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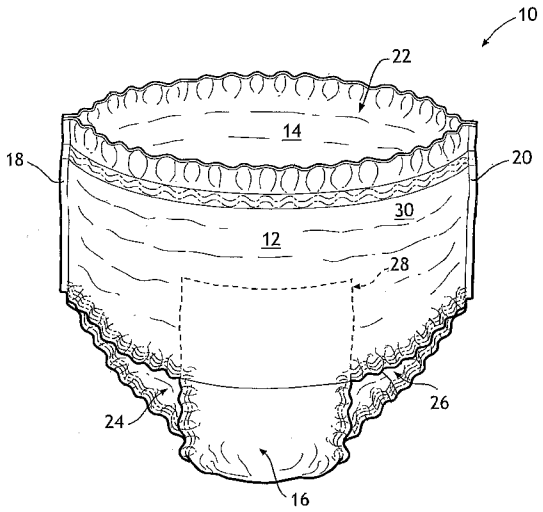
(54) **Title:** A COLORED, ELASTOMERIC NONWOVEN MATERIAL AND AN ABSORBENT ARTICLE FORMED THEREFROM



(57) **Abstract:** An elastomeric nonwoven material is disclosed along with an absorbent article which is at least partially formed therefrom. The elastomeric nonwoven material includes a first layer, a second layer, and a third layer all being secured together. The first layer has an L Hunter value of less than about 95 and the third layer has an L Hunter value which is greater than about 95. The elastomeric nonwoven material is capable of being stretched 100% from a relaxed condition to an extended condition. The elastomeric nonwoven material has an L Hunter value in the relaxed condition which is less than its L Hunter value when in the extended condition. This color difference improves the discretion and normalcy of the absorbent article when it is being worn.

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A COLORED, ELASTOMERIC NONWOVEN MATERIAL AND AN ABSORBENT ARTICLE FORMED THEREFROM

BACKGROUND OF THE INVENTION

New and improved materials are constantly being developed which possess new and/or different properties and characteristics. An elastomeric nonwoven material is one such material which possesses both stretch and retraction properties, which makes it ideally suited for use in disposable absorbent articles. Disposable absorbent articles such as an infant diaper, a child training pant, a feminine menstrual pant, an adult incontinent brief, an adult protective undergarment, etc., normally require elastic sections and/or members that can stretch and retract to conform to the various movements and positions of the wearer's torso and thighs.

Today, there is a desire by manufacturers of disposable absorbent articles to make their products appear similar or identical to regular cotton underwear. One reason for doing so is that it is easier to transition an adult, who is suffering from urinary incontinence, from cotton underpants into a disposable adult incontinent undergarment when the adult incontinent undergarment resembles the cotton underpants that they have been wearing for several decades. A second reason is that a child who wets his or her pants may be less intimidated to spend a night at a friend's house if his or her disposable underwear appears similar to regular cotton underpants. A third reason is that the parents of some toddlers may find it easier to transition their child from disposable training pants into cotton underwear if there does not appear to be a style difference. For these and other reasons, manufacturers are starting to incorporate colored elastomeric materials into their products. For example, the waist band, leg bands and stretchable side panels can be constructed from colored elastomeric materials. Attachment ears and attachment flaps can also be made from colored elastomeric materials.

The outer layer of an elastomeric nonwoven material can be colored to make it appear very similar to cloth underwear. The elastomeric nonwoven

material can be dyed, treated, printed, coated, slot coated, painted, brushed or have a color applied to it. The elastomeric nonwoven material can be treated to appear as a solid color or have two or more colors. The elastomeric nonwoven material can also be printed or treated so as to reveal a colored pattern, such as lines, stripes, bands, dots, circles, chevrons, symbols, lettering, wording, graphics, visual images, etc.

Up until now, manufacturers have applied a color to the entire inside and outer surfaces of an elastomeric nonwoven laminate used to form disposable absorbent articles. When such was done, the inner and outer layers exhibited very similar L Hunter values. This meant that when the elastomeric nonwoven laminate was stretched from a relaxed condition to an extended condition, the L Hunter value did not change. Very little or no color differentiation could be detected in the absorbent article from the relaxed condition to the extended condition.

