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(54) DISPOSABLE ABSORBENT ARTICLE HAVING A WAIST OPENING WITH A SCALLOPED EDGE

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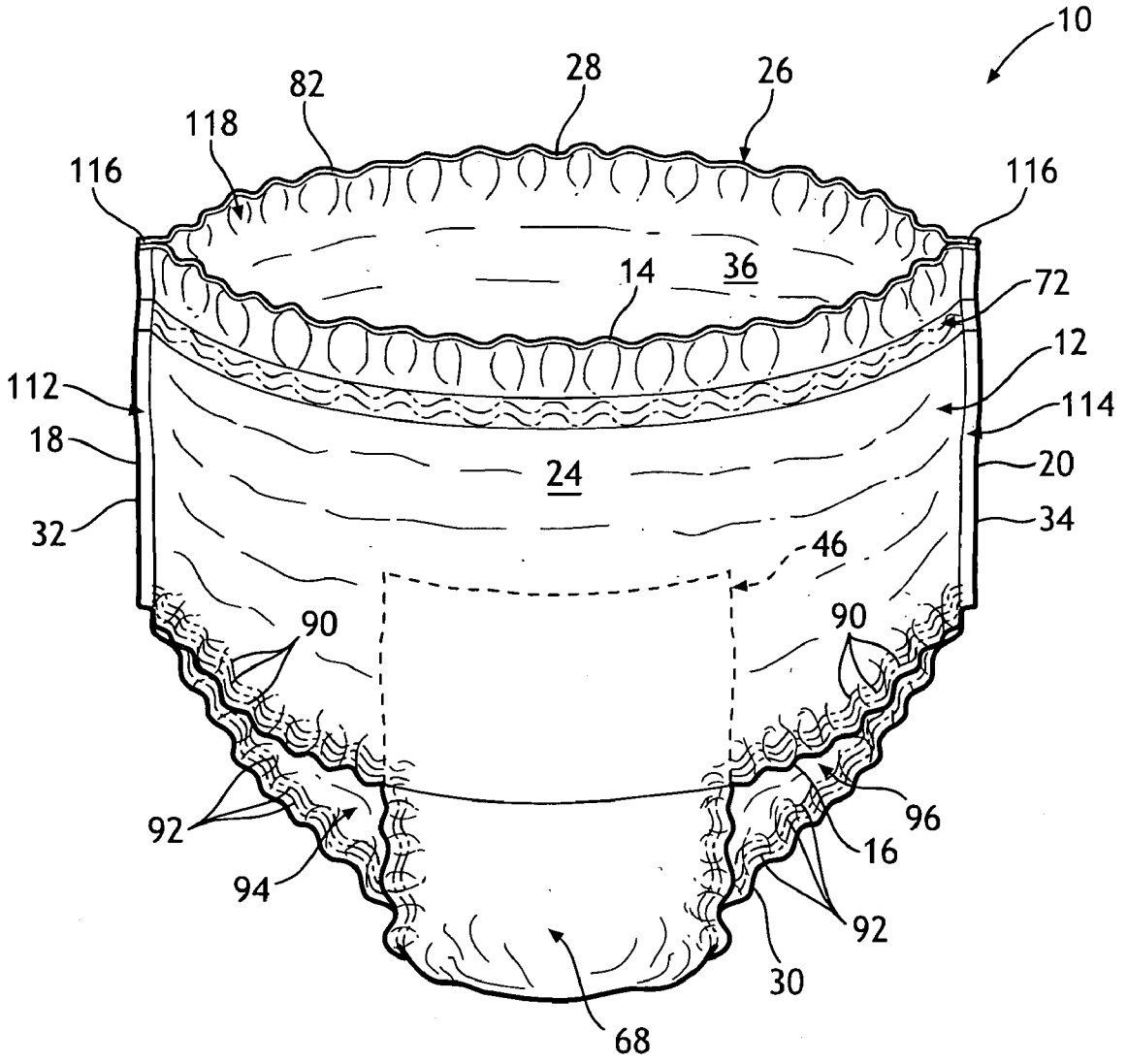
(57) **ABSTRACT**

A disposable absorbent article is disclosed having stretchable front and back regions each having a first scalloped end, a second end, a first side edge, a second side edge, an interior surface and an exterior surface. An absorbent assembly is secured to the interior surfaces of the front and back regions. A waist band is secured to the exterior surfaces of the front and back regions and each of a pair of leg bands is secured to the interior surface of one of the front and back regions. The absorbent article further includes a pair of seams joining the front and back regions together along the first and second side edges to form an absorbent article having a waist opening with a scalloped edge and a pair of leg openings.



