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(54) CALIBRATED FASTENER SYSTEM

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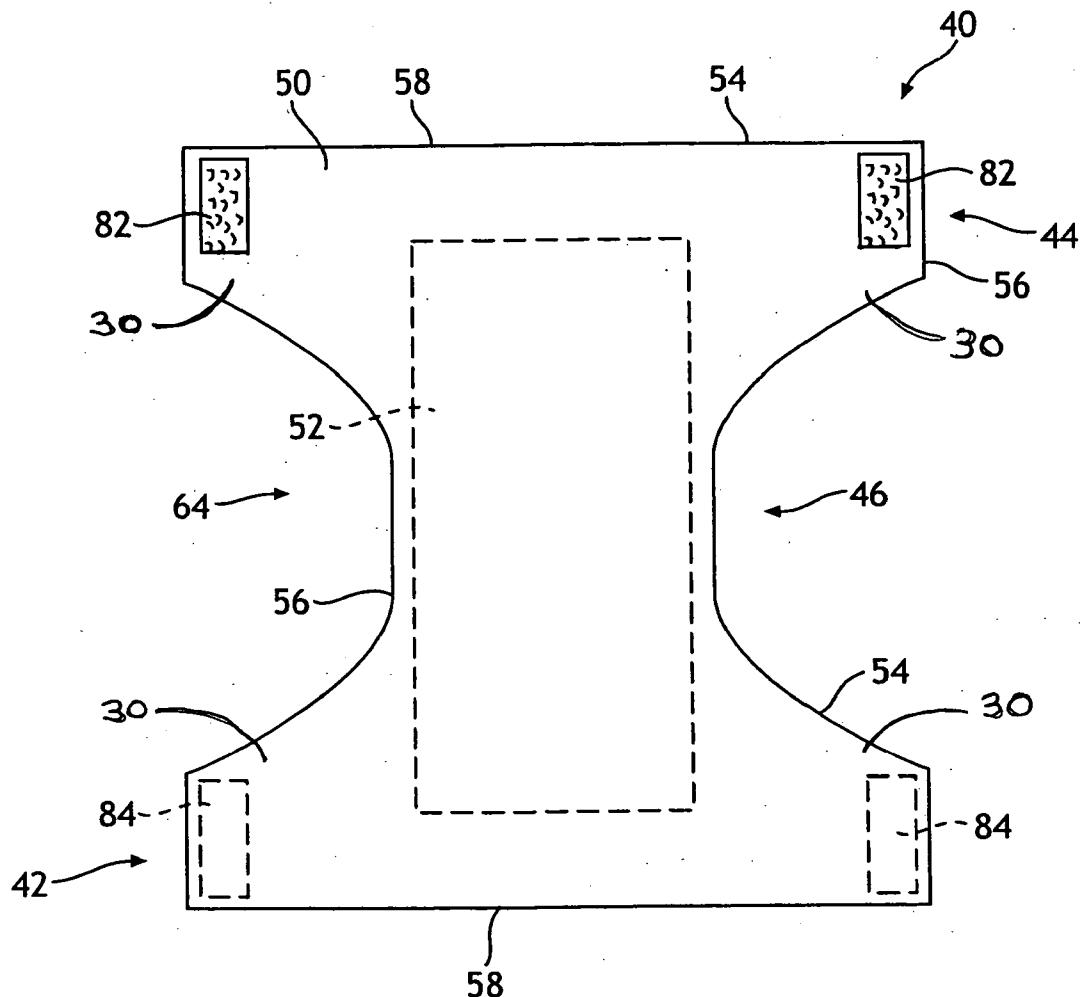
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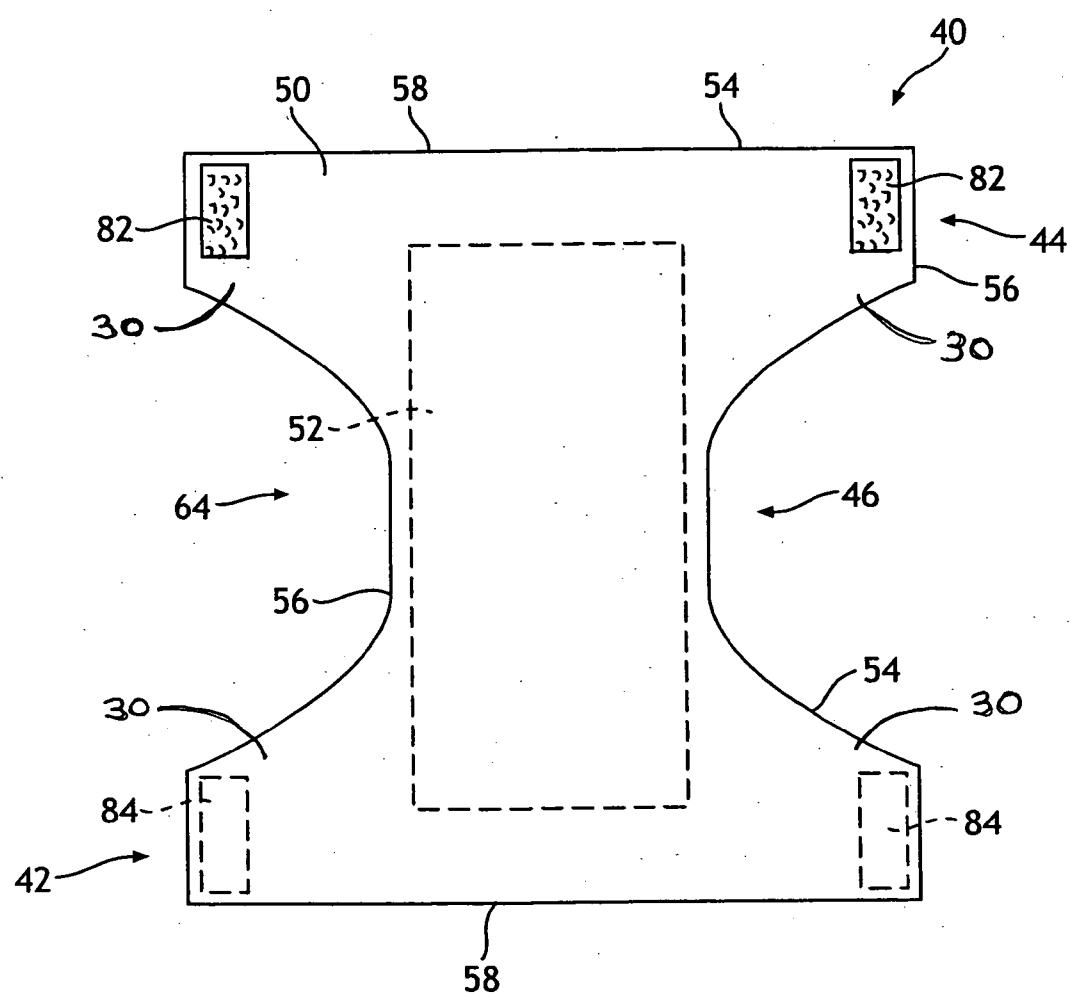
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(57) ABSTRACT

Disposable garments having a first pair of positioning indicia and second pair of positioning indicia. The first pair of indicia located symmetrically about the longitudinal centerline, the second pair of indicia located substantially symmetrically about the longitudinal centerline. The first pair of indicia located closer to the longitudinal centerline than the second pair of indicia. The first pair of indicia has a length in a longitudinal direction. The second pair of indicia has a length in a longitudinal direction and the longitudinal length of the first pair of indicia is less than the longitudinal length of the second pair of indicia.