Now it has been discovered that discretion and normalcy of a disposable absorbent article can be improved when it is at least partially constructed from an elastomeric nonwoven material having an outer layer with an L Hunter value of less than about 95 and the inner layer with an L Hunter value of greater than about 95. When the disposable absorbent article is stretched at least 100% from a relaxed condition to an extended condition, the elastomeric nonwoven material becomes lighter. For example, discretion can be improved when a dark color undergarment, which is initially appealing to a consumer during purchase, becomes lighter as it is stretched to a larger dimension while being positioned and worn about the person's torso. A lighter color undergarment tends to be less noticeable when worn under most clothing.

SUMMARY OF THE INVENTION

Briefly, this invention relates to an elastomeric nonwoven material as well as an absorbent article which is at least partially formed from the elastomeric nonwoven material. The elastomeric nonwoven material includes a first layer, a second layer, and a third layer, all of which are secured together. The first layer

has an L Hunter value of less than about 95 and the third layer having an L Hunter value which is greater than about 95. The elastomeric nonwoven material is capable of being stretched 100% from a relaxed condition to an extended condition. The elastomeric nonwoven material has an L Hunter value in the relaxed condition which is less than its L Hunter value when in the extended condition. This color difference improves the discretion and normalcy of the absorbent article when it is being worn.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of an absorbent article having a waist opening and a pair of leg openings.

Fig. 2 is a side view of an elastomeric nonwoven material used to construct at least a portion of the absorbent article shown in Fig. 1.

Fig. 3 is a photograph comparing a solid colored, disposable absorbent undergarment, on the left, to a solid colored, cotton underpants commercially sold by Jockey, on the right.

Fig. 4 is a photograph comparing a striped colored, disposable absorbent undergarment, on the left, to a striped colored, cotton underpants commercially sold by Jockey, on the right.

Fig. 5 is a photograph comparing a disposable absorbent undergarment with a colored pattern formed adjacent to the waist opening, on the left, to a disposable absorbent undergarment having a colored striped waistband, on the right.

Fig. 6 is a photograph showing a solid colored, disposable absorbent undergarment with a white waistband in a relaxed condition before being pulled up around a wearer's torso.

Fig. 7 is a photograph showing the solid colored, disposable absorbent undergarment shown in Fig. 6 after it has been stretched100% from a relaxed condition to an extended condition and the color appears lighter.

Fig. 8 is a photograph showing the front and crotch regions of a solid colored, disposable absorbent undergarment with the front region being

stretched so that it appears lighter in color when compared to the crotch portion which has not been stretched.

DETAILED DESCRIPTION

Referring to Fig. 1, an absorbent article 10 is depicted which is designed to absorb human exudate, such as urine, menses, blood, fecal matter, perspiration, as well as other body fluids excreted by a human body. The absorbent article 10 can be sized and configured to be worn by infants, toddlers, children or adults. Desirably, the absorbent article 10 is a disposable absorbent article that is designed for a single or temporary use. By "disposable" it is meant that the absorbent article 10 is meant to be disposed of after being used once, instead of being laundered or cleaned for re-use. The absorbent article 10 is designed to be pulled up around a user's legs and to be positioned about the user's torso without having to first open the absorbent article 10 in order to place it on a person's body. Alternatively, the absorbent article 10 can be of a refastenable design where it can be positioned about a user's torso and then the front and back portions can be fastened or attached together to form an article having a waist opening and a pair of leg openings. In Fig. 1, the absorbent article 10 is shown as a disposable adult incontinent undergarment such as is manufactured by Kimberly-Clark Corporation and sold under the trademarks POISE or DEPEND. The absorbent article 10 is shown having its normal appearance just prior to being pulled up around a user's torso.