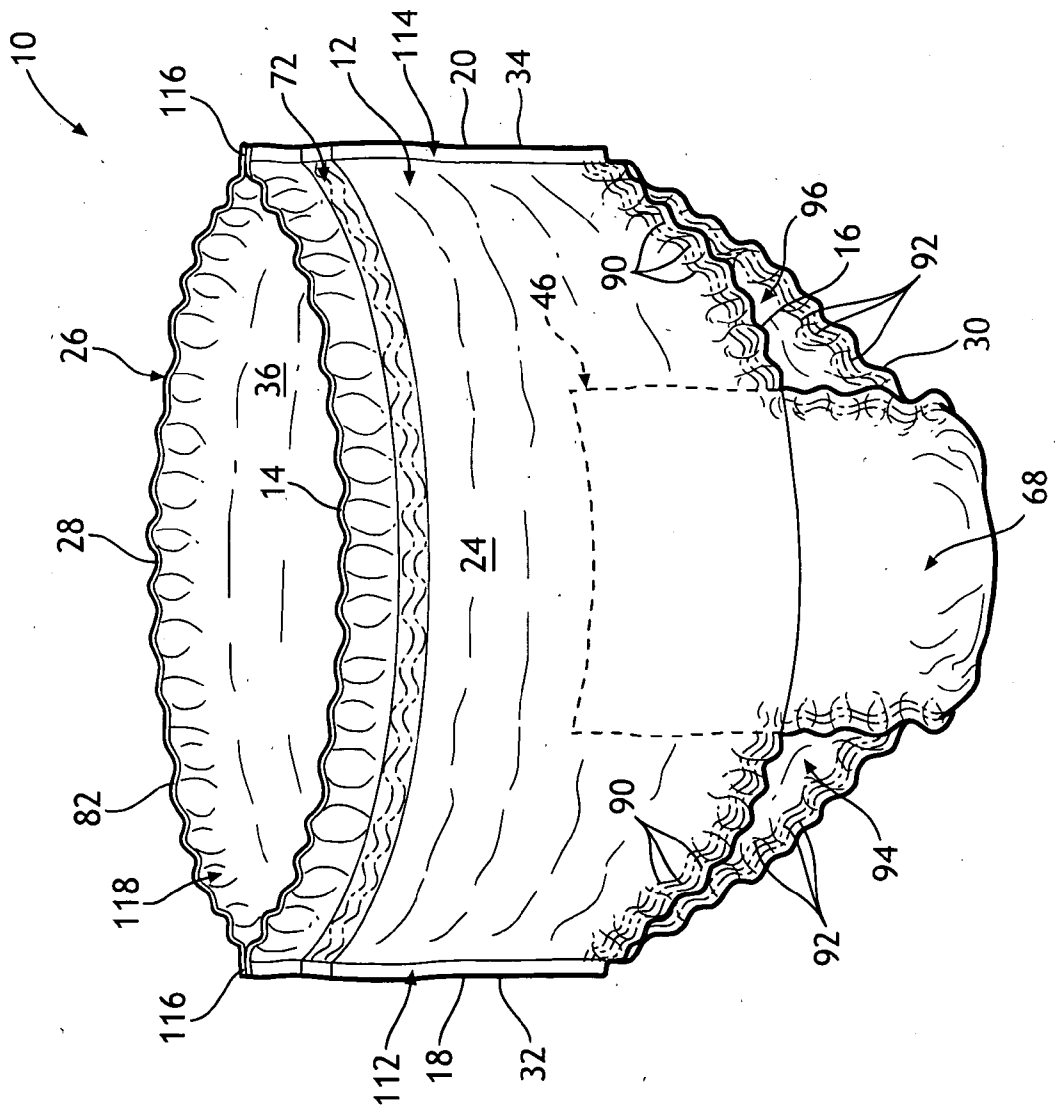

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FIG. 1

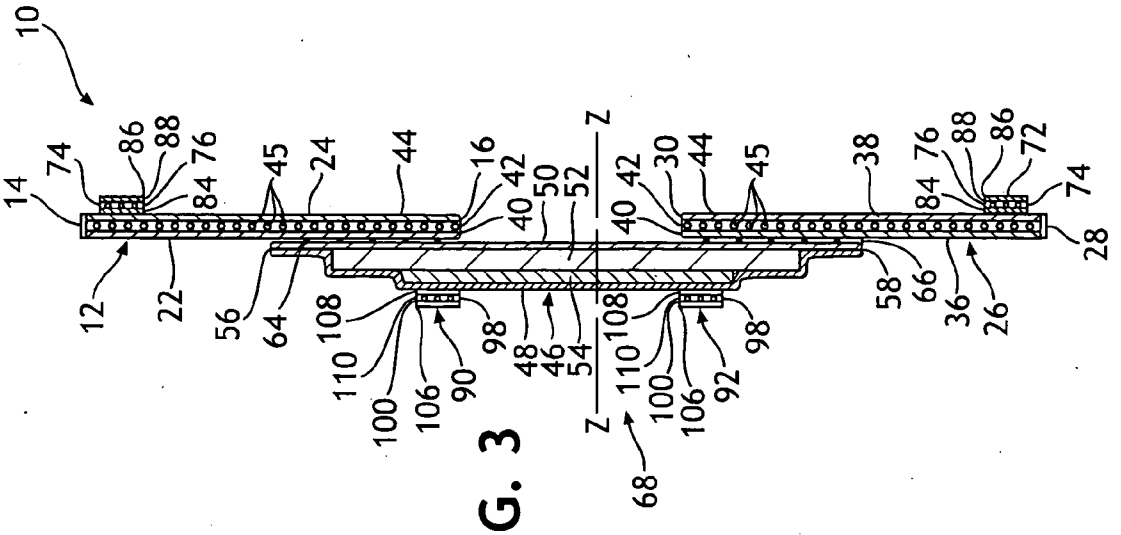
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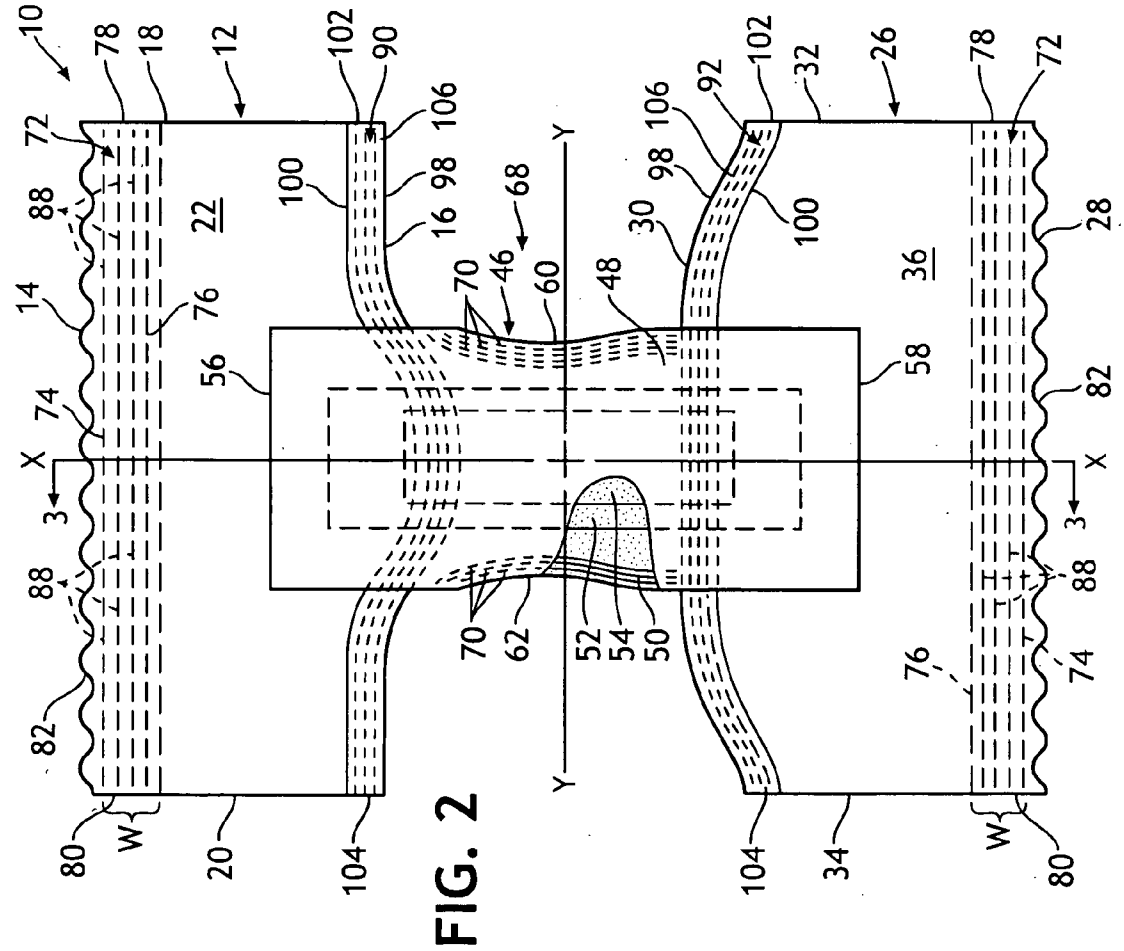
FIG. 3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46
60
48
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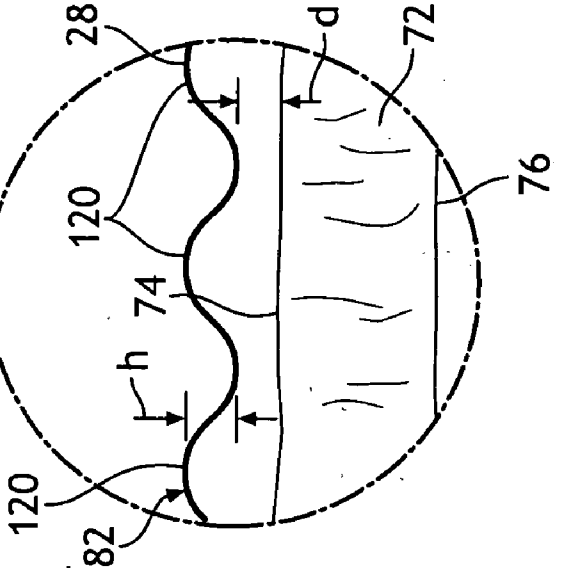
FIG. 2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72
120
76
74
h
120
82