**FIG. 1**

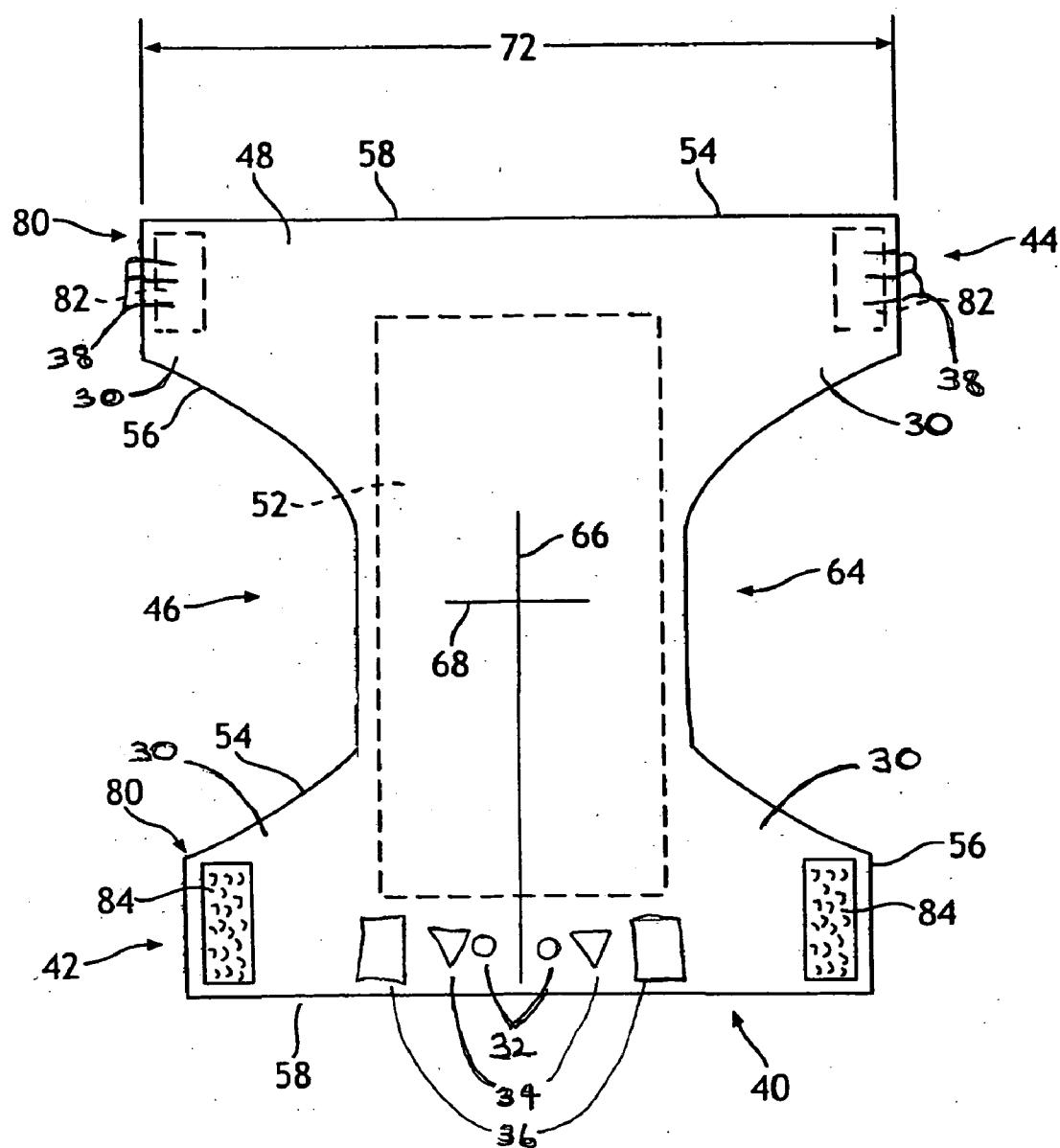
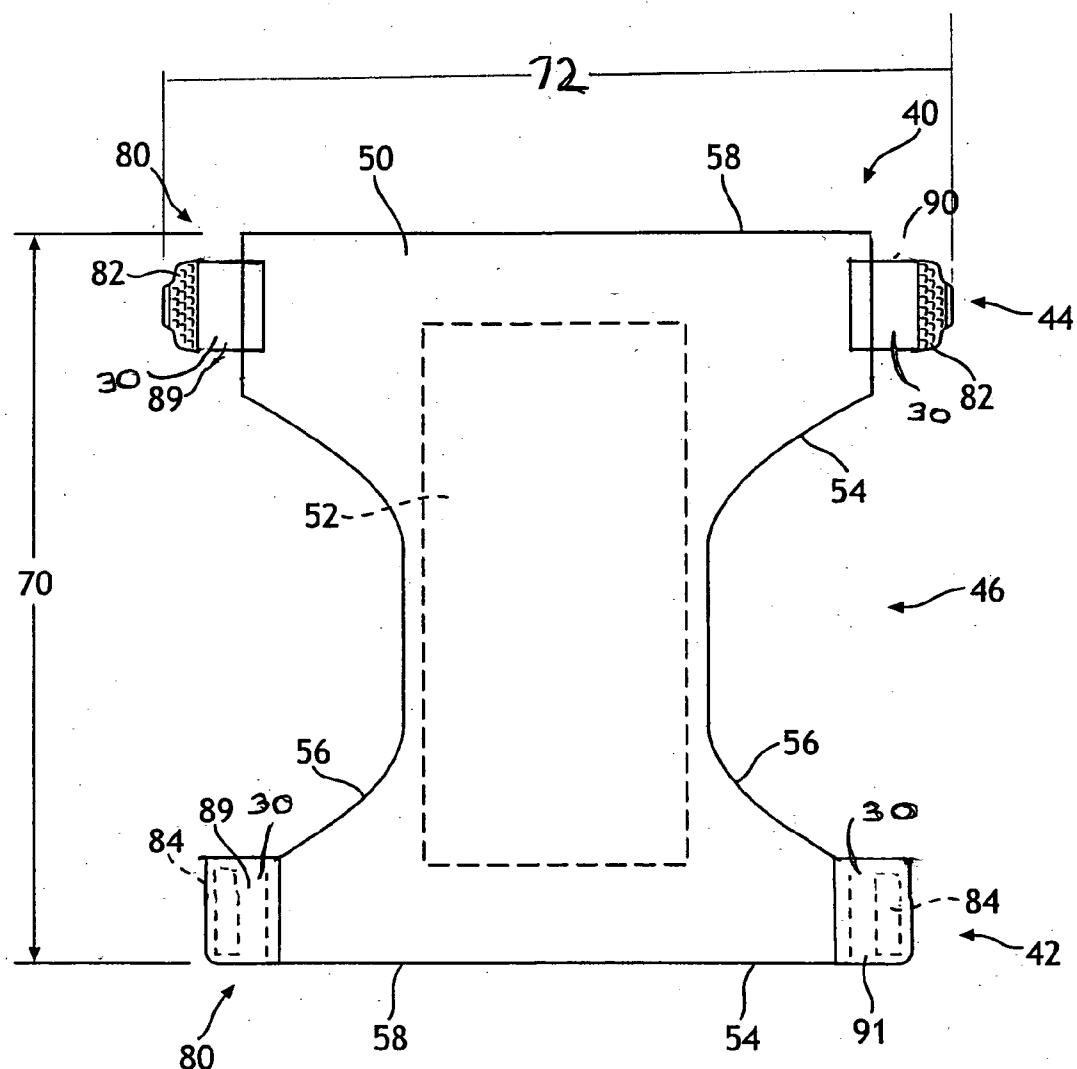


