the two ends, and a defined length from its one end to its other end. A SAM can have one or more widths, each of which is less than its defined length. A SAM also has a centerline, running along the SAM pathway, in the center of its width, from its one end to its other end. A SAM pathway cannot substantially or completely encircle the lower torso of the body of the wearer. At least a portion of a SAM pathway passes through a side of the wearable absorbent article. In some embodiments, a SAM can be contained within a side of the wearable absorbent article. Further, in various embodiments, a SAM can be contained within a side panel or a side ear of a wearable absorbent article.

[0049] A side of a wearable absorbent article can be defined in various ways. A side of a wearable absorbent article can include a portion of a front of the article as well as a portion of a back of the article. Sometimes, a side of a wearable absorbent article can be considered disposed in a portion of the article that is laterally offset from a longitudinal centerline of the article. Throughout the present disclosure, unless otherwise stated, a side of a wearable absorbent article is disposed in a portion of the article that is laterally outboard from longitudinal edges of an absorbent core of the article. In some instances, a side of a wearable absorbent article can be considered disposed in a portion of the article that is laterally outboard from a narrowest portion of a chassis of the article. In various instances, a side of a wearable absorbent article can be considered disposed in a side panel or a side ear of the article. Embodiments of the present disclosure can be used with any of these definitions of a side of a wearable absorbent article.

[0050] In an anchoring subsystem of a wearable absorbent article, one or more SAMs can be configured to contact various parts of a body of a wearer, to at least assist in anchoring the anchoring subsystem to the body. A SAM can receive at least some collected loads from one or more elements of the wearable absorbent article, such as a chassis, a fastener, a leg cuff, etc. A SAM can also provide holding forces to help balance the collected loads through contact with the body. In balancing these loads and forces, the SAM carries tensions in the anchoring system. This balancing can enable the anchoring subsystem to at least assist in holding a wearable absorbent article in place on a wearer.

[0051] A SAM can be configured in various forms. In some embodiments, a SAM can include a number of elements, such as fasteners. Part or all of a SAM can be straight, curved, angled, segmented, or other shapes, or combinations of any of

these shapes. A SAM pathway can be a unitary, continuous pathway, or can be formed by a number of discrete elements and/or separate areas disposed along a SAM pathway. As examples, a SAM can be formed by substantially parallel strands of material running through a side panel or a side ear, or by a series of pieces of material attached to a side panel or a side ear, or by a distribution of unstretched areas in an incrementally stretched side panel or side ear.

[0052] Part or all of a SAM can be structurally associated with one or more elements of the wearable absorbent article. As examples, part or all of a SAM can be discrete from and/or joined to and/or attached to and/or embedded in and/or integral with one or more elements of the wearable absorbent article. Throughout the present disclosure, the term “joined” refers to configurations whereby an element is directly connected to another element by affixing the element directly to the other element and to configurations whereby an element is indirectly secured to another element by affixing the element to intermediate member(s) which in turn are affixed to the other element.

[0053] A SAM can be made from any material suitable for carrying tensions in an anchoring system. Part or all of a SAM can include one or more of various elastic, inelastic, extensible, inextensible, stretchable, and/or non-stretchable material(s) and/or any other suitable material(s) and/or combinations of any of these materials. As examples, part or all of a SAM can include one or more of various elastomeric materials, such as extruded films, elastics, nonwovens, scrims, slot-coated films, sprayed or melt-blown fibers, and/or printed elastics and/or any other suitable elastomeric material(s) and/or combinations of any of these materials. As a further example a SAM can be formed from rubber or natural elastic, sewn onto a reusable outer cover.

[0054] Also as examples, part or all of a SAM can be structurally associated with part or all of one or more elements of a wearable absorbent article, such as embodiments wherein one or more of the element(s) are configured with an elastic nonwoven, with an elastic film and extensible nonwoven, with an extensible film and an elastic nonwoven, to be pre-stretched with elastic strands allowed to contract, to be incrementally stretched, with zero strain laminate, and/or in combinations of these and/or other configurations. In some embodiments, a SAM can include one or more laminate materials. In various embodiments, a SAM can be formed from various basis weights, chemistries, and/or incremental stretchings, as will be understood by one of ordinary skill in the art.

[0055] A SAM can be any suitable width or thickness. For example, a SAM can be from 5 mm to about 50 mm wide or any width within that range. The width and/or thickness of a SAM can be substantially or completely uniform over one or more parts of the SAM or over the entire length of the SAM, or can vary over the length of the SAM. In some embodiments, a SAM can have a substantially uniform width of about 10 mm, about 20 mm, or about 30 mm. Throughout the present disclosure, unless otherwise stated, the width of a SAM is measured at a particular point on the SAM's pathway, as the largest overall dimension across the pathway, from one side edge of the pathway to the other side edge of the pathway, in a direction perpendicular to the SAM's centerline.

[0056] As described above, an anchoring subsystem can balance loads and forces, thus performing functions similar to those of an anchoring system for a wearable absorbent article, as described in U.S. patent application Ser. No. 11/599,851.