FIG. 5

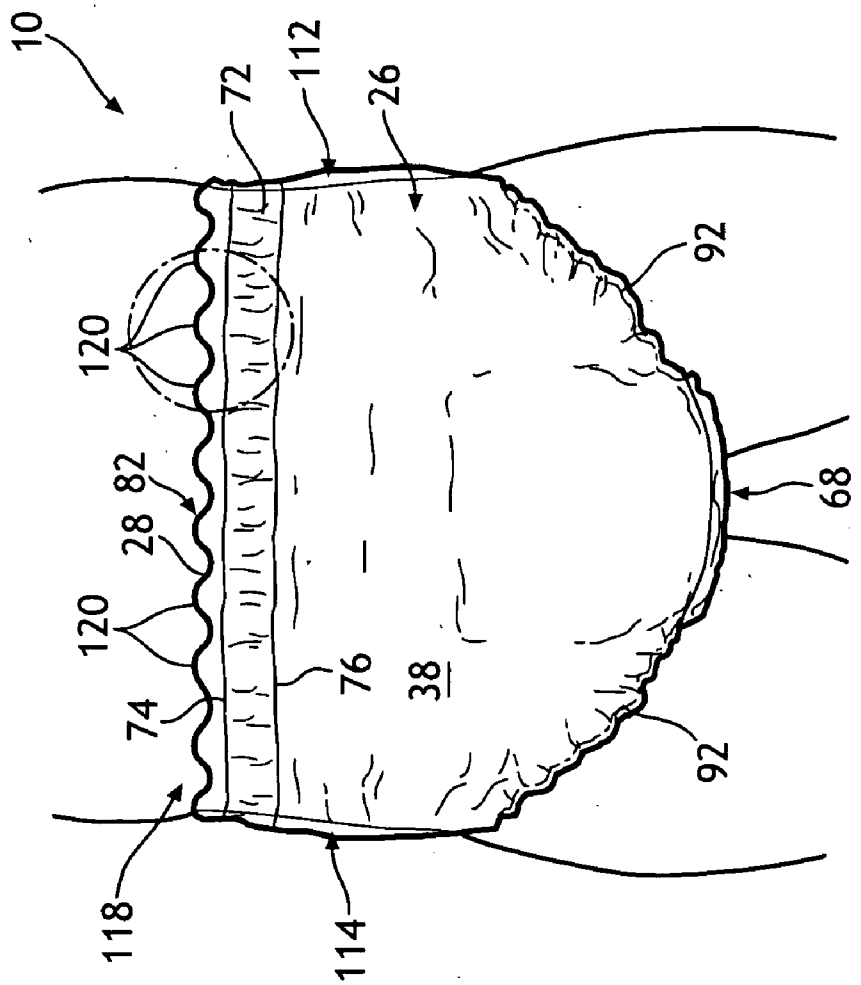
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FIG. 4

DISPOSABLE ABSORBENT ARTICLE HAVING A WAIST OPENING WITH A SCALLOPED EDGE

BACKGROUND OF THE INVENTION

[0001] Disposable absorbent articles are available in many different sizes, styles and configurations and are designed for absorbing human exudate, such as urine and fecal matter. Most disposable absorbent, articles are intended to be worn by infants, toddlers, or adults and are designed for single or temporary use. By "single or temporary use" it is meant that the disposable absorbent article will be disposed of after being used once instead of being laundered or cleaned for re-use, as is typical of regular cloth underwear. Examples of some disposable absorbent articles include an infant diaper, a child training pant, a feminine menstrual pant and an adult incontinent undergarment. Many of such disposable absorbent articles are similar in appearance, size and shape to regular cloth underwear except that they are formed from a variety of materials including absorbent and elastic materials. The absorbent materials allow the disposable absorbent article to absorb and retain body waste while the elastic material permits the disposable absorbent article to snugly conform to the anatomy of the user's torso.

[0002] Most manufacturers of such disposable absorbent articles are constantly looking to improve the appearance, aesthetics and normalcy of such articles to simulate cloth underwear. The reason for this is that the adult users of disposable absorbent articles have been preconditioned by years of wearing cloth underwear. "Cloth" underwear includes underwear formed from various natural and/or synthetic materials, including cotton, nylon, rayon, SPANDEX, as well as other materials known to those skilled in the art that are used to manufacture undergarments. Especially in adult incontinent undergarments, site and handling tests have indicated that women who use such products prefer that their disposable absorbent articles appear to be similar to regular cloth underwear. They are asking for a disposable absorbent article that both feels like and appears like regular cloth underwear.

[0003] Now a disposable absorbent article for absorbing human discharges has been invented that mirrors cloth underwear in that it includes a waist opening with a scalloped edge. The stretchable waist band is separate and distinct from the scalloped edge and is located slightly below the waist opening. The scalloped edge provides a soft feel, comfort to the user and has a more cloth underwear-like appearance.

SUMMARY OF THE INVENTION

[0004] Briefly, this invention relates to a disposable absorbent article having a waist opening with a scalloped edge. The disposable absorbent article includes stretchable front and back regions each having a first scalloped end, a second end, a first side edge, a second side edge, an interior surface and an exterior surface. An absorbent assembly is secured to the interior surfaces of the front and back regions. The absorbent assembly includes a bodyside liner, an outer cover, and an absorbent positioned therebetween. A waist band is secured to the exterior surfaces of the front and back regions slightly below the first scalloped ends of the front and back regions. Each of a pair of leg bands is secured to the interior surface of one of the front and back regions. Each of the pair of leg bands is positioned adjacent to the second end of one of the front and back regions. The absorbent article also includes a pair of seams joining the front and back regions together along the first and second side edges to form an absorbent article having a waist opening with a scalloped edge and a pair of leg openings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] **FIG. 1** is a perspective view of a disposable absorbent article having a waist opening with a scalloped edge.