FIG. 2

**FIG. 3**

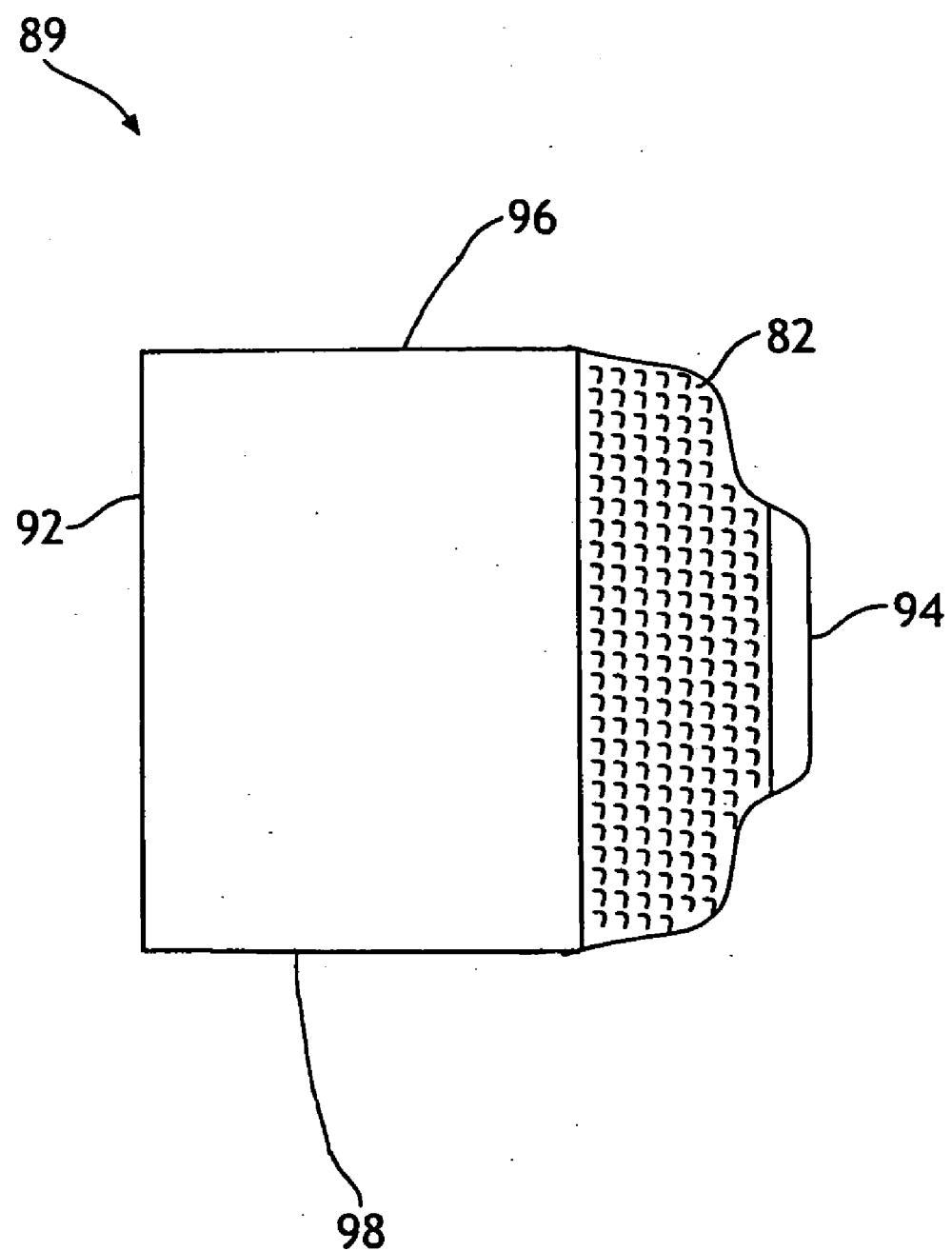


FIG. 4

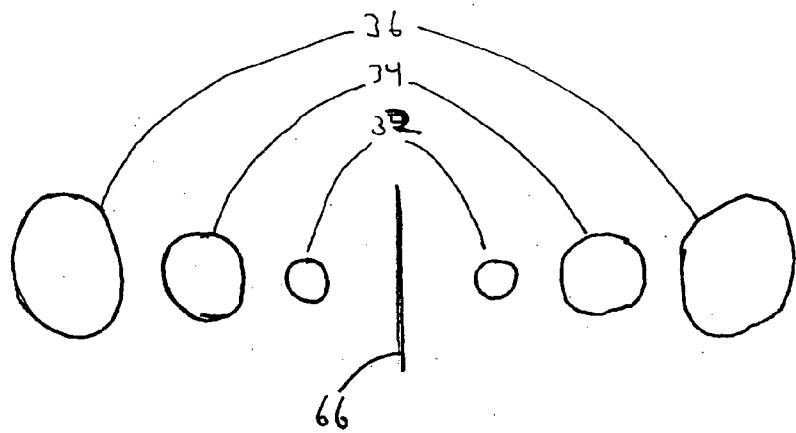


FIG 5 A

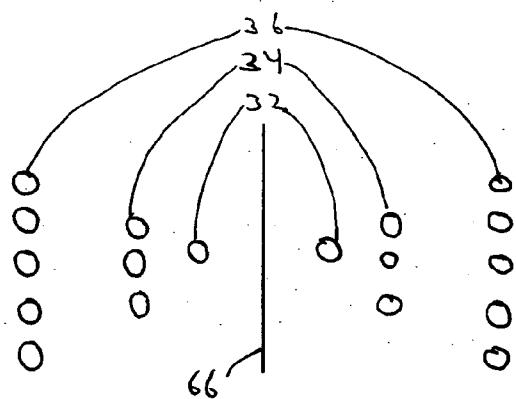


FIG 5 B

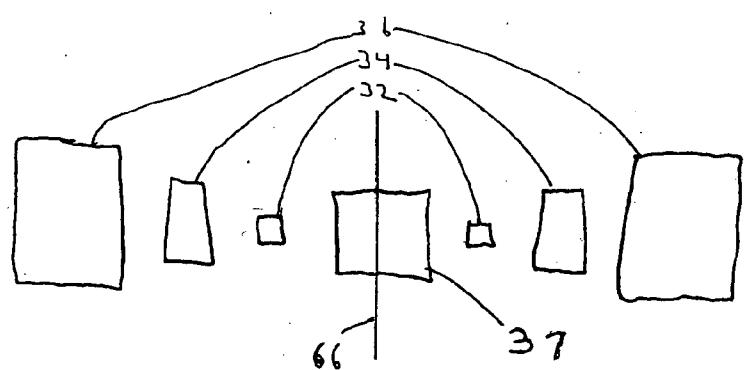


FIG 5 C

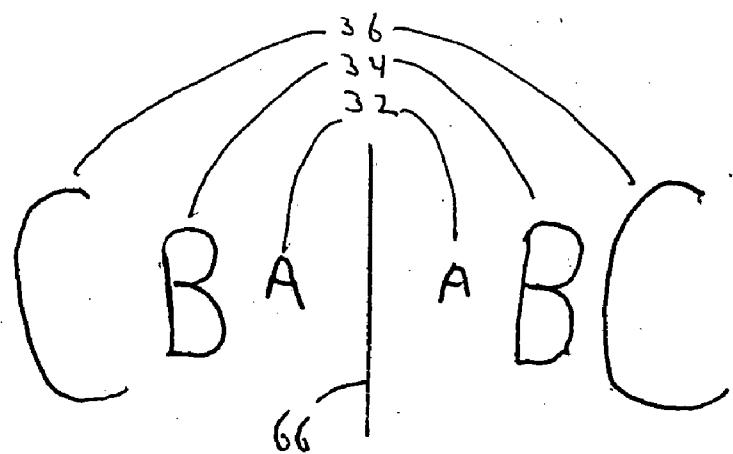


FIG. 5 D

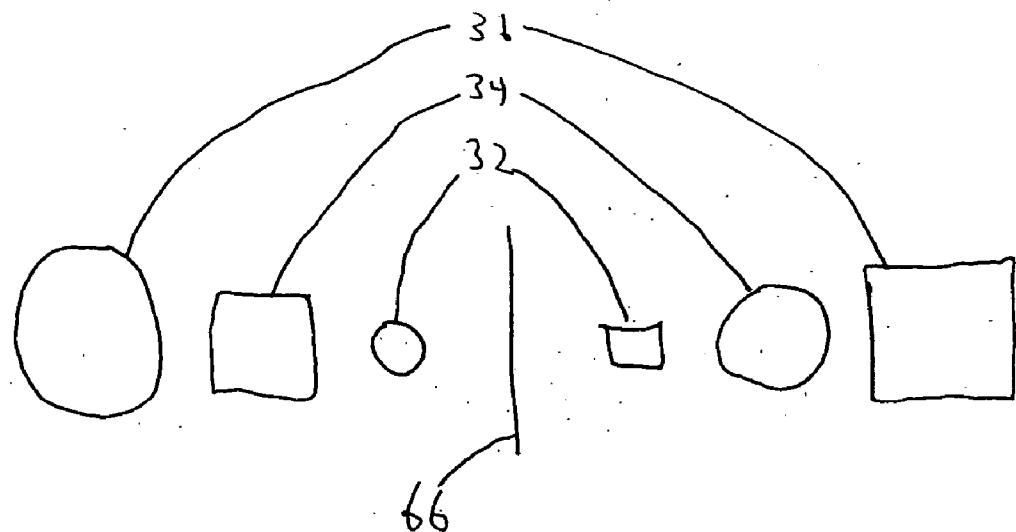


FIG. 5 E

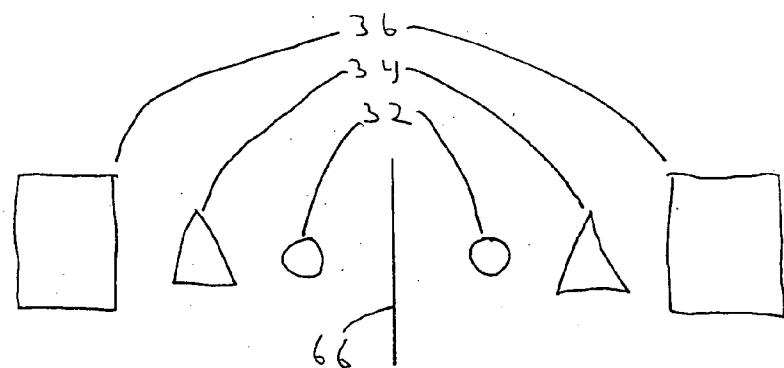


FIG. 6A

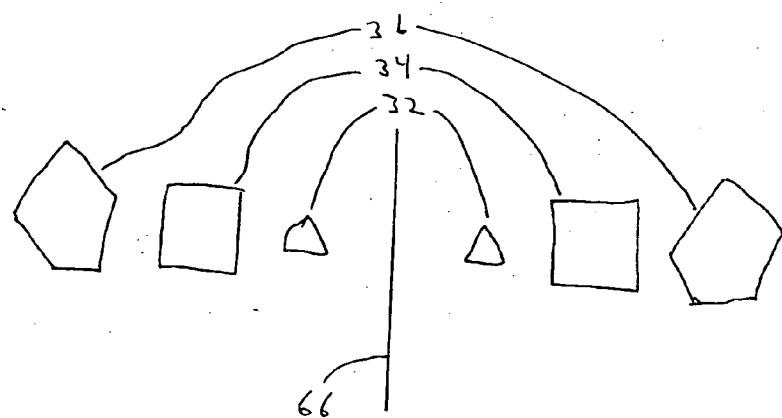


FIG. 6B

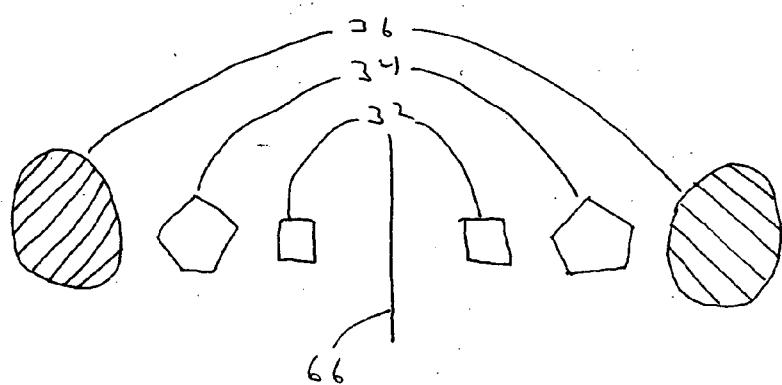


FIG. 6C

CALIBRATED FASTENER SYSTEM

BACKGROUND OF THE INVENTION

[0001] In general, personal care articles should comfortably fit the body of a wearer. Personal care articles may have fastening tabs located at the rear of the personal care article that extend outwardly and secure to a front portion of the article. For the personal care article to be effective, the fastening tabs should be properly placed on the front portion of the personal care article. Additionally, personal care articles may have second fastening tabs located at the front of the personal care article that extend outwardly and secure to a rear portion of the article. For the personal care article to be effective, these fastening tabs should be properly placed on the rear portion of the personal care article.