The absorbent article 10 includes a front region 12, a back region 14 and a crotch region 16. The front region 12 can be a separate and distinct member that covers at least a portion of the wearer's front torso and stomach area. Alternatively, the front region 12, the back region 14 and the crotch region 16 can be a unitary member formed from a single piece of material. In Figure 1, the front region 12 is shown as a separate and distinct member. The front region 12 is longitudinally spaced apart from the back region 14. The back region 14 can also be a separate and distinct member that covers at least a portion of the wearer's back torso and buttock area. The front and back regions, 12 and 14

respectively, can be of approximately the same size or one region can be larger than the other region. Typically, the back region 14 is slightly larger than the front region 12. The crotch region 16 extends between or bridges across the front and back regions, 12 and 14 respectively. The crotch region 16 is designed and sized to fit between the thighs of the wearer. The crotch region 16 can be folded in half such that the front and back regions, 12 and 14 respectively, can be joined together by side seams 18 and 20. The side seams 18 and 20 can be formed by ultrasonic bonds, adhesive, glue, mechanical fasteners, thermal bonds, pressure bonds, heat and pressure bonds, or any other type of bond known to those skilled in the art. When the front and back regions, 12 and 14 respectively, are secured together, the absorbent article 10 becomes a unitary structure having a waist opening 22 and a pair of leg openings 24 and 26.

An absorbent 28 is positioned on an inside surface of the crotch region 16 and is situated to receive any body fluid and/or fecal matter excreted or expelled by the wearer. The absorbent 28 can be secured to one or more of the front, back or crotch regions, 12, 14 and 16 respectively. Desirably, the absorbent 28 is attached to at least two of the three regions 12, 14 and 16. More desirably, the absorbent 28 is attached to all three regions 12, 14 and 16. The absorbent 28 can be made from natural or synthetic fibers, including cellulose fibers, surfactant-treated meltblown fibers, wood pulp fibers, including cellulose or cotton fibers, or coform. Coform is a blend of pulp and synthetic meltblown fibers manufactured by Kimberly-Clark Corporation, having an office at 401 North Lake Street, Neenah, Wisconsin 54956. Two preferred materials are wood pulp fluff and coform.

The absorbent 28 can also include a superabsorbent material. Superabsorbents are normally small particles, flakes or granulars that are added to the fluff to increase the overall absorbent capacity of the absorbent 28. Superabsorbents are commercially available from several different vendors including Dow Chemical Company, Hoechst-Celanese and Stockhausen, Inc. Two superabsorbents that work well in adult incontinent articles for retaining large quantities of urine are DRYTECH 2035M and FAVOR SXM 880. DRYTECH 2035M is commercially sold by Dow Chemical Company, having a

mailing address of P.O. Box 846028 Dallas, Texas 75284-6028. FAVOR SXM 880 is available from Stockhausen, Inc., having a mailing address of P.O. Box 7247-7261 Philadelphia, Pennsylvania 19170-7261.

At least a portion of the front, back and possibly the crotch regions, 12, 14 and 16 respectively, can each be formed from an elastomeric nonwoven material 30 that is capable of stretching or expanding in at least one direction. Desirably, the elastomeric nonwoven material 30 can stretch or expand in two or more directions. More desirably, the elastomeric nonwoven material 30 can stretch or expand in multiple directions. The elastomeric nonwoven material 30 should also have the ability to retract or return back to or towards its original size and dimension. By "elastomeric" it is meant that the nonwoven material 30 is capable of being stretched or expanded and then quickly or immediately returning to or towards its original form or state. By "nonwoven" it is meant that the fibers, filaments, strands or threads of the elastomeric material 30 are assembled by a process other than weaving.