[0006] **FIG. 2** is a plane view of the disposable absorbent article shown in **FIG. 1**. with an absorbent assembly secured to the inner surface of the front and back regions and showing a partial cut away view of the construction of the absorbent assembly.

[0007] **FIG. 3** is a side view of the disposable absorbent article shown in **FIG. 2** and taken along line **3-3**.

[0008] **FIG. 4** is a view of a person's buttock and rear torso when wearing the disposable absorbent article shown in **FIG. 1** depicting a waist opening with a scalloped edge and a waist band secured to the exterior surface of the back region slightly below the scalloped edge.

[0009] **FIG. 5** is an enlarged view of the encircled area shown on **FIG. 4**.

DETAILED DESCRIPTION

[0010] Referring to **FIG. 1**, a disposable absorbent article **10** is depicted that is designed for absorbing human exudate, such as urine and fecal matter. The disposable absorbent article **10** is intended to be worn by persons, including infants, toddlers, or adults, and is designed for a single or temporary use. The disposable absorbent article **10** is meant to be disposed of after being used once, instead of being laundered or cleaned for re-use. The disposable absorbent article **10** is designed to be pulled up around the user's torso without having to first open the absorbent article **10** in order to place it on a person's body. In **FIG. 1**, the disposable absorbent article **10** is shown as an adult incontinent undergarment. The disposable absorbent article **10** is shown having its normal appearance just prior to being pulled up around a user's torso.

[0011] Referring to **FIGS. 2 and 3**, the disposable absorbent article **10** is depicted in an open configuration solely for the purpose of better showing the various components. The disposable absorbent article **10** in an open configuration has a longitudinal central axis X-X, a transverse central axis Y-Y and a vertical central axis Z-Z. The disposable absorbent article **10** includes a front region **12** having a first end **14** spaced apart from a second end **16** and a first side edge **18** spaced apart from a second side edge **20**. Desirably, the first end **14** is scalloped. The front region **12** is stretchable and has an interior surface **22** and an exterior surface **24**, see **FIG. 3**. By "stretchable" it is meant that the front region **12** can be lengthened, widened, or extended by applying a force, such as by pulling. The front region **12** is also capable of retracting to or towards its original pre-stretched length. By "retraction" it is meant that the front region **12** can be shortened, or reduced in size or length. For example, a 1 inch (2.54 cm) strip of material can be stretched to about 2 inches (about 5 cm) and then when the stretching force is removed,

the material will retract to or towards its original pre-stretched length of 1 inch (2.54 cm). The retracted length of the front region **12** is measured as the distance between the first and second side edges, **18** and **20** respectively. The retracted length is measured after the force required to stretch the material has been removed. A common means of making the front region **12** stretchable is to form it from an elastic component. By "elastic" is meant a material that is capable of quickly or immediately returning to or towards its initial form or state after deformation. Examples of stretchable materials include natural and synthetic rubbers, laminates containing at least one elastomeric layer, elastomeric films, spunbond, a spunbond laminate (SBL) or other material known to those skilled in the art. SBL is a material manufactured and commercially sold by Kimberly-Clark Corporation® having an office at 401 North Lake Street, Neenah, Wis. 54956. Some stretchable materials and/or the process for making such stretchable materials are taught and described in U.S. Pat. Nos. 4,720,415; 5,336,545; 5,366,793; 5,385,775 and in Patent Publication 2002/0119722A1 dated Aug. 29, 2002, all of which are incorporated by reference and made a part hereof.

[**0012**] The disposable absorbent article **10** also includes a back region **26** having a first scalloped end **28** spaced apart from a second end **30** and a first side edge **32** spaced apart from a second side edge **34**. Desirably, the first end **28** is scalloped. More desirably, the first scalloped end **14** of the front region **12** will be identical in size and configuration to the first scalloped end **28** of the back region **26**. The back region **26** is stretchable and has an interior surface **36** and an exterior surface **38**, see **FIG. 3**. The same definitions recited above for the words "stretchable" and "retraction" apply to the back region **26**. The retracted length of the back region **26** is measured as the distance between the first and second side edges, **32** and **34** respectively. The retracted length is measured after the force required to stretch the material has been removed.

[**0013**] The front and back regions, **12** and **26** respectively, are discontinuous from one another along the longitudinal axis X-X. The interior surfaces **22** and **36** of the front and back regions, **12** and **26** respectively, are in direct contact with the user's skin and are also sometimes referred to as the bodyside surfaces. The exterior surfaces **24** and **38** are situated opposite to the interior surfaces **22** and **36** and are spaced away from the user's skin. The exterior surfaces **24** and **38** are also sometimes referred to as the garment facing surfaces since they can be in direct contact with the inner surfaces of the user's outer clothing.

[**0014**] The front and back regions, **12** and **26** respectively, are formed from a stretchable material. Desirably, the stretchable material is an elastic material. More desirably, the stretchable material is an elastic laminate that contains two or more layers wherein at least one of the layers is elastic. By "elastic layer" it is meant an elastic sheet, an elastic film, an elastic net-like material or a plurality of elastic strands aligned in a given plane. When a plurality of elastic strands is utilized, they can be positioned on a single carrier layer or be positioned between two or more outer layers. Each of the front and back regions, **12** and **26** respectively, is formed such that essentially the entire region **12** and **26** is capable of being stretched and is also capable of being retracted. By "essentially the entire" it is meant that approximately about 90% to about 100% of the front region **12** is stretchable and retractable, and approximately about 90% to about 100% of the back region **26** is stretchable and retractable.

[**0015**] Referring now to **FIG. 3**, each of the front and back regions, **12** and **26** respectively, is shown being formed as a three-layer laminate. Each of the front and back regions, **12** and **26** respectively, includes a first layer **40**, a second layer **42**, and a third layer **44**. The first and third layers, **40** and **44** respectively, are the outer layers and can be formed from the same material or from different materials. The first and third layers, **40** and **44** respectively, can be constructed from natural or synthetic fibers and can be a woven or non-woven material. The second or middle layer **42** has the elastic properties and is sandwiched between the first and third layers, **40** and **44** respectively. It should be noted that one or both of the first and third layers (outer layers) **40** or **44** can be made from an elastic material, if desired. The front and back regions, **12** and **26** respectively, can also be formed as a two-layer laminate with at least one of the layers being elastic, if desired.

[**0016**] The elastic laminate provides stretch and retraction in at least one direction. The stretch and retraction can be in one direction or in two or more directions. Desirably, the stretch and retraction of the front and back regions, **12** and **26** respectively, are in a direction approximately parallel to the transverse axis Y-Y. The transverse direction extends laterally across the torso from the left hip to the right hip. More desirably, the stretch and retraction of the front and back regions, **12** and **26** respectively, are in at least two directions, one direction being approximately parallel to the longitudinal axis X-X and the other direction being angled thereto. Most desirably, the stretch and retraction of the front and back regions, **12** and **26** respectively, are in multiple directions, or stated another way, in three or more directions extending over an arc of 360 degrees. The ability of the front and back regions, **12** and **26** respectively, to stretch and retract will provide a restrictive force during use of the disposable absorbent article **10** to ensure that it snugly conforms to the anatomy of the wearer's torso.