As a result, an anchoring subsystem can provide benefits similar to those of an anchoring system for a wearable absorbent article; helping prevent the article from sagging and/or slipping down on a wearer. However, an anchoring subsystem differs from an anchoring system in the extent of its presence within a wearable absorbent article. In an anchoring subsystem of a wearable absorbent article, no element of the anchoring subsystem substantially or completely encircles the lower torso of a wearer when the wearable absorbent article is worn by the wearer. Further, an anchoring subsystem is contained within a particular, defined area of a wearable absorbent article. For example, a side anchoring subsystem of a wearable absorbent article is contained within a side of the disposable wearable absorbent article.

[0057] FIGS. 2-10 illustrate side ears of a front fastenable wearable absorbent article with a reusable outer cover, wherein each of the side ears includes an anchoring subsystem. Each of the elements of each embodiment of FIGS. 2-10 is configured in the same way as the like-numbered element of the embodiment of FIG. 1, except as described below. Throughout the present disclosure, the term “like-numbered” is intended to indicate a correspondence between labels of elements wherein the last two numbers in the labels of the elements are the same. Element labels are considered to be like-numbered despite differing numeral prefixes corresponding to figure numbers, and despite differing suffixes corresponding to particular embodiments.

[0058] FIG. 2 illustrates a side ear 253 with a fastener 254 and an anchoring subsystem 261, wherein the side ear 253 is illustrated as broken away from a back portion of a reusable outer cover 221. The anchoring subsystem 261 includes two SAMs with partially coextensive pathways. The first SAM begins as a distinct pathway, longitudinally inboard to the second SAM, extends laterally outward and longitudinally outward, partially coextends with the second SAM, then continues as a distinct pathway, extending laterally outward and longitudinally outward, to the fastener 254, ending longitudinally outboard from the second SAM. The second SAM begins as a distinct pathway, longitudinally outboard from the first SAM, extends laterally outward and longitudinally inward, partially coextends with the first SAM, then continues as a distinct pathway, extending laterally outward and longitudinally inward, to the fastener 254, ending longitudinally inboard to the first SAM.

[0059] FIG. 3 illustrates a side ear 353 with a fastener 354 and an anchoring subsystem 361, wherein the side ear 353 is illustrated as broken away from a back portion of a reusable outer cover 321. The anchoring subsystem 361 includes two SAMs with partially coextensive pathways. The first SAM begins coextensive with the second SAM, extends laterally inward, then continues as a distinct pathway, extending laterally outward and longitudinally outward, to the fastener 354, ending longitudinally outboard from the second SAM. The second SAM begins coextensive with the first SAM, extends laterally inward, then continues as a distinct pathway, extending laterally outward and longitudinally inward, to the fastener 354, ending longitudinally inboard to the first SAM.

[0060] FIG. 4 illustrates a side ear 453 with a fastener 454 and an anchoring subsystem 461, wherein the side ear 453 is illustrated as broken away from a back portion of a reusable outer cover 421. The anchoring subsystem 461 includes two SAMs with partially coextensive pathways. The first SAM begins as a distinct pathway, longitudinally inboard to the second SAM, extends laterally outward and longitudinally

outward, then partially coextends with the second SAM, extending laterally outward, to the fastener 454. The second SAM begins as a distinct pathway, longitudinally outboard from the first SAM, extends laterally outward and longitudinally inward, then partially coextends with the first SAM, extending laterally outward to the fastener 454.

[0061] FIG. 5 illustrates a side ear 553 with a fastener 554 and an anchoring subsystem 561, wherein the side ear 553 is illustrated as broken away from a back portion of a reusable outer cover 521. The anchoring subsystem 561 includes one SAM. The SAM begins in the back portion and extends laterally outward to the fastener 554.

[0062] FIG. 6 illustrates a side ear 653 with a fastener 654 and an anchoring subsystem 661, wherein the side ear 653 is illustrated as broken away from a back portion of a reusable outer cover 621. The anchoring subsystem 661 includes one SAM. The SAM begins in the back and extends laterally outward and longitudinally outward to the fastener 654.

[0063] FIG. 7 illustrates a side ear 753 with a fastener 754 and an anchoring subsystem 761, wherein the side ear 753 is illustrated as broken away from a back portion of a reusable outer cover 721. The anchoring subsystem 761 includes one SAM. The SAM begins in the back and extends laterally outward and longitudinally inward to the fastener 754.

[0064] FIG. 8 illustrates a side ear 853 with a fastener 854 and an anchoring subsystem 861, wherein the side ear 853 is illustrated as broken away from a back portion of a reusable outer cover 821. The anchoring subsystem 861 includes one SAM. The SAM begins in the back and extends laterally outward and longitudinally outward then laterally outward and longitudinally inward to the fastener 854.