The elastomeric nonwoven material 30 can be formed from almost any kind of material that has elastic properties. Examples of suitable materials include natural and synthetic rubbers, laminates containing at least one elastomeric layer, elastomeric films, spunbond laminates, spunbond film laminates having the inner and outer layers formed from spunbond and a middle layer formed from an elastic thermoplastic film, as well as other materials known to those skilled in the art. Desirably, the elastomeric nonwoven material 30 is a three layer laminate structure. However, more than three layers can be utilized, if desired. Specialized laminates, such as a stretch bonded laminate (SBL), a neck bonded laminate (NBL), a continuous filament, stretch bonded laminate (CF-SBL), a high breathable stretch thermal laminate (HBSTL) or a vertical filament laminate (VFL) can also be used. SBL, NBL, CF-SBL, HBSTL and VFL are all laminates manufactured and commercially sold by Kimberly-Clark Corporation. Some laminates use a non-stretched material in one layer while other laminates utilize a pre-stretched material in one or more layers to impart unique features and characteristics. Some elastomeric nonwoven materials and/or processes for making such elastomeric nonwoven materials are taught and described in U.S.

patents: 4,720,415; 5,336,545; 5,366,793; 5,385,775 and in patent Publication 2002/0119722A1 dated August 29, 2002, all of which are incorporated by reference and made a part hereof.

Today, many elastomeric nonwoven materials are formed from a synthetic raw material, such as a polyolefin, that is then extruded or transformed into individual fibers, filaments, strands or threads. The individual fibers, filaments, strands or threads can then be assembled on a carrier web to form a continuous fabric. Alternatively, the raw material can be extruded into a thin sheet or film. Desirably, the elastomeric nonwoven material 30 is a stretchable laminate. By "stretchable" it is meant that the elastomeric nonwoven material 30 can be lengthened, widened or extended in one or more directions by applying a force at both ends of a predetermined section, such as by pulling on it. The elastomeric nonwoven material 30 is also capable of retracting back to or towards its original pre-stretched length or configuration. By "retracting" it is meant that the elastomeric material 30 can be shortened or reduced in size or length from its stretched condition back to or towards its original dimensions. For example, a 1-inch (2.54 cm) strip of the elastomeric material 30 can be stretched to 2 inches (5.08 cm) and then, when the stretching force is removed, the material 30 will retract back to or towards its original pre-stretched length of 1 inch (2.54 cm). For the purpose of this invention, the elastomeric material 30 is at approximately room temperature, not at an elevated temperature, when it is being stretched or retracted.

Turning now to Fig. 2, the elastomeric nonwoven material 30 is shown as a three layer laminate. The elastomeric nonwoven material 30 includes a first layer 32, a second or middle layer 34 and a third layer 36. The three layers 32, 34 and 36 are secured, joined or bonded together by various means known to those skilled in the art to form the elastomeric nonwoven material 30. For example, the three layers 32, 34 and 36 can be secured together using ultrasonics, adhesives, glue, thermal bonds, pressure bond, heat and pressure bonds, chemical bonds, mechanical fasteners, etc. In one embodiment, the first layer 32 is bonded to the second layer 34 and the second layer 34, in turn, is sequentially bonded to the third layer 36. In another embodiment, the first,

second and third layers, 32, 34 and 36 respectively, are simultaneously bonded together by a plurality of bonds.

The first layer 32 forms the exterior or outer surface of the absorbent article 10 and faces away from the body of the user. The first layer 32 has a predetermined surface area. The significance and relationship of this surface area to the surface areas of the second and third layers, 34 and 36 respectively, will be explained shortly. The first layer 32 can be formed from various materials that are soft and quiet since it will form the outer surface of the absorbent article 10. The first layer 12 can be formed from spunbond which exhibits a soft texture and feel. Spunbond is manufactured and sold by Kimberly-Clark Corporation. The first layer 32 is capable of being colored. The fibers, filaments, strands or threads of the first layer 32 can be colored or the first layer 32 can be colored after it is formed. The first layer 32 can be dyed, printed, treated, coated, slot coated, painted, brushed, dipped in a colorant or have a color applied to it by means known to those skilled in the art. Other means of coloring fibers, filaments, strands, threads, films, sheets or fabrics known to those skilled in the art can also be utilized. The first layer 32 can be printed or treated to have a single solid color, two or more colors, or be at least partially colored. By "partially colored" it is meant that at least a portion of the first layer 32 exhibits a color that is applied by a coloring process known to those skilled in the art, for example, by printing. Furthermore, the first layer 32 can be colored to reveal a visual pattern, stripes, dots, circles, letters, words, icons, graphic symbols, etc.