[**0017**] Desirably, the front and back regions, **12** and **26** respectively, are constructed from a stretch bonded laminate (SBL). Exemplary SBL materials are described in U.S. Pat. No. 4,720,415. In the stretch bonded laminate, the elastic core, or middle layer **42**, is elongated before the two outer nonwoven layers **40** and **44** are attached. The attachment can be by an adhesive, by heat, by pressure, by a combination of heat and pressure, etc. Another material option for the front and back regions, **12** and **26** respectively, is a necked bonded laminate (NBL). The NBL material is also a three-layer laminate but the elastic core, or middle layer **42**, is not pre-stretched prior to being attached to the two outer non-woven layers **40** and **44**. The outer layers **40** and **44** are necked stretched before the elastic core, or middle layer **42**, is attached to them. Exemplary NBL materials are described in U.S. Pat. No. 5,336,545. Other examples of elastomeric materials that can be used for the front and back regions, **12** and **26** respectively, include a continuous filament stretch bonded laminate (CFSBL) described in U.S. Pat. No. 5,385,775, a vertical filament laminate (VFL) described in Patent Publication 2002/0119722 A1 dated Aug. 29, 2002, a necked stretch bonded laminate (NSBL) and a necked thermal laminate (NTL). Combinations of the above materials can also be used.

[0018] It should also be noted that the front and back regions, **12** and **26** respectively, can be constructed from an elastic film that is capable of being stretched in at least one direction and desirably in both the machine direction and the cross-direction. Alternatively, the front and back regions, **12** and **26** respectively, can be formed from an elastic nonwoven that has a machine direction stretch and/or a cross-direction stretch. Extensible materials can also be used to form the front and back regions, **12** and **26** respectively, of the disposable absorbent article **10**. Various other stretchable and elastic materials can be used which are known to those skilled in the art.

[0019] Still referring to **FIG. 3**, the front and back regions, **12** and **26** respectively, can alternatively be formed from two outer layers **40** and **44** with a plurality of elastic strands **45** sandwiched therebetween. The elastic strands **45** can be formed from LYCRA. The elastic strands **45** can be aligned approximately parallel to one another or be angled or skewed relative to one another. The elastic strands **45** can also be uniformly or randomly spaced apart from one another. The elastic strands **45** can vary in shape, size, configuration, and/or length. The diameter and/or cross-sectional configuration of the elastic strands **45**, the decitex (weight in grams per 10,000 meters of a strand) of the elastic strands **45**, and the tension imparted into the elastic strands **45** can all be varied to suit one's particular product needs. The elastic strands **45** can have a round, semi-circular, square, rectangular, oval or some other geometrical configuration. The elastic strands **45** can overlap, intersect or crisscross at least one other elastic strand **45**. The various ways of positioning, orienting, and adhering the elastic strands **45** to the two outer layers **40** and **44** are well known to those skilled in the art.

[0020] Referring again to **FIGS. 1-3**, the disposable absorbent article **10** also includes an absorbent assembly **46** which is secured to the interior surfaces **22** and **36** of the front and back regions, **12** and **26** respectively. The absorbent assembly **46** includes a bodyside liner **48**, an outer cover **50** and an absorbent **52** positioned therebetween. The absorbent **52** can include a superabsorbent material. Desirably, the bodyside liner **48** is liquid pervious and the outer cover **50** is liquid-impervious. A surge layer **54** can be optionally used, which is located between the bodyside liner **48** and the absorbent **52**. The surge layer **54** can function to rapidly acquire and temporarily retain body fluid, such as urine, before it can be absorbed into the absorbent **52**. Desirably, the surge layer **54** is also capable of wicking body fluid lengthwise and/or widthwise across its surface, as well as directing the body fluid downward in a z-direction, toward the absorbent **52**.

[0021] Referring to **FIGS. 2 and 3**, the absorbent assembly **46** has a first end **56**, a second end **58**, a first side edge **60** and a second side edge **62**. The absorbent assembly **46** is shown secured to the interior surface **22** of the front region **12** approximate the first end **56** by an attachment **64**. The absorbent assembly **46** is also secured to the interior surface **36** of the back region **26** approximate the second end **58** by an attachment **66**. Alternatively, the absorbent assembly **46** can be secured to the exterior surfaces **24** and **38** of the front and back regions, **12** and **26** respectively, if desired. The absorbent assembly **46** can be secured to the front and back regions, **12** and **26** respectively, after each region has been stretched a predetermined amount. The amount that the front and back regions, **12** and **26** respectively, are stretched before the absorbent assembly **46** is attached can vary. By attaching the absorbent assembly **46** to the interior surfaces **22** and **36** of the front and back regions, **12** and **26** respectively, the absorbent assembly **46** is capable of being in direct contact with the wearer's body. This is beneficial in absorbing body fluids discharged by the wearer.

[0022] The attachments **64** and **66** can be a permanent type of attachment as well as being a removable or releasable attachment. Desirably, the attachments **64** and **66** are permanent attachments where they are not designed to be removed without destroying the bond. The attachments **64** and **66** can be formed by using glue, adhesive, ultrasonic bonds, thermal bonds, heat bonds, pressure bonds, heat and pressure bonds, or any other attachment mechanism known to those skilled in the art. The attachments **64** and **66** can also include a chemical bond or a mechanical fastener, such as by sewing with thread, using buttons and button holes, using snaps, by employing hook and loop fasteners, etc. A hook and loop fastener is generally considered a releasable attachment. One type of hook and loop fastener is VELCRO wherein a hook material is releasably engaged into a loop material.

[0023] The attachments **64** and **66** can be formed along a continuous line or over a surface area having a predetermined length and width. Alternatively, the attachments **64** and **66** can consist of intermittent point bonds that are spaced apart from one another. For example, the intermittent point bonds can be formed by using a hot or a cold melt adhesive or by forming ultrasonic bonds. Various bond formations can be used which are known to those skilled in the art. Desirably, the attachments **64** and **66** are formed using intermittent bonds because it allows the elastic material forming the front and back regions, **12** and **26** respectively, to gather the absorbent assembly **46** as the elastic contracts. This gathering feature causes the absorbent assembly **46** to remain in direct contact with the user's body prior to and during the time period that the absorbent assembly **46** is being insulted with body fluid.