[0002] To achieve the optimal combination of comfortable fit, absorbency and leakage protection, the caregiver is encouraged to don the personal care article on the wearer so that the front and rear waist regions are substantially aligned with each other. For some diaper structures, the optimal properties may be achieved by perfect alignment of the front and rear waist regions. For many diaper structures, the optimal properties are achieved by aligning the waistband regions so that the front waist edge is slightly below the back waist edge relative to a standing wearer. For the caregiver, it has often been difficult to place the diaper structure under the baby or other wearer and fasten it to achieve optimal alignment, without multiple attempts. Often, the caregiver fastens the diaper structure on the wearer and then discovers that the waistband regions are not optimally aligned. The caregiver must then unfasten the diaper structure, reposition it, and fasten it again until optimal alignment is achieved.

[0003] Similarly, the caregiver is encouraged to don the diaper structure on the wearer so that the center of the back waistband and the center of the front waistband align with the center of the wearer's back and stomach. The encouraged side-to-side alignment keeps the leg elastics equally tight on the wearer's legs, thus preventing irritation on one side and leakage on the other side. More particularly, if the diaper is cocked to one side or the other side, the size of the leg holes is disproportionate. The leg elastics then apply unequal tension, resulting in one side that is tight and the other side that is loose.

[0004] Therefore, it is important to ensure that the fasteners are secured on the personal care article properly in an easy and intuitive way.

SUMMARY OF THE INVENTION

[0005] The present inventors undertook intensive research and development efforts concerning disposable garment including indicia. While conducting their research, the present inventors discovered unique disposable garments including indicia which insure that fasteners are secured on the disposable garment properly in an easy and intuitive way. A first version of the present invention involves a disposable garment having a first waist region, a second waist region and a crotch region which extends between and connects the first waist region and the second waist region. The garment also includes a longitudinal centerline extending from the first waist region to the second waist region. The disposable garment includes a bodyfacing surface; a garment facing surface; and a fastening system. The fasten-

ing system includes at least two fasteners located in the first waist region configured to engage at least a portion of the garment facing surface in the second waist region. The garment facing surface includes a first pair of positioning indicia and second pair of positioning indicia in the second waist region. Further, the first pair of indicia is located symmetrically about the longitudinal centerline, the second pair of indicia is located substantially symmetrically about the longitudinal centerline. The first pair of indicia is located closer to the longitudinal centerline than the second pair of indicia. The first pair of indicia has a length in a longitudinal direction. The second pair of indicia has a length in a longitudinal direction and the longitudinal length of the first pair of indicia is less than the longitudinal length of the second pair of indicia.

[0006] Another version of the present invention relates to a disposable garment having a first waist region, a second waist region and a crotch region which extends between and connects the first waist region and the second waist region. The garment includes a longitudinal centerline extending from the first waist region to the second waist region. The disposable garment includes a bodyfacing surface; a garment facing surface; and a fastening system. The fastening system includes at least two fasteners located in the first waist region configured to engage at least a portion of the garment facing surface in the second waist region. The garment facing surface includes a first pair of positioning indicia, a second pair of positioning indicia and a third pair of positioning indicia in the second waist region. Further, the first pair of indicia is located symmetrically about the longitudinal centerline. The second pair of indicia is located substantially symmetrically about the longitudinal centerline, and the third pair of positioning indicia is located substantially symmetrically about the longitudinal centerline. The first pair of indicia is located closer to the longitudinal centerline than the second pair of indicia. The first pair of indicia has a length in a longitudinal direction. The second pair of indicia has a length in a longitudinal direction and the longitudinal length of the first pair of indicia is less than the longitudinal length of the second pair of indicia. The third pair of indicia has a length in a longitudinal direction and the longitudinal length of the second indicia is less than the longitudinal length of the third indicia.

[0007] A third version of the present invention relates to an array of disposable garments including a first size and a second size. The second size is larger than the first size. The first size includes positioning indicia. The second size includes position indicia. Further, the first size positioning indicia and the second size positioning indicia are calibrated.

[0008] It is to be understood that both the foregoing general description and the following detailed description are exemplary and are intended to provide further explanation of the invention claimed. The accompanying drawings, that are incorporated in and constitute part of this specification, are included to illustrate and provide a further understanding of the articles of the invention. Together with the description, the drawings serve to explain various aspects of the invention.

DRAWINGS

[0009] The foregoing and other features and aspects of the present invention and the manner of attaining them will

become more apparent, and the invention itself will be better understood by reference to the following description, appended claims and accompanying drawings, where:

[0010] FIG. 1 illustrates a plan view of the bodyfacing surface of a representative disposable absorbent article;

[0011] FIG. 2 illustrates a plan view of the garment facing surface of a representative disposable absorbent article;

[0012] FIG. 3 illustrates a plan view of the bodyfacing surface of a representative disposable absorbent article;

[0013] FIG. 4 illustrates a version of an ear suitable for incorporation into a disposable absorbent article;

[0014] FIGS. 5A-5E illustrate versions of indicia suitable for incorporation into a disposable absorbent article; and

[0015] FIGS. 6A-6C illustrate versions of indicia suitable for incorporation into a disposable absorbent article.

DESCRIPTION

[0016] The disclosure of the present invention will be expressed in terms of its various components, elements, constructions, configurations, arrangements and other features that may also be individually or collectively be referenced by the term, "aspect(s)" of the invention, or other similar terms. It is contemplated that the various forms of the disclosed invention may incorporate one or more of its various features and aspects, and that such features and aspects may be employed in any desired, operative combination thereof.

[0017] It should also be noted that, when employed in the present disclosure, the terms "comprises", "comprising" and other derivatives from the root term "comprise" are intended to be open-ended terms that specify the presence of any stated features, elements, integers, steps, or components, and are not intended to preclude the presence or addition of one or more other features, elements, integers, steps, components, or groups thereof.

[0018] As used herein, the term "prefastened" refers to a condition wherein the absorbent article has a fastening feature, which is engaged or fastened prior to use by the wearer. For example, the fastening feature of the absorbent article may be engaged or fastened during the manufacturing process.

[0019] The present invention is directed to disposable garments having a calibrated improved fastening system. Additionally, the present invention is directed to a garment having a unique combination of features that provide previously unrecognized and unexpected benefits. This detailed description of the present invention will include a description of a representative disposable garment including the various components of such garments. The description of the representative disposable garment will also include a description of many features encompassed by the present invention.

Representative Disposable Garment

[0020] The present invention concerns a calibrated fastening system for use with disposable garments. The disposable garments are adapted to be worn adjacent to the body of a wearer, that is, a disposable garment that is similar to a disposable diaper. It is understood that the features of the

present invention are equally adaptable for other types of disposable garments such as adult incontinence garments, training pants, disposable swim pants and feminine hygiene garments.

[0021] As used herein, the term "disposable" refers to garments which are intended to be discarded after a limited use and which are not intended to be laundered or otherwise restored for reuse. The disposable garments of the present invention will be described in terms of a disposable diaper which is adapted to be worn by infants about the lower torso.

[0022] With regard to the designated surfaces of a disposable absorbent article and its components, the various upper or bodyfacing surfaces are configured to face toward the body of the wearer when the disposable absorbent article is worn by the wearer for ordinary use. The various opposing, lower or garment facing surfaces are configured to face away from the wearer's body when the disposable absorbent article is worn by the wearer.

[0023] As used herein, reference to two materials or elements being "joined" is intended to refer to the situation wherein the two materials or elements are directly joined to one another or where they are indirectly joined to one another or where they are indirectly joined to an intermediate element. Similarly, methods of joining two materials or elements include forming the elements or materials integrally, or attaching the elements together such as through the use of adhesive bonds, sonic bonds, thermal bonds, pinning, stitching, or a variety of other attachment techniques known in the art, as well as combinations thereof.

[0024] Stretchable materials may include materials that are extensible and materials that are elastomeric. Extensible materials typically have lower capacities to retract to their original lengths after stretching, while elastomeric materials typically have a greater range of stretch and come close to completely retracting to their original lengths. It should be noted that the elongation, extension or permanent deformation properties of an extensible material are determined when the material is dry. Additionally, the percentage of elongation, extension or permanent deformation can be determined in accordance with the following formula:

$$100 * [(L - L_0) / (L_0)]$$

[0025] where:

[0026] L=elongated length; and

[0027] L₀=initial length.

[0028] FIGS. 1-3 representatively illustrate examples of a disposable garment, in this instance a diaper (as generally indicated at 40). Referring to FIGS. 1-3, the diaper (40) defines a front waist region (42), a rear waist region (44) and a crotch region (46) which extends between and connects the front (42) and rear (44) waist regions. The front waist region (42) comprises the portion of the diaper (40) which, when worn, is positioned on the front of the wearer, while the rear waist region (44) comprises the portion of the diaper which, when worn, is positioned on the back of the wearer. The crotch region (46) of the diaper (40) comprises the portion of the diaper which, when worn, is positioned between the legs of the wearer and covers the lower torso of the wearer. The front waist region (42) and the rear waist region (44) may be referred to as a first waist region and a second waist region, wherein the first waist region corresponds to the

front or rear waist region (42, 44) and the second waist regions' corresponds to the other waist region.

[0029] The diaper (40) also includes an outer cover (48), a bodyside liner (50), and an absorbent core (52) situated between the outer cover (48) and the liner (50). The outer edges of the diaper (40) define a periphery (54) with laterally opposed, longitudinally extending side edges (56) and longitudinally opposed, laterally extending end edges (58). The diaper (40) may also include a system of elastomeric gathering members, such as leg elastics and waist elastics (not illustrated). The longitudinal side edges (56) define leg openings (64) for the diaper (40), and optionally are curvilinear and contoured. The lateral end edges (58) are illustrated as straight, but optionally, may be curvilinear. The diaper (40) additionally has a longitudinal centerline (66) and a lateral centerline (68). The diaper (40) may also include additional components to assist in the acquisition, distribution and storage of bodily waste. For example, the diaper (40) may include a transport layer, such as described in U.S. Pat. No. 4,798,603, issued to Meyer et al., or a surge management layer, such as described in European Patent Application Publication No. 0 539 703, published May 5, 1993.