The first layer 32, or a portion thereof, can be of any color that has an L Hunter value of less than about 95 when the first layer 32 is in a relaxed condition. By a "relaxed condition" it is meant that the first layer 32 is not stretched or extended from its original size and dimensions. White has an L Hunter value of 100. The L Hunter value is a standard physical measurement used by those skilled in the art for evaluating colors and color differences. An explanation of the Photoelectric Color Difference Meter used to obtain the L Hunter value and the test procedure is described in "The Journal of the Optical Society of America", volume 48, pages 985 - 995, December, 1958, by author R. S. Hunter. This article is incorporated by reference and made a part hereof.

The first layer 32 will have an L Hunter value of from between 0 to less than about 95. Desirably, the first layer 32 will have an L Hunter value of from between about 10 to about 90. More desirably, the first layer 32 will have an L Hunter value of from between about 20 to about 85. Even more desirably, the first layer 32 will have an L Hunter value of from between about 40 to about 80.

The first layer 32 can be formed to manifest or reveal a solid color or it can be treated, printed, coated, etc., to reveal a colored pattern, stripes, icons, symbols, visual images, graphic symbols or even have letters and/or words formed thereon. The fibers, filaments, strands or threads can be colored with a predetermined color before they are assembled or made into the first layer 32. Alternatively, the fibers, filaments, strands or threads can be first formed into the first layer 32 which is used to construct the absorbent article 10 before the first layer 32 is colored. Desirably, the fibers, filaments, strands or threads are colored before the first layer 32 is formed.

As stated above, the first layer 32 can be colored by any process known to those skilled in the art. Printing is one desirable form of imparting one or more colors onto the first layer 32. Various printing techniques can be used. Ink jet printing is one form of printing which can be used and is very common. Ink jet printing is a versatile form of printing in which there is no direct contact between the equipment and the fibers, filaments, strands or threads that make up the substrate or fabric of the first layer 32. In the ink jet printing process, different colored inks can be quickly and efficiently delivered to the fibers, filaments, strands or threads that make up the first layer 32. Wax jet printing is another type of printing that can also be used to apply a color to the fibers, filaments, strands or threads that make up the substrate or fabric of the first layer 32. Wax jet printing is similar to ink jet printing but uses melted droplets of wax instead of inks or dyes. One advantage of using wax jet printing is that the color is less likely to rub off of the fibers, filaments, strands or threads. A third form of printing that can be used to apply a color to the first layer 32 is flexography. Flexography is a process in which ink is delivered to a plate via a special cylinder that contains small reservoirs which carry the ink. Flexography allows for precise and adjustable ink metering to the plate and transfer of the color to the finished

material. Flexographic printing is a beneficial process in that it allows for a lot of choices in the inks, the substrates and the finishing process that is required. These and other printing processes, known to those skilled in the art, can be used to print the fibers, filaments, strands or threads that make up the first layer 32 or be used to print a color onto the first layer 32 after it is constructed.

When the first layer 32 is printed, for example using either the ink jet printing process or the wax jet printing process, the first layer should have an L Hunter value of less than about 95. Desirably, when the first layer 32 is printed, it should have an L Hunter value of less than about 90. More desirably, when the first layer 32 is printed, it should have an L Hunter value of less than about 85. Even more desirably, when the first layer 32 is printed, it should have an L Hunter value of from between about 20 to about 80.