[0024] The front and back regions, **12** and **26** respectively, can be stretched in a direction approximately parallel to the transverse axis Y-Y, or in any other direction or directions, before the absorbent assembly **46** is secured to it. The amount of stretch can vary. No stretch is required if one does not wish to do so. Desirably, the front and back regions, **12** and **26** respectively, are stretched at least about 5% from a relaxed state before the absorbent assembly **46** is secured thereto. Desirably, the front and back regions, **12** and **26** respectively, are stretched at least about 10% from a relaxed state before the absorbent assembly **46** is secured thereto. More desirably, the front and back regions, **12** and **26** respectively, are stretched at least about 25% from a relaxed state before the absorbent assembly **46** is secured thereto. Most desirably, the front and back regions, **12** and **26** respectively, are stretched from between about 25% to about 500% from a relaxed state before the absorbent assembly **46** is secured thereto. The front and back regions, **12** and **26** respectively, extend laterally beyond the first and second side edges, **60** and **62** respectively, of the absorbent assembly **46**. The front region **12** also extends longitudinally beyond the first end **56** of the absorbent assembly **46** and the back region **26** extends longitudinally beyond the second end **58** of the absorbent assembly **46**. This size configuration

of the front and back regions, **12** and **26** respectively, allow them to elastically conform to the torso of the wearer.

[**0025**] Still referring to **FIG. 2**, when the absorbent assembly **46** is secured to the front and back regions, **12** and **26** respectively, a crotch region **68** is formed. The crotch region **68** separates the front region **12** from the back region **26** and is designed to cover the perineum area of the wearer. The crotch region **68** can cover a distance of a few inches in an infant diaper to several inches in an adult incontinence garment. For example, a crotch region **68** in an infant diaper may range from about 2 inches (about 5 centimeters (cm)) to about 10 inches (about 25 cm); while in an adult incontinence garment, the crotch region **68** may range from about 6 inches (about 15 cm) to about 20 inches (about 51 cm).

[**0026**] The absorbent assembly **46** can be stretchable or non-stretchable in relation to the front and back regions, **12** and **26** respectively. Desirably, the absorbent assembly **46** is non-stretchable in relation to the front and back regions, **12** and **26** respectively. By having the absorbent assembly **46** be non-stretchable in relation to the front and back regions, **12** and **26** respectively, it is meant that the absorbent assembly **46** will not appreciably stretch in the longitudinal or transverse directions. The reason for this is that the front and back regions, **12** and **26** respectively, are elastically stretchable and can extend and retract to snugly conform to the user's anatomy, especially to his or her torso. It is not necessary for the absorbent assembly **46** to stretch and/or retract to the same extent. The absorbent assembly **46** could alternatively be constructed with a pleated or folded construction, so as to be capable of being expanded in the longitudinal or transverse directions, if expansion of the absorbent assembly **46** is needed. The pleating or folding should take place before the absorbent assembly **46** is secured to the front and back regions, **12** and **26** respectively.

[**0027**] Normally, there is no need to have the absorbent assembly **46** gather as the front and back regions, **12** and **26** respectively, retract. However, the absorbent assembly **46** can be constructed and attached to the front and back regions, **12** and **26** respectively, in a way that will allow the absorbent assembly **46** to be gathered as the front and back regions, **12** and **26** respectively, elastically retract in a direction parallel to the transverse axis Y-Y. In either circumstance, the absorbent assembly **46** should remain over the perineum. As the absorbent assembly **46** receives body fluid and/or excrement discharged by the wearer, it will be displaced outward, away from the user's torso. The attachments **64** and **66** assure that the absorbent assembly **46** will be aligned over the perineum of the user while allowing the absorbent assembly **46** to move outward, in the z-direction, away from the torso as additional body fluid is received and retained.

[**0028**] Still referring to **FIGS. 2 and 3**, the absorbent assembly **46** also has at least one elastic member **70** positioned adjacent to and aligned approximately parallel to each of its first and second side edges **60** and **62**. Each of the elastic members **70** is situated between the bodyside liner **48** and the outer cover **50**. Each of the elastic members **70** provides a gasket to hold the side edges **60** and **62** of the absorbent assembly **46** against the user's body. Each of the elastic members **70** can be in the form of an elastic strand, ribbon or strip. Desirably, there are from about 2 to about 6 elastic members **70** positioned adjacent to each of the side edges **60** and **62**. In **FIGS. 2 and 3**, three elastic members **70** are shown positioned adjacent to each of the side edges **60** and **62**. The elastic members **70** can have a cross-sectional configuration that is round, square, rectangular or any other desired geometrical configuration. The elastic members **70** can be aligned parallel to the longitudinal axis X-X and should extend completely through the crotch region **68**. The opposite ends of the elastic members **70** can terminate short of the front and back regions, **12** and **26** respectively, as shown in **FIG. 2** or extend into the front and back regions, **12** and **26** respectively, if desired.

[**0029**] The disposable absorbent article **10** also includes a waist band **72** formed from an elastic material. In **FIGS. 2 and 3**, the waist band **72** is shown being secured to the exterior surfaces **24** and **38** of the front and back regions, **12** and **26** respectively. The waist band **72** can be attached in a semi-stretched condition. By "semi-stretched" is meant that the waist band **72** has not fully retracted to its original length. The waist band **72** can be secured to the front and back regions, **12** and **26** respectively, by using ultrasonics, by a thermal bond, by adhesive, by heat, by pressure, by a combination of heat and pressure, or a combination of any of the above. The waist band **72** can also be secured to the front and back regions, **12** and **26** respectively, by a chemical bond or by a mechanical attachment, such as by sewing with thread. Other means of securing the waist band **72** to the front and back regions, **12** and **26** respectively, are known to those skilled in the art.

[**0030**] The waist band **72** has a first edge **74**, a second edge **76**, a first side edge **78** and a second side edge **80**. The first edge **74** is straight or linear in configuration so that it is visually distinguishable from the scalloped first ends **14** and **28**. The first edge **74** is spaced apart from the scalloped first end **14** of the front region **12** and from the scalloped first end **28** of the back region **26**. The first edge **74** can be spaced apart from the scalloped first ends **14** and **28** by at least about 2 millimeters (mm). Desirably, the first edge **74** will be spaced apart from the scalloped first ends **14** and **28**, by at least about 3 mm. More desirably, the first edge **74** will be spaced apart from the scalloped first ends **14** and **28**, by at least about 4 mm. Most desirably, the first edge **74** will be spaced apart from the scalloped first ends **14** and **28**, by less than about 10 mm. The reason for this spacing is to provide an aesthetically pleasing and comfortable scalloped edge **82** on the disposable absorbent article **10**. The scalloped edge **82** will provide the disposable absorbent article **10** with a similar appearance to that of cloth underwear.

[**0031**] Referring again to **FIG. 2**, the first and second side edges, **78** and **80** respectively, of the waist band **72** are aligned with the first and second side edges, **18** and **20** respectively, of the front region **12** and also with the first and second side edges, **32** and **34** respectively, of the back region **26**. The waist band **72** has a width, denoted as (w), which can range from between about 3 millimeters (mm) to about 150 mm. Desirably, the width (w) of the waist band **72** ranges from between about 5 mm to about 100 mm. More desirably, the width (w) of the waist band **72** ranges from between about 10 mm to about 50 mm. Most desirably, the width (w) of the waist band **72** ranges from between about 12 mm to about 25 mm.