[0030] As used herein, the term "inboard" is intended to refer to the direction from an edge toward a respective centerline. The term "outboard" is intended to refer to a direction away from a respective centerline.

[0031] The diaper (40) generally defines a longitudinally extending length dimension (70), and a laterally extending width dimension (72) (as representatively illustrated in FIGS. 2 and 3). The diaper may have any desired shape, such as rectangular, I-shaped, a generally hourglass shape, or a T-shape.

[0032] The outer cover (48) and the liner (50) may be generally coextensive (e.g., FIG. 2), or optionally, may be non-coextensive. Either or both of the outer cover (48) and the liner (50) may have length and width dimensions which are generally larger than those of the absorbent core (52) and extend beyond the corresponding dimensions of the absorbent core (52) to provide longitudinal side edges (56) and lateral end edges (58) which may be connected or otherwise associated together in an operable manner.

[0033] The outer cover (48) can be composed of various materials and is suitably liquid impermeable. Desirably the outer cover (48) is made of a stretchable material. In a particular aspect, the outer cover (48) is made of an elastomeric material. Suitable elastomeric materials are stretchable in one or more directions. Elastomeric materials may include cast or blown films, foams, or meltblown fabrics composed of polyethylene, polypropylene, or polyolefin copolymers, as well as combinations thereof. The elastomeric materials may include PEBAK elastomer (available from AtoChem located in Philadelphia, Pa.), HYTREL elastomeric polyester (available from E.I. DuPont de Nemours of Wilmington, Del.), KRATON elastomer (available from Kraton Polymers of Houston, Tex.), or strands of LYCRA elastomer (available from E.I. DuPont de Nemours of Wilmington, Del.), or the like, as well as combinations thereof. The outer cover (48) may include materials that have elastomeric properties through a mechanical process, printing process, heating process, or chemical treatment. For example, such materials may be apertured, creped, neck-

stretched, heat activated, embossed, and micro-strained; and may be in the form of films, webs, and laminates.

[0034] In particular aspects, the outer cover (48) may include a 0.4 ounces per square yard (osy) (13.6 grams per square meter (gsm)) basis weight layer of G2760 KRATON elastomer strands adhesively laminated with a 0.3 gsm layer of adhesive between two facings. Each facing can be composed of a thermal point bonded bicomponent spunbond non-woven fibrous web having a 0.7 osy (23.7 gsm) basis weight. The adhesive is an adhesive which is supplied by AtoFindley Adhesive, a business having offices in Wauwatosa, Wis., and designated as H2525A, and the elastomer strands are placed and distributed to provide approximately 12 strands of KRATON elastomer per inch (2.54 cm) of lateral width of the outer cover (48).

[0035] Materials suitable for a biaxially stretchable outer cover (48) include biaxially stretchable materials and biaxially elastic stretchable materials. One example of a suitable outer cover material can include a 0.3 osy (10 gsm) polypropylene spunbond that is necked 60% in the lateral direction and creped 60% in the longitudinal direction, laminated with 3 grams per square meter (gsm) AtoFindley Adhesives H2525A styrene-isoprene-styrene based adhesive to 8 gsm PEBAK 2533 film with 20% TiO₂ concentrate. The outer cover (48) can suitably be stretched, laterally and/or longitudinally, by at least 30% (to at least 130% of an initial (unstretched) width and/or length of the outer cover (48)). More suitably, the outer cover (48) can be stretched laterally and/or longitudinally, by at least 50% (to at least 150% of the unstretched width or length of the outer cover (48)). Even more suitably, the outer cover (48) can be stretched, laterally and/or longitudinally, by at least 100% (to at least 200% of the unstretched width or length of the outer cover (48)). Tension force in the outer cover (48) at 50% extension is suitably between 50 and 1000 grams, more suitably between 100 and 600 grams, as measured on a 3 inch (7.62 cm) wide piece of the outer cover material.

[0036] Another example of a suitable material for a biaxially stretchable outer cover (48) is a breathable elastic film/nonwoven laminate, described in U.S. Pat. No. 5,883,028, issued to Morman et al., incorporated herein by reference to the extent that it is consistent (i.e., not in conflict) herewith. Examples of materials having two-way stretchability and retractability are disclosed in U.S. Pat. No. 5,116,662, issued to Morman, and U.S. Pat. No. 5,114,781, issued to Morman, both of which are hereby incorporated herein by reference to the extent that each is consistent (i.e., not in conflict) herewith. These two patents describe composite elastic materials capable of stretching in at least two directions. The materials have at least one elastic sheet and at least one necked material, or reversibly necked material, joined to the elastic sheet at least at three locations arranged in a nonlinear configuration, so that the necked, or reversibly necked, web is gathered between at least two of those locations.

[0037] In an alternative aspect, the outer cover (48) is made of an extensible material. Extensible materials suitable for use as an outer cover (48) can provide an elongation of at least 10; alternatively, at least 20; alternatively, at least 30; or, alternatively, at least 40% when subjected to a tensile force of 30 gmf per inch (per 2.54 cm). Material suitable for use as an outer cover (48) can also provide a substantially

permanent deformation of at least 10; alternatively, at least 15; alternatively, at least 20; alternatively, at least 25; or, alternatively, at least 30% when subjected to a tensile force of 50 gmf per inch (per 2.54 cm) and then allowed to relax, after removal of the tensile force, for a period of 1 minute. It should be readily appreciated that the described removal of the applied force results in a zero applied tensile stress and a zero applied tensile force.

[0038] The outer cover (48) can be composed of various materials and is suitably liquid impermeable. If extensible, for example, the outer cover (48) can be composed of a necked fabric, a creped fabric, a crimped fiber fabric, an extendable fiber fabric, a bonded-carded fabric, a micro-pleated fabric, polymer films or the like, as well as combinations thereof. The fabrics may be knit, woven or non-woven materials, such as spunbond fabrics. In a particular aspect, the outer cover (48) can be composed of an extensible laminate of two or more layers. For example, the outer cover (48) may be a necked laminate formed from at least one neckable fabric laminated to at least one extendable film material wherein the necked laminate is extensible in at least one direction. The outer cover material (48), if extensible, may otherwise be a laminate formed from at least one necked fabric laminated to at least one extendable film material. In such a configuration, the laminate need not be necked. For purposes of the present description, the term "nonwoven web" refers to a web of fibrous material that is formed without the aid of a textile weaving or knitting process. The term "fabrics" is used to refer to woven, knitted and nonwoven fibrous webs. An example of an extensible material suitable for use as an outer cover (48) is a 60% necked, polypropylene spunbond having a basis weight of about 1.2 osy (41 gsm).

[0039] The liner (50) suitably presents a bodyfacing surface which is compliant, soft feeling, and non-irritating to the wearer's skin. Further, the liner (50) may be less hydrophilic than the absorbent core (52), to present a relatively dry surface to the wearer, and is sufficiently porous to be liquid permeable, permitting liquid to readily penetrate through its thickness. A suitable liner (50) may be manufactured from a wide selection of web materials, such as porous foams, reticulated foams, apertured plastic films, natural fibers, synthetic fibers (for example, polyester or polypropylene fibers), or a combination of natural and synthetic fibers. The liner (50) is suitably employed to help isolate the wearer's skin from liquids held in the absorbent core (50).

[0040] Desirably the liner (50) is made of a stretchable material. In a particular aspect, the liner (50) is made of an elastomeric material. Suitable elastomeric materials are stretchable in one or more directions. Suitable elastomeric materials for construction of the liner (50) can include elastic strands, LYCRA elastics, cast or blown elastic films, nonwoven elastic webs, meltblown or spunbond elastomeric fibrous webs, as well as combinations thereof. Examples of suitable elastomeric materials include KRATON elastomers, HYTREL elastomers, ESTANE elastomeric polyurethanes (available from B.F. Goodrich and Company of Cleveland, Ohio), or PEBAX elastomers.

[0041] As an additional example, in one aspect the liner (50) suitably includes a non-woven, spunbond polypropylene fabric composed of about 2 to 3 denier fibers formed

into a web having a basis weight of about 12 gsm which is necked approximately 60%. Strands of about 9 gsm KRA-TON G2760 elastomer material placed eight strands per inch (2.54 cm) are adhered to the necked spunbond material. The fabric is surface treated with an operative amount of surfactant, such as about 0.6 percent AHCOVEL Base N62 surfactant, available from ICI Americas, a business having offices in Wilmington, Del. The surfactant can be applied by any conventional means, such as spraying, printing, brush coating or the like. Other suitable materials may be extensible biaxially stretchable materials, such as a neck stretched/creped spunbond.

[0042] In an alternative aspect, the liner (50) is made of an extensible material. Extensible liner materials (50) can provide an elongation of at least 50% when subjected to a tensile force of 10 gmf per inch (per 2.54 cm). Extensible materials suitable for use as a liner (50) can also provide a substantially permanent deformation of at least 10% when subjected to a tensile force of 50 gmf per inch (per 2.54 cm) and then allowed to relax, after removal of the tensile force, for a period of 1 minute. It should be readily appreciated that the described removal of the applied force results in a zero applied tensile stress and a zero applied tensile force.