[0065] FIG. 9 illustrates a side ear 953 with a fastener 954 and an anchoring subsystem 961, wherein the side ear 953 is illustrated as broken away from a back portion of a reusable outer cover 921. The anchoring subsystem 961 includes one SAM. The SAM begins in the back and extends laterally outward and longitudinally outward then laterally outward to the fastener 954.

[0066] FIG. 10 illustrates a side ear 1053 with a fastener 1054 and an anchoring subsystem 1061, wherein the side ear 1053 is illustrated as broken away from a back portion of a reusable outer cover 1021. The anchoring subsystem 1061 includes one SAM. The SAM begins in the back and extends laterally outward then laterally outward and longitudinally inward to the fastener 1054.

[0067] To determine whether a component of an absorbent article, such as an outer cover, is launderable or laundering resistant, the component is machine washed and machine dried according to the protocol from AATCC (American Association of Textile Chemists and Colorists) Test Method 124-2001, with the selected parameters and substitutions listed below.

[0068] AATCC Test Method 124-2001

[0069] a) Per section 6, Apparatus and materials, a Kenmore 600 (Heavy Duty—Super Capacity Plus—Quiet Pak) is used for the automatic washing machine, and a Maytag Commercial (such as model numbers MDE27MNACW, MDE15MNAYW, and MDE13MNACW) is used for the automatic tumble dryer.

[0070] b) Despite the instructions in Section 6, Apparatus and materials, the following ballast is used: Test Fabric style 493 from Testfabrics, Inc., West Pittston, Pa.,

which is cotton sheeting, with a thread count of 60×60, a weight of 151 gsm, and a size of 55" by 39".

- [0071] c) Despite the instructions in Section 6, Apparatus and materials, the evaluation area is not configured according to section 6.7 and the apparatus of section 6.8 is not used. Instead, all visual evaluations are performed under typical artificial lighting conditions (e.g. fluorescent light), which allows a person with normal vision to clearly see.
- [0072] d) Despite the instructions in Section 7, Test Specimen, the component to be tested is (as necessary) entirely removed from the rest of the absorbent article, and (to the extent allowed by the removal) the component is tested as an undamaged whole. Up to three components of the same type are washed simultaneously.
- [0073] e) Regarding the machine wash in Section 8.2.2, use the "large" setting on the machine for the water level, select a wash temperature of 32+/-3° C. (90+/-5° F.), and a rinse temperature of 16+/-3° C. (60+/-5° F.).
- [0074] f) Regarding the settings in Section 8.2.2, select Normal/Cotton Sturdy, which has a washing time of 12 minutes, an initial spin time of 6 minutes, a refill time of 4 minutes, a rinse time of 5 minutes, and a final spin cycle time of 6 minutes.
- [0075] g) Regarding the Drying in Section 8.3, select Cotton Sturdy and Whites & Colors.
- [0076] h) Despite the instructions in Section 8.5, the steps of conditioning and preconditioning are not performed.
- [0077] i) Despite the instructions in Section 9, Evaluation, these evaluation steps are not performed. Instead, the tested component is evaluated by one of skill in the art, to determine whether the testing has resulted in significant degradation to the appearance or performance of the article that would render it unsuitable for its intended functionality and/or use.
- [0078] The dimensions and values disclosed herein are not to be understood as being strictly limited to the exact numerical values recited. Instead, unless otherwise specified, each such dimension is intended to mean both the recited value and a functionally equivalent range surrounding that value. For example, a dimension disclosed as "40 mm" is intended to mean "about 40 mm."
- [0079] Every document cited herein, including any cross referenced or related patent or application is hereby incorpo-

rated herein by reference in its entirety unless expressly excluded or otherwise limited. The citation of any document is not an admission that it is prior art with respect to any invention disclosed or claimed herein or that it alone, or in any combination with any other reference or references, teaches, suggests or discloses any such invention. Further, to the extent that any meaning or definition of a term in this document conflicts with any meaning or definition of the same term in a document incorporated by reference, the meaning or definition assigned to that term in this document shall govern.

[0080] 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. A wearable absorbent article comprising an absorbent core and a reusable outer cover with a side having a side anchoring subsystem configured to indirectly anchor the absorbent core to a wearer of the article.
2. The wearable absorbent article of claim 1, wherein the outer cover is launderable.
3. The wearable absorbent article of claim 1, wherein the outer cover is laundering resistant.
4. The wearable absorbent article of claim 1, wherein the side anchoring subsystem is discrete from the side.
5. The wearable absorbent article of claim 1, wherein the side anchoring subsystem is attached to the side.
6. The wearable absorbent article of claim 1, wherein the side anchoring subsystem is embedded in the side.
7. The wearable absorbent article of claim 1, wherein the side anchoring subsystem is integral with the side.
8. The wearable absorbent article of claim 1, wherein the side anchoring subsystem includes one side anchoring member.
9. The wearable absorbent article of claim 1, wherein the side anchoring subsystem includes two side anchoring members.
10. The wearable absorbent article of claim 1, configured as a front-fastenable article.

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