[**0032**] Referring again to **FIGS. 2 and 3**, the waist band **72** can be constructed from one or more layers. As depicted,

the waist band **72** is constructed from two outer members **84** and **86** having an elastic material **88**, such as one or more elastic strands, secured therebetween. Desirably, multiple elastic strands will be positioned between the two outer members **84** and **86**. The outer members **84** and **86** can be formed from a non-elastic material. The non-elastic material can be various woven or non-woven materials. An example of a non-woven material that can be used to form one or both of the outer members **84** and **86** is polypropylene spunbond. Each outer member **84** and **86** can also be formed as a laminate, such as SBL, of two or more layers, if desired. The elastic strands can be formed from LYCRA. At least one of the elastic strands in the waist band **72** can extend from the first side edge **78** to the second side edge **80**. Desirably, all of the elastic strands in the waist band **72** will extend from the first side edge **78** to the second side edge **80**, as is depicted in **FIG. 2**. Alternatively, at least one of the elastic strands in the waist band **72** does not extend from the first side edge **78** to the second side edge **80**. For example, one or more of the elastic strands in the waist band **72** can extend over only a portion of the distance located between the first and second side edges, **78** and **80** respectively.

[**0033**] The elastic strands can be aligned approximately parallel to one another or be angled or skewed relative to one another. The elastic strands can also be uniformly or randomly spaced apart from one another. The elastic strands can vary in shape, size, configuration, and/or length. The diameter and/or cross-sectional configuration of the elastic strands, the decitex (weight in grams per 10,000 meters of a strand) of the elastic strands, and the tension imparted into the elastic strands can all be varied to suit one's particular product needs. The elastic strands can have a round, semi-circular, square, rectangular, oval or some other geometrical configuration. The elastic strands can overlap, intersect or crisscross at least one other elastic strand. The various ways of positioning, orienting or securing the elastic strands to the outer members **84** and **86** are well known to those skilled in the art.

[**0034**] The number of elastic strands can range from 1 to about 50. The exact number of elastic strands that are present will depend on the width (w) of the waist band **72**, the diameter of each elastic strand, the arrangement of the elastic strands on the outer members **84** and **86**, etc. Desirably, from about 2 to about 25 elastic strands are present in the waist band **72**. More desirably, from about 3 to about 20 elastic strands are present in the waist band **72**. Most desirably, from about 3 to about 15 elastic strands are present in the waist band **72**. In **FIGS. 2 and 3**, three elastic strands are depicted in the waist band **72**.

[**0035**] Referring again to **FIGS. 1-3**, the disposable absorbent article **10** also includes a pair of leg bands **90** and **92**. The leg band **90** is secured to the interior surface **22** of the front region **12** and the leg band **92** is secured to the interior surface **36** of the back regions **26**. Each of the pair of leg bands **90** and **92** is positioned adjacent to one of the second ends **16** and **30** of the front and back regions, **12** and **26** respectively, and approximate leg openings **94** and **96**, see **FIG. 1**. Each of the leg bands **90** and **92** has a first edge **98**, a second edge **100**, a first side edge **102** and a second side edge **104**. The first edge **98** of the leg band **90** is a smooth outer edge that is aligned with the second end **16** of the front region **12**. The first edge **98** of the leg band **92** is a smooth outer edge that is aligned with the second end **30** of the back region **26**. Desirably, the first edge **98** of the leg band **90** is aligned flush with the second end **16** of the front region **12** while the first edge **98** of the leg band **92** is aligned flush with the second end **30** of the back region **26**.

[**0036**] The first and second side edges, **102** and **104** respectively, of the leg band **90** are aligned with the first and second side edges, **18** and **20** respectively, of the front region **12**. Likewise, the first and second side edges, **102** and **104** respectively, of the leg band **92** are aligned with the first and second side edges, **32** and **34** respectively, of the back region **26**. Each of the pair of leg bands **90** and **92** can be constructed from two outer members **106** and **108** having an elastic material **110**, such as one or more elastic strands, secured therebetween. Desirably, multiple elastic strands will be positioned between the two outer members **106** and **108**. The outer members **106** and **108** can be formed from a non-elastic material as was explained above relative to the outer members **84** and **86** used to form the waist band **72**. Likewise, the elastic material **110** can be the same as was explained above relative to the elastic material used in the waist band **72**. Normally, the leg bands **90** and **92** will have a narrower width than that of the waist band **72**. Typically, from about 1 to about 6 elastic strands are present in each of the leg bands **90** and **92**. Desirably, less than 4 elastic strands are present in each of the leg bands **90** and **92**. In **FIGS. 2 and 3**, three elastic strands are present in each of the leg bands **90** and **92**.

[**0037**] The elastic strands in the leg bands **90** and **92** are typically aligned approximately parallel to the second ends **16** and **30** of the front and back regions, **12** and **26** respectively. The second ends **16** and **30** are located adjacent to the crotch region **68** of the disposable absorbent article **10**. The elastic strands in the leg bands **90** and **92** can be uniformly or randomly spaced apart from one another and are normally located within about 0.3 inches (about 0.76 cm) of the leg openings **94** and **96**.

[**0038**] Referring now to **FIGS. 1, 2** and **4**, the absorbent assembly **46** of the disposable absorbent article **10** is capable of being folded transversely, approximate the transverse axis Y-Y. This folding enables the front region **12** to overlap the back region **26**. When the absorbent assembly **46** is folded, the first and second side edges, **18** and **20** respectively, of the front region **12** will be aligned with the first and second side edges, **32** and **34** respectively, of the back region **26**. In addition, the first and second side edges, **78** and **80** respectively, of the waist band **72** and the first and second side edges, **102** and **104** respectively, of the leg bands **90** and **92** will also be aligned with the first and second side edges **18** and **20** of the front region **12**. After being folded, a pair of seams **112** and **114** are formed which join the front region **12** to the back region **26**. The pair of seams **112** and **114** can form a permanent bond that is normally unbreakable during use or form a temporary bond that is designed to be easily broken when the disposable absorbent article **10** is to be removed from the user's torso and be discarded. Desirably, the pair of seams **112** and **114** will form a bond that is not easily broken or opened. The pair of seams **112** and **114** can be made using ultrasonics, heat, pressure, heat and pressure, adhesive, glue, or a combination of any of the aforementioned. In addition, the pair of seams **112** and **114** can be formed by a chemical bond or by a mechanical bond, such as by sewing with a thread. These and other types of bonds

are well known to those skilled in the art. Desirably, the pair of seams **112** and **114** is formed using ultrasonic equipment.