[0043] A suitable extensible liner (50) may be manufactured from a wide range of materials including, but not limited to knit, woven and nonwoven materials, apertured formed thermoplastic films, apertured plastic films, hydro-formed films, porous foams, reticulated foams, reticulated thermoplastic films, and thermoplastic scrims. Suitable woven and nonwoven materials can include natural fibers (e.g., wood or cotton fibers), synthetic or modified natural fibers (e.g., polymeric fibers, such as polyester, polypropylene fibers, and polyethylene, or polyvinylalcohol, starch base resins, polyurethanes, cellulose esters, nylon, and rayon fibers), or a combination of natural and synthetic fibers. When the extensible liner material (50) includes a nonwoven web, the web may be spunbonded, carded, wet-laid, melt-blown, hydroentangled, combinations of the above, or the like. An example of a suitable extensible liner (50) is a 50% necked, polypropylene spunbond having a basis weight of about 0.5 osy.

[0044] As previously mentioned, the liner (50) may be treated with a surfactant. This can be accomplished by a variety of techniques known to those skilled in the art. Treating the liner (50) with a surfactant generally renders the liner (50) more hydrophilic. This typically results in liquid penetrating the liner (50) faster than if it were not treated.

[0045] The absorbent core (52) may include a matrix of hydrophilic fibers, such as a web of cellulosic fluff, mixed with particles of a high-absorbency material commonly known as superabsorbent material. In a particular version, the absorbent core (52) includes a mixture of superabsorbent hydrogel-forming particles and wood pulp fluff. The wood pulp fluff may be exchanged with synthetic polymeric, meltblown fibers or with a combination of meltblown fibers and natural fibers. The superabsorbent particles may be substantially homogeneously mixed with the hydrophilic fibers or may be non-uniformly mixed.

[0046] The absorbent core (52) may have any of a number of shapes. For example, the absorbent core (52) may be rectangular, 1-shaped or T-shaped. It is often desired that the absorbent core (52) be narrower in the crotch portion than the rear or front portion(s).

[0047] The high-absorbency material can be selected from natural, synthetic and modified natural polymers and materials. The high-absorbency materials can be inorganic materials, such as silica gels, or organic compounds, such as crosslinked polymers. The term "crosslinked" refers to any means for effectively rendering normally water-soluble materials substantially water insoluble, but swellable. Such means can include, for example, physical entanglement, crystalline domains, covalent bonds, ionic complexes and associations, hydrophilic associations, such as hydrogen bonding, and hydrophobic associations or Van der Waals forces.

[0048] Examples of synthetic, polymeric, high-absorbency materials include the alkali metal and ammonium salts of poly(acrylic acid) and poly(methacrylic acid), poly(acrylamides), poly(vinyl ethers), maleic anhydride copolymers with vinyl ethers and alpha-olefins, poly(vinyl pyrrolidone), poly(vinyl morpholinone), poly(vinyl alcohol), and mixtures and copolymers thereof. Further polymers suitable for use in the absorbent core include natural and modified natural polymers, such as hydrolyzed acrylonitrile-grafted starch, acrylic acid grafted starch, methyl cellulose, carboxymethyl cellulose, hydroxypropyl cellulose, and the natural gums, such as alginates, xanthum gum, locust bean gum, and the like. Mixtures of natural and wholly or partially synthetic absorbent polymers can also be useful. Processes for preparing synthetic, absorbent gelling polymers are disclosed in U.S. Pat. No. 4,076,663, issued to Masuda et al., and U.S. Pat. No. 4,286,082, issued to Tsubakimoto et al.

[0049] The high-absorbency material may be in a variety of geometric forms. It is desired that the high-absorbency material be in the form of discrete particles. However, the high-absorbency material may also be in the form of fibers, flakes, rods, spheres, needles, or the like. Often, the high-absorbency material is present in the absorbent core (52) in an amount of from about 5 to about 100 weight percent based on total weight of the absorbent core (52).

[0050] Referring again to FIGS. 1-3, illustrated are versions of a diaper (40) in its generally flat-out, uncontracted state (i.e., with all elastic induced gathering and contraction removed). The diaper (40) includes a liner (50) and an outer cover (48) which are coextensive and have length and width dimensions generally larger than those of an absorbent core (52). The liner (50) is associated with and superposed on the outer cover (48) to thereby form the periphery (54) of the diaper (40). The periphery (54) defines an outer perimeter or edge(s) of the diaper (40). The periphery (54) generally includes longitudinal side edges (56) and lateral end edges (58).

[0051] The disposable absorbent articles may also include a single or a dual fastening system (80) for securing the absorbent article about the waist of the wearer. The illustrated versions of the diaper (40) include a dual fastening system (80), however one skilled in the art may chose to include only a single fastener system with elements chosen from the dual fastening system described. The dual fastening system illustrated includes at least two first fasteners (82) and at least two second fasteners (84). The first fasteners (82) are situated in the rear waist region (44) of the diaper (40), and located inboard each longitudinal side edge (56). The first fasteners (82) engage the outer cover (48) of the

front waist region (42) of the diaper (40) for holding the diaper on the wearer. Desirably, the first fasteners (82) are releasably engageable directly with the garment facing surface of the outer cover (48). Alternatively, the diaper (40) may include a fastening panel (not illustrated) situated in the front waist region (42) of the garment facing surface of the outer cover (48). In this configuration, the fastening panel forms a portion of the garment facing surface of the garment. In such a configuration, the first fasteners (82) are releasably engageable with the fastening panel to maintain the diaper (40) about the waist of the wearer. As representatively illustrated in FIGS. 1 and 3, the first fasteners (82) may be hook type fasteners and the outer cover (48) or fastening panel may be configured to function as a complimentary loop type fastener. Desirably, the first fasteners (82) are hook type fasteners which are releasably engageable with the outer cover (48). Such an arrangement provides the ability to vary the size of the waist opening in very small increments over a wide range to fit the waist of the wearer. The first fasteners (82) may have a variety of shapes and sizes which provide the desired fastening of the diaper (40) about the waist of the wearer.

[0052] A dual fastening system (80) would further include at least two second fasteners (84) to provide improved securement of the diaper (40) about the waist of the wearer. For example, as representatively illustrated in FIGS. 1-3, the diaper (40) may include at least two second fasteners (84) situated in the front waist region (42) of the diaper, and located adjacent each longitudinal side edge (56). The second fasteners (84) are configured to encircle the hips of the wearer and engage the bodyfacing surface of the liner (50) in the rear waist region (44) of the diaper (40). Suitably, as representatively illustrated in FIG. 2, the second fasteners (84) are hook type fasteners which are releasably engageable directly with the bodyfacing surface of the liner (50). Alternatively, the diaper (40) may include one or more fastening panels (not illustrated) on the bodyfacing surface of the rear waist region (44) to which the second fasteners (84) are releasably engageable.

[0053] The dual fastening system (80) may be presented to a user in a flat configuration, such that the user may don the garment without removal of clothes. Alternatively, the dual fastening system (80) may be presented to a user in a prefastened configuration, such that the user may don the garment as one would don underpants.

[0054] The term fastening tab as used in the present application refers to the laterally outward portions of the front or rear waist region (42, 44). The dual fastening system (80) includes fastening tabs (30). Fastening tabs (30) may be secured to the bodyfacing surface by ultrasonic bonding at opposing sides of front and rear waist regions (42, 44) of the disposable garment (as illustrated in FIG. 3). Each fastening tab (30) includes a bodyfacing surface and a garment facing surface. Each fastening tab (30) further includes first (82) or second (84) fasteners attached to the fastening tabs on the bodyfacing or garment facing surface.

[0055] While ultrasonic bonding is disclosed as a method for mounting fastening tabs (30), other well known methods are contemplated. For example, curing adhesives, stitching, and pressure sensitive adhesives, are all potential mechanisms for suitably and permanently securing the inboard ends of fastening tabs (30). Fastening tabs (30) may be

secured to the bodyfacing surface, alternatively, fastening tabs (30) may be secured to the garment facing surface, alternatively, fastening tabs (30) may be secured between the garment facing and bodyfacing surfaces.

[0056] Fastening tabs (30) may be formed as an integral part of the garment facing surface and/or the bodyfacing surface (as illustrated in **FIGS. 1 and 2**). Such an arrangement reduces the amount of elements needed to form the garment.

[0057] Fastening tab (30) may include a tab substrate preferably comprising a non-woven material, such as spunbond-meltblown-spunbond material (SMS). Spunbond-meltblown-spunbond material comprises a layer of meltblown material disposed between and in surface-to-surface relationship with the spunbond layers.

[0058] Other materials having suitable characteristics can be substituted for the above described tab substrates for fastening tab (30). Furthermore, extensible materials can be utilized for the tab substrate.

[0059] An alternative dual fastening system (80) may include one or more ears (89). As illustrated in **FIGS. 3 and 4**, each ear (89) includes a proximal edge (92), an opposed distal edge (94), a first connecting edge (96), and a second connecting edge (98). As used herein, the proximal edge (92) is that edge of the ear (89) located nearest to the longitudinal centerline (66). The distal edge (94) is that edge of the ear (89) which is opposite the proximal edge (92). The first (96) and second (98) connecting edges connect the proximal edge (92) and the distal edge (94) thereby defining a body of material which at least partially defines an ear (89). The ear (89) may be made of a variety of materials including those that are extensible, non extensible, elastomeric and/or non-elastomeric. Desirably, the ear (89) is made of a non-elastomeric material.