Still referring to Fig. 2, one can see that the second layer 34 is sandwiched between the first and third layers, 32 and 36 respectively. The second layer 32 is the middle layer and does not contact the skin of the user. The second or middle layer 34 generally exhibits the greatest elastomeric properties, although it does not necessarily have to. The second layer 34 can be formed from a thermoplastic film such as a polyolefin. Polyethylene and polypropylene are two polyolefins that make very good elastomeric films. The second layer 34 is normally thinner than either the first or third layers, 32 and 36 respectively, but does not have to be. For example, the second layer 34 can have a thickness which is less than, equal to or is greater than the thickness of either of the first or third layers, 32 and 36 respectively. The second layer 34 can be secured to one or both of the first and third layers, 32 and 36 respectively. Desirably, the second layer 34 is secured to both the first layer 32 and to the third layer 36 to form a unitary, elastomeric nonwoven material 30. The second layer 34 can be secured by using ultrasonic bonds, adhesive, glue, mechanical fasteners, thermal bonds, pressure bonds, heat and pressure bonds, or any other type of bond known to those skilled in the art.

The second layer 34 can be clear or transparent in color. By "clear or transparent" it is meant that the second layer 34 is capable of transmitting light so that objects or images can be seen as if there were no intervening material.

Alternatively, the second layer 34 could contain a color that is similar or identical to the third layer 36. The second layer 34 has a surface area which is equal to or approximately equal to the surface area of the first layer 32 when the elastomeric nonwoven material 30 is in either the relaxed condition or in an extended condition. By a "relaxed condition" it is meant that the elastomeric nonwoven material 30 is not stretched or extended from its original size and dimensions when assembled into the absorbent article 10. By an "extended condition" it is meant that the elastomeric nonwoven material 30 has been stretched 100%, in at least one direction, from its relaxed condition. This similarity in surface area means that the second layer 34 is constructed such that it does not have a substantial or significant number of openings formed perpendicular to its outer surfaces and which extend completely therethrough. Even though the structure of the second layer 34 can have an open pore configuration with a plurality of passageways circuitously formed therein, it does not contain large openings or holes that extend throughout its thickness. Desirably, the second layer 34 is a thin film, sheet or fabric that has outer edges that are coterminously aligned with those of the first layer 32.

Still referring to Fig. 2, the third layer 36 of the elastomeric nonwoven material 30 forms the interior or inner surface of the absorbent article 10 and, as such, is in direct contact with the body of the user. It is important for the third layer 36 to be soft and gentle against the skin of the user. It should not be abrasive or scratch the skin. Like the first layer 32, the third layer 36 should be quiet so that as the user changes body position or moves about, the elastomeric nonwoven material 30 will make very little, if any, sound. The third layer 36, like the first layer 32, can also be formed from spunbond since it has all the desirable properties.

The third layer 36 also has a surface area which is equal to or approximately equal to the surface area of the first layer 32 when the elastomeric nonwoven material 30 is either in a relaxed condition or in an extended condition. The surface area of the third layer 36 is also equal to or approximately equal to the surface area of the second layer 34 when the elastomeric nonwoven material 30 is either in a relaxed condition or in an extended condition. By sizing the three

layers 32, 34 and 36 to have an equal or approximately equal surface area, one can control the amount of color change that can occur as the elastomeric nonwoven material 30 is extended. Desirably, each of the three layers 32, 34 and 36 will have an identical surface area when in a relaxed condition and will have a larger but identical surface area when in the extended condition. In addition, desirably each of the three layers 32, 34 and 36 will have an identical surface area at all locations between the relaxed condition and the extended condition. This structural feature distinguishes the elastomeric nonwoven material 30 from a laminate, which incorporates one or more elastic strands positioned between an inner layer and an outer layer. The plurality of elastic strands would not have a surface area equal to or approximately equal to the surface area of either the inner or outer layers.

Many wearers' of disposable absorbent articles prefer that their undergarment be discreet and exhibits normalcy and evokes emotional confidence in the wearer when the disposable absorbent article 10 is being worn. By "discreet" it is meant that the disposable absorbent article 10 is not readily noticeable by others. The disposable absorbent article should not appear too bulky under the wearer's clothing and should not emit sounds that may indicate it is formed from thermoplastic materials versus cotton or nylon. By "normalcy" it is meant that the disposable absorbent article 10 appears similar to regular cloth underwear.