[**0039**] Referring to **FIG. 1**, each of the pair of seams **112** and **114** has a scalloped end **116**, which is located adjacent to the scalloped edge **82**. Once the pair of seams **112** and **114** is formed, the disposable absorbent article **10** will become a unitary structure and acquire a pant-like appearance. the unitary structure will have a waist opening **118** adjacent to the scalloped edge **82**. In addition, the pair of leg openings **94** and **96** will be spaced apart from the waist opening **118**. Since the front and back regions, **12** and **24** respectively, are formed from a stretchable elastic material, the waist opening **118** and the pair of leg openings **94** and **96** can expand or retract in size to accommodate the anatomy of the user.

[**0040**] Referring now to **FIGS. 4 and 5**, the scalloped edge **82** contains of a series of semicircular curved projections **120** that form an ornamental border. The semicircular curved projections **120** have a height, denoted (h), which represents the distance between a peak and an adjacent trough. The height h should be less than about 5 millimeters (mm), desirably, less than about 4 mm, and more desirably, less than about 2 mm. The scalloped edge **82** acquires a very pleasing aesthetic appearance, which is similar to cloth underwear, when there are less than two semicircular curved projections **120** formed per inch when the front and/or back regions, **12** and/or **26** respectively, are in a relaxed condition. By "relaxed condition" it is meant that the front and/or back regions, **12** and/or **26**, will not be subjected to a tension force. One curved projection **120** spans the distance from the bottom of one trough to the bottom of an adjacent trough. Desirably, there will be less than one and a half semicircular curved projections **120** formed per inch when the front and/or back regions, **12** and/or **26** respectively, are in a relaxed condition. More desirably, there will be one semicircular curved projection **120** formed per inch when the front and/or back regions, **12** and/or **26** respectively, are in a relaxed condition.

[**0041**] While the invention has been described in conjunction with a specific embodiment, it is to be understood that many alternatives, modifications and variations will be apparent to those skilled in the art in light of the aforegoing description. Accordingly, this invention is intended to embrace all such alternatives, modifications and variations that fall within the spirit and scope of the appended claims.

We claim:

1. A disposable absorbent article comprising:

a) a stretchable front region having a first scalloped end, a second end, a first side edge, a second side edge, an interior surface and an exterior surface;

b) a stretchable back region having a first scalloped end, a second end, a first side edge, a second side edge, an interior surface and an exterior surface;

c) an absorbent assembly secured to said interior surfaces of said front and back regions, said absorbent assembly includes a bodyside liner, an outer cover, and an absorbent positioned therebetween;

d) a waist band secured to said exterior surfaces of said front and back regions and being spaced apart from said first scalloped ends of each of said front and back regions;

e) a pair of leg bands each secured to said interior surface of one of said front and back regions, and each of said pair of leg bands being positioned adjacent to said second end of one of said front and back regions; and

f) a pair of seams joining said front and back regions together along said first and second side edges to form an absorbent article having a waist opening with a scalloped edge and a pair of leg openings.

2. The disposable absorbent article of claim 1 wherein each of said pair of seams has a scalloped end.

3. The disposable absorbent article of claim 1 wherein said first scalloped end of said front region is identical in size and configuration to said first scalloped end of said back region.

4. The disposable absorbent article of claim 1 wherein said scalloped edge contains a series of semicircular curved projections forming an ornamental border.

5. The disposable absorbent article of claim 4 wherein said series of semicircular curved projections has a height measured between a peak and an adjacent trough of less than about 5 millimeters.

6. The disposable absorbent article of claim 5 wherein said series of semicircular curved projections has a height of about 2 millimeters.

7. The disposable absorbent article of claim 1 wherein said waist band has a first edge that is spaced apart from said scalloped edge by at least about 2 millimeters.

8. The disposable absorbent article of claim 4 wherein there is at least one semicircular curved projection formed per inch of said scalloped edge in said front region when said front region is in a relaxed condition.

9. The disposable absorbent article of claim 8 wherein there are at least one and a half semicircular curved projections formed per inch of said scalloped edge in said front region when said front region is in a relaxed condition.

10. A disposable absorbent article comprising:

a) a stretchable front region having a first scalloped end, a second end, a first side edge, a second side edge, an interior surface and an exterior surface;

b) a stretchable back region having a first scalloped end, a second end, a first side edge, a second side edge, an interior surface and an exterior surface;

c) an absorbent assembly secured to said interior surfaces of said front and back regions, said absorbent assembly includes a bodyside liner, an outer cover, and an absorbent positioned therebetween, and said absorbent assembly is capable of being folded to enable said front region to overlap said back region;

d) a waist band secured to said exterior surfaces of said front and back regions and being spaced apart from said first scalloped ends of each of said front and back regions by at least about 2 millimeters;

e) a pair of leg bands each secured to said interior surface of one of said front and back regions and each of said pair of leg bands being positioned adjacent to said second end of one of said front and back regions; and

f) a pair of seams joining said front and back regions together along said first and second side edges to form an absorbent article having a waist opening with a scalloped edge and a pair of leg openings.

11. The disposable absorbent article of claim 10 wherein said scalloped edge contains a series of semicircular curved projections forming an ornamental border.

12. The disposable absorbent article of claim 11 wherein there are at least one and a half semicircular curved projections formed per inch of said scalloped edge in said back region when said back region is in a relaxed condition.

13. The disposable absorbent article of claim 10 wherein said waist band has a first edge that is spaced apart from said scalloped edge by at least about 2 millimeters.

14. The disposable absorbent article of claim 13 wherein said waist band has a first edge that is spaced apart from said scalloped edge by at least about 4 millimeters.

15. The disposable absorbent article of claim 10 wherein each of said pair of seams has a scalloped end.

16. A disposable absorbent article comprising:

a) a stretchable front region having a first scalloped end, a second end, a first side edge, a second side edge, an interior surface and an exterior surface;

b) a stretchable back region having a first scalloped end, a second end, a first side edge, a second side edge, an interior surface and an exterior surface;

c) an absorbent assembly secured to said interior surfaces of said front and back regions, said absorbent assembly includes a liquid pervious bodyside liner, a liquid-impervious outer cover, and an absorbent positioned therebetween, and said absorbent assembly is capable of being folded to enable said front region to overlap said back region;

d) a waist band secured to said exterior surfaces of said front and back regions and being spaced apart from said first scalloped ends of each of said front and back regions by less than about 10 millimeters;

e) a pair of leg bands each secured to said interior surface of one of said front and back regions and each of said pair of leg bands being positioned adjacent to said second end of one of said front and back regions; and

f) a pair of seams joining said front and back regions together along said first and second side edges to form an absorbent article having a waist opening with a scalloped edge and a pair of leg openings.

17. The disposable absorbent article of claim 16 wherein said scalloped edge contains a series of semicircular curved projections forming an ornamental border.

18. The disposable absorbent article of claim 17 wherein there is at least one and a half semicircular curved projections formed per inch of said scalloped edge in said back region when said back region is in a relaxed condition.

19. The disposable absorbent article of claim 16 wherein each of said pair of leg bands has a smooth outer edge aligned with said second end of one of said front and back regions.

20. The disposable absorbent article of claim 16 wherein each of said pair of leg bands is aligned flush with said second end of one of said front and back regions.

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