[0060] The diaper (40) illustrated in **FIG. 3** includes a version of the alternative dual fastening system (80) described herein. Specifically, the dual fastening system (80) includes at least two first fasteners (82) and at least two second fasteners (84). Typically, the first fasteners (82) are located inboard of a distal edge (94) on a bodyfacing surface of a first ear (90). At least a portion of the proximal edge (92) of the first ear (90) is joined to the rear waist region (44) of the diaper (40), with the distal edge (94) of the ear extending outboard from the longitudinal centerline (66) and forming a portion of the side edge (56) of the diaper. Desirably, the first fasteners (82) are releasably engageable directly with the garment facing surface of the outer cover (48). Alternatively, the diaper (40) may include a fastening panel (not illustrated) situated in the front waist region (42) of the garment facing surface of the outer cover (48). In such a configuration, the first fasteners (82) are releasably engageable with the fastening panel to maintain the diaper (40) about the waist of the wearer.

[0061] The dual fastening system of this alternate version also includes a pair of second fasteners (84). Specifically, the second fasteners (84) are located inboard of a distal edge (94) on a garment facing surface of a second ear (91). At least a portion of the proximal edge (92) of the second ear (91) is joined to the front waist region (42) of the diaper (40), with the distal edge (94) of the ear extending outboard from the longitudinal centerline (66) and forming a portion of the

side edge (56) of the diaper. Desirably, the second fasteners (84) are hook type fasteners which are releasably engageable directly with the bodyfacing surface of the liner (50). Alternatively, the diaper (40) may include one or more fastening panels (not illustrated) on the bodyfacing surface of the rear waist region (44) to which the second fasteners (84) are releasably engageable.

[0062] Suitable fasteners are well known to those of skill in the art and can include adhesive tape tab fasteners, hook and loop fasteners, mushroom fasteners, snaps, pin, belts and the like, and combinations thereof. For example, as representatively illustrated in **FIGS. 1 and 3**, the first fasteners (82) may be hook type fasteners and the outer cover (48) or fastening panel (not illustrated) may be configured to function as a complimentary loop type fastener. Desirably, the first fasteners (82) are hook type fasteners which are releasably engageable with at least a portion of an outer cover (48). The second fasteners (84) may also be hook type fasteners (as representatively illustrated in **FIG. 2**) and the liner (50) or fastening panel (not illustrated) may be configured to function as a complimentary loop type fastener. Desirably, the second fasteners (84) are hook type fasteners which are releasably engageable with at least a portion of a liner (50). Such an arrangement provides the ability to vary the size of the waist opening in very small increments over a wide range to fit the waist of the wearer. The first (82) and second (84) fasteners may have a variety of shapes and sizes which provide the desired fastening of the diaper about the waist of the wearer.

[0063] The present inventors have discovered that certain advantages are achieved by adding indicia, specifically first and second indicia to a disposable garment such as a diaper. Indicia may be included on various portions of the garment and may be configured in various shapes and sizes to guide in fitting the garment. In the various embodiments, indicia may comprise any number of shapes and sizes on the front or rear waist region on the bodyfacing or garment facing surface. The indicia may be simple geometric shapes or more complex designs, for example paw prints or animal shapes. Other shapes are contemplated. For example, indicia may comprise alphanumeric characters.

[0064] As used herein and in the claims that follow, the term "indicia" is meant to include any type of lines, patterns, ornamental designs, symbols, script, color codes, combinations of the aforementioned or other markings which have the capability, either inherently or with additional denotation, to aid an individual fitting the diaper to the wearer. Additionally, indicia may optionally be cross referenced to an anthropometric trait such as weight, height or waist circumference which is then included on a package or otherwise communicated to a user. Indicia may be perceptible using any of the senses.

[0065] Visual indicia may include paint, ink, dyes, or other coloring agents applied to, or visible through, a surface, as well as separate elements having indicia, such as a separate sheet of material secured to the surface, colored thread stitched or otherwise secured to the substrate to form the indicia, elastomeric elements having a different color than the substrate and secured thereto, or other elements having substantially the same function and effect, secured to the substrate. "Indicia" also includes luminescent material such as luminescent paint having luminescent pigments that radi-

ate visible light when exposed to ultraviolet light. Examples of suitable luminescent paints are those made with phosphors, such as zinc or cadmium sulfides. Indicia also include embossing or ultrasonic bonding. For example, embossing can darken the existing color of the material being embossed or provide a texture to the material being embossed. The embossing may reduce the bulk or softness of the material being embossed. Alternatively, in a two layer composite, embossing may allow the color of an underlying layer to become more visible through an upper layer.

[0066] Embodiments wherein phosphors are utilized in constructing the indicia have numerous advantages. First, assuming a garment receives ambient light during the day, its indicia containing phosphors may be visible at night or in poor lighting.

[0067] Second, such garment will be easier to locate at night due to the luminescent effect of the indicia. Therefore, the garment will be easier to locate without operating a light and awakening other persons. Further, less light would be required for placement on a wearer at night. For example, a spent garment for an infant could be replaced with a fresh garment article having luminescing indicia. The amount of ambient light required to secure such fresh garment would be generally less than the amount of light required if such luminescing material were not available. Positioning of fastening tabs (30) would be relatively effortless because of using the luminescent indicia to assist in locating and securing fastening tabs (30). Therefore, the garment could be changed with, minimal disturbance of the wearing infant or other adults, if present in the same room.

[0068] Tactile indicia may include embossing, the addition of raised bumps to a surface or other elements which may be felt with the hands to aid an individual fitting the diaper to the wearer

[0069] Indicia preferably have bright colors so that the indicia are easily detected by a user. Indicia preferably greatly contrast in color from the (typically white, light pink, or light blue) color of respective personal care articles. For example the indicia may comprise three elements. These elements can comprise blue, green and purple colors, respectively, or any other color combination. The element of the indicia may be used to guide a user fitting the disposable garment regarding the positioning of the fasteners. The indicia may guide the user regarding the lateral positioning of the fasteners. For example, the person installing the garment may utilize the indicia to insure that the fastening tabs (30) located in the waist regions opposite the indicia are aligned an equal distance from the longitudinal centerline (66). Alternatively, the indicia may guide the user regarding the longitudinal positioning of the fasteners. The person installing the garment may utilize the multi-colored elements to insure that the fastening tabs (30) located in the waist region opposite the indicia are aligned an equal distance from the end edge (58). Alternatively, the indicia may guide the user regarding the longitudinal and lateral positioning of the fasteners.

[0070] By placing the fastening tabs (30) at the proper longitudinal and lateral position increased comfort and better utilitarian operation are achieved. When a garment is placed on a wearer, and the fastening tabs (30) are secured utilizing the indicia on the waist region, the proper position is assured.

[0071] FIG. 2 illustrates indicia located on the garment facing surface (in the back waist region (44)). The indicia located on the garment surface in the back waist region (44) may comprise two, three or more pair of positioning indicia. Illustrated are three pair of positioning indicia, a first pair (32), a second pair (34) and a third pair (36). Each pair (32, 34, 36) being located substantially symmetrically about the longitudinal centerline (66). As illustrated the first pair of positioning indicia (32) is located closer to the longitudinal center line than the second pair of positioning indicia (34). Further the second pair of positioning indicia (34) is located closer to the longitudinal center line than the third pair of positioning indicia (36). This provides the user an easy reference to place the right and left fastening tabs (30) equidistance from the longitudinal centerline (66). Further the indicia are calibrated to intuitively convey to the consumer placement information. Specifically, the first pair of positioning indicia (34) has a length in the longitudinal direction that is less than the length in the longitudinal direction of the second pair of positioning indicia (32). This relative size conveys to the user who dons the article that placement of the fastening tabs (30) on the first pair of positioning indicia (32) results in a small garment than placement of the fastening tabs (30) on the second pair of positioning indicia (34). Additionally, the second pair of positioning indicia (34) has a length in the longitudinal direction that is less than the length in the longitudinal direction of the third pair of positioning indicia (36). Depending on the design and size of the article, there may be 2, 3, 4 or more pairs of positioning indicia, with the pairs closer to the longitudinal centerline (66) having a longitudinal length smaller than the pair further from the longitudinal centerline (66).

[0072] As illustrated in FIG. 2, the first, second and third pairs of positioning indicia (32, 34, 36) comprise different indicia. For example, the first pair (32) may be circles, the second pair (34) may be triangles and the third pair (36) may be squares.

[0073] FIGS. 5A, 5B, 5C, 5D and 5E illustrate several examples of indicia and their positioning relative to a longitudinal centerline (66). As illustrated in FIG. 5A, the first, second and third pairs of positioning indicia (32, 34, 36) may comprise similar (alike but not identical) or identical indicia, for example all circles. As illustrated in FIG. 5D, the first, second, and third pairs of positioning indicia (32, 34, 36) may comprise alphanumeric characters. The two indicia that comprise a pair of indicia may be similar (a pair of circles, a pair of squares, a pair of ducks, etc.), as shown in FIG. 5D, alternatively the two indicia that comprise a pair of indicia may be dissimilar, as shown in FIG. 5E, where the first pair of position indicia (32) comprise a circle and square or alternatively a duck and a bunny.

[0074] As illustrated in FIG. 5B, an indicia may comprise either an individual element, for example a single circle (the first pair of positioning indicia (32)). Alternatively, indicia may comprise a group of elements, for example three or five associated circles (the second and third pair of positioning indicia (34, 36)). The group of elements may consist of several circles grouped and isolated from the other graphics to form indicia. The group of elements may be closely related, such as a paw print and associated toe prints.

[0075] As illustrated in FIG. 5C, in addition to the pairs of positioning indicia (32, 34, 36), a center graphic (37) may

be included. The center graphic (37) may be related to the pairs of indicia (32, 34, 36) such as a lion center graphic (37) where the pairs of indicia (32, 34, 36) are paw prints, or the center graphic (37) may be unrelated to the pairs of indicia (32, 34, 36).

[0076] Additionally, the fastening tabs (30) may also have tab indicia (38). As illustrated in FIG. 2, the vertical lines on the fastening tabs (30) may be used with the indicia on the bodyfacing surface in the back waist region (44) to further aid the user in placement of the fastener tabs (30).

[0077] The fastener tabs (30) may comprise indicia (32) visible at, and optionally located on garment facing surface or the bodyfacing surface. The indicia (32) on the fastener tabs (30) may comprise first and second substantially parallel lines extending across substantially the entire length a fastening tab (30).

[0078] In placing a garment on a wearer, a donner may utilize the tab indicia (38) in combination with the indicia located on the waist region opposite the fastener tab (30) as a guide, in fitting the personal care article to a wearer.

[0079] Indicia may be utilized to convey the waist size, weight range or other anthropometric data to the user. The Indicia may convey this data to the user directly, for example the indicia may indicate the waist size of 10, 12 and 14 inches. Alternatively, the indicia may correspond to data that is provide on the package or otherwise provided to the user.

[0080] Indicia may be further utilized to convey the waist size, or weight range that an array of disposable garments may fit. For example, FIGS. 6A, 6B and 6C illustrate indicia that could be utilized on an array of disposable garments comprising two, three, or more different sizes of disposable garments, wherein the indicia for a first size would be calibrated with the indicia for a second larger size. As illustrated, FIG. 6A may correspond to a small size, FIG. 6B may correspond to a medium size, and FIG. 6C may correspond to a large. As illustrated, the second indicia (34) from the small size (FIG. 6A) corresponds to the first indicia (32) from the medium size (FIG. 6B). Further, the third indicia (36) from the small size (FIG. 6A) corresponds to the second indicia (34) from the medium size (FIG. 6B).

[0081] The calibration between the second indicia (34) from the small size (FIG. 6A) and the first indicia (32) from the medium size (FIG. 6B) may indicated a similar user waist size, or a similar user weight, or it may simply be calibrated to intuitively show that the large size is for larger users.

[0082] This calibration may be continued with the large size, where the second indicia (34) from the medium size (FIG. 6B) corresponds to the first indicia (32) from the large size (FIG. 6C), and the third indicia (36) from the medium size (FIG. 6B) corresponds to the second indicia (34) from the large size (FIG. 6C). This calibration between two sizes in an array of disposable garment may include one, two or three or more indicia corresponding between a given size and a large size. This calibration, as illustrated, may include corresponding indicia in an array of disposable garments that include two, three or more sizes.

[0083] One of skill in the art will readily appreciate that the various first (32) and second (34) positioning indicia

described herein may be combined to arrive at a number of configurations not illustrated herein, yet quite suitable for use in disposable garment.

[0084] Having described the invention in rather full detail, it will be readily apparent that various changes and modifications can be made without departing from the spirit of the invention. All of such changes and modifications are contemplated as being within the scope of the invention as defined by the appended claims and any equivalents thereto.

What is claimed is:

1. A disposable garment having a first waist region, a second waist region and a crotch region which extends between and connects the first waist region and the second waist region, a longitudinal centerline extending from the first waist region to the second waist region, the disposable garment comprising:

a bodyfacing surface;

a garment facing surface; and

a fastening system, the fastening system comprising:

at least two fasteners located in the first waist region configured to engage at least a portion of the garment facing surface in the second waist region; the garment facing surface comprises a first pair of positioning indicia and second pair of positioning indicia in the second waist region, wherein the first pair of indicia are located symmetrically about the longitudinal centerline, the second pair of indicia are located substantially symmetrically about the longitudinal centerline, the first pair of indicia is located closer to the longitudinal centerline than the second pair of indicia, the first pair of indicia has a length in a longitudinal direction, the second pair of indicia has a length in a longitudinal direction and the longitudinal length of the first pair of indicia is less than the longitudinal length of the second pair of indicia.

2. The disposable garment of claim 1 wherein the fasteners are located on fastener tabs, the fastener tabs include indicia, the fastener tab indicia cooperating with the first and second pair of indicia in guiding a user regarding the positioning of the fasteners.

3. The disposable garment of claim 1 wherein the first pair and the second pair of indicia are similar.

4. The disposable garment of claim 1 wherein the indicia in the second waist region guides the user fitting the disposable garment regarding the longitudinal positioning of the fasteners.

5. The disposable garment of claim 1 wherein the indicia comprise visual indicia.

6. The disposable garment of claim 1 wherein the indicia comprise tactile indicia.

7. The disposable garment of claim 1 wherein the indicia comprise alphanumeric characters.

8. The disposable garment of claim 1 further comprising a second fastening system, the second fastening system comprising:

at least two fasteners located in the second waist region configured to engage at least a portion of the bodyfacing surface in the first waist region; the bodyfacing surface comprises a first pair of positioning indicia and a second pair of positioning indicia in the first waist region, wherein the first pair of indicia are

located symmetrically about the longitudinal centerline, the second pair of indicia are located substantially symmetrically about the longitudinal centerline, the first pair of indicia is located closer to the longitudinal centerline than the second pair of indicia, the first pair of indicia has a length in a longitudinal direction, the second pair of indicia has a length in a longitudinal direction and the longitudinal length of the first pair of indicia is less than the longitudinal length of the second pair of indicia.

9. A disposable garment having a first waist region, a second waist region and a crotch region which extends between and connects the first waist region and the second waist region, a longitudinal centerline extending from the first waist region to the second waist region, the disposable garment comprising:

a bodyfacing surface;

a garment facing surface; and

a fastening system, the fastening system comprising:

at least two fasteners located in the first waist region configured to engage at least a portion of the garment facing surface in the second waist region; the garment facing surface comprises a first pair of positioning indicia, a second pair of positioning indicia and a third pair of positioning indicia in the second waist region, wherein the first pair of indicia are located symmetrically about the longitudinal centerline, the second pair of indicia are located substantially symmetrically about the longitudinal centerline, and the third pair of positioning indicia are located substantially symmetrically about the longitudinal centerline, the first pair of indicia is located closer to the longitudinal centerline than the second pair of indicia, the first pair of indicia has a length in a longitudinal direction, the second pair of indicia has a length in a longitudinal direction and the longitudinal length of the first pair of indicia is less than the longitudinal length of the second pair of indicia, the third pair of indicia has a length in a longitudinal direction and the longitudinal length of the second pair of indicia is less than the longitudinal length of the third indicia.

10. The disposable garment of claim 9 wherein the fasteners are located on fastener tabs, the fastener tabs include indicia, the fastener tab indicia cooperating with the first, second and third pair of indicia in guiding a user regarding the positioning of the fasteners.

11. The disposable garment of claim 9 wherein the first, second and third pair of indicia are similar.

12. The disposable garment of claim 9 wherein the indicia in the second waist region guides the user fitting the disposable garment regarding the longitudinal positioning of the fasteners.

13. The disposable garment of claim 9 wherein the indicia comprise visual indicia.

14. The disposable garment of claim 9 wherein the indicia comprise tactile indicia.

15. The disposable garment of claim 9 wherein the indicia comprise alphanumeric characters.

16. The disposable garment of claim 9 further comprising a second fastening system, the second fastening system comprising:

at least two fasteners located in the second waist region configured to engage at least a portion of the bodyfacing surface in the first waist region.

17. The disposable garment of claim 16 wherein the bodyfacing facing surface comprises a first pair of positioning indicia and second pair of positioning indicia in the first waist region, wherein the first pair of indicia are located symmetrically about the longitudinal centerline, the second pair of indicia are located substantially symmetrically about the longitudinal centerline, the first pair of indicia is located closer to the longitudinal centerline than the second pair of indicia, the first pair of indicia has a length in a longitudinal direction, the second pair of indicia has a length in a longitudinal direction and the longitudinal length of the first pair of indicia is less than the longitudinal length of the second pair of indicia.

18. An array of disposable garments comprising a first size and a second size wherein the second size is larger than the first size, the first size comprise positioning indicia, the second size comprise position indicia, and the first size positioning indicia and the second size positioning indicia are calibrated.

19. The array of disposable garments of claim 18 wherein the first size positioning indicia include at least two indicia that are calibrated with at least two indicia that is included on the second size positioning indicia.

20. The array of disposable garment of claim 18 further contained within a package, wherein the package comprises information related to the calibrated indicia.

21. The array of disposable garments of claim 18 wherein the disposable garments have a first waist region, a second waist region and a crotch region which extends between and connects the first waist region and the second waist region, a longitudinal centerline extending from the first waist region to the second waist region, the disposable garments comprising:

a bodyfacing surface;

a garment facing surface; and

a fastening system, the fastening system comprising:

at least two fasteners located in the first waist region configured to engage at least a portion of the garment facing surface in the second waist region; the garment facing surface comprises a first pair of positioning indicia, a second pair of positioning indicia and a third pair of positioning indicia in the second waist region, wherein the first pair of indicia are located symmetrically about the longitudinal centerline, the second pair of indicia are located substantially symmetrically about the longitudinal centerline, and the third pair of positioning indicia are located substantially symmetrically about the longitudinal centerline, the first pair of indicia is located closer to the longitudinal centerline than the second pair of indicia, the first pair of indicia has a length in a longitudinal direction, the second pair of indicia has a length in a longitudinal direction and the longitudinal length of the first pair of indicia is less than the longitudinal length of the second pair of indicia, the third pair of indicia has a length in a longitudinal direction, the longitudinal length of the second pair of indicia is less than the longitudinal length of the third indicia and the first size second indicia is calibrated with the second size first indicia.

22. The array of disposable garments of claim 21 wherein the first size third indicia is calibrated with the second size second indicia.