The third layer 36 will have an L Hunter value that is greater than about 95. Desirably, the third layer 36 will have an L Hunter value of from between about 95 to 100. More desirably, the third layer 36 will have an L Hunter value of from between about 95 to about 99. Even more desirably, the third layer 36 will have an L Hunter value of from between about 95 to about 98. Since the color "white" has an L Hunter value of 100, any color having an L Hunter value of about 95 or higher will appear to be very similar to white.

In addition, the first layer 32 and the third layer 36 will have a difference in L Hunter value of at least about 25 when both are in either a relaxed condition or in an extended condition. Desirably, the first layer 32 and the third layer 36 will have a difference in L Hunter value of at least about 30 when both are in either a

relaxed condition or in an extended condition. More desirably, the first layer 32 and the third layer 36 will have a difference in L Hunter value of at least about 35 when both are in either a relaxed condition or in an extended condition.

The third layer 36 can be formed to manifest or reveal a solid color or it can be treated, printed, coated, etc., to reveal a colored pattern, stripes, icons, symbols, visual images, graphic symbols or even have letters and/or words formed thereon. The fibers, filaments, strands or threads can be colored with a predetermined color before they are assembled or made into the third layer 36. Alternatively, the fibers, filaments, strands or threads can be first formed into the third layer 36, which is used to construct the absorbent article 10, before the third layer 36 is colored. Desirably, the fibers, filaments, strands or threads are colored before the third layer 36 is formed.

Once the elastomeric nonwoven material 30 is assembled into the disposable absorbent article 10, the elastomeric nonwoven material 30 will have an L Hunter value in the relaxed condition which is less than its L Hunter value when in the extended condition. This means that as the elastomeric nonwoven material 30 is stretched or extended, it becomes lighter in color. This difference in L Hunter values also indicates that the elastomeric nonwoven material 30 is conforming to a user's body. As the wearer pulls the disposable absorbent article 10 up over his or her thighs and around their torso, certain sections of the elastomeric nonwoven material 30 will expand and stretch and become lighter. For example, the front and back regions, 12 and 14 respectively, will stretch more than the crotch region 16. In doing so, the front and back regions, 12 and 14 respectively, will become lighter and acquire a higher L Hunter value. This means that the front and back regions, 12 and 14 respectively, will become less noticeable under the wearer's clothing.

The elastomeric nonwoven material 30 should have an L Hunter value in the relaxed condition which is at least 5% less than its L Hunter value when in the extended condition. Desirably, the elastomeric nonwoven material 30 should have an L Hunter value in the relaxed condition which is at least 10% less than its L Hunter value when in the extended condition. More desirably, the elastomeric nonwoven material 30 should have an L Hunter value in the relaxed

condition which is at least 15% less than its L Hunter value when in the extended condition. Another way of qualifying the difference in L Hunter value of the elastomeric nonwoven material 30 is to state that the L Hunter value in the relaxed condition be 1.5 less than the L Hunter value in the extended condition. Desirably, the L Hunter value of the elastomeric nonwoven material 30, in the relaxed condition, is from about 1.5 to about 20 less than the L Hunter value in the extended condition. More desirably, the L Hunter value of the elastomeric nonwoven material 30, in the relaxed condition, is from about 2 to about 15 less than the L Hunter value in the extended condition.

The ability of the elastomeric nonwoven material 30 to change color is unique for it enables a manufacturer to produce a finished product having a color that is very appealing to the eye of the ultimate consumer. For example, a consumer may prefer a deep pink, peach, blue, beige or some other color. The ability of a consumer to purchase a product having an aesthetically pleasing color, a product having strips or a product exhibiting a unique pattern or design can lead to increased sales. When the variety of colors, patterns and designs is coupled with the ability of the disposable absorbent article 10 to become lighter when positioned on the body, a synergistic effect is recognized. The change in color to a lighter hue increases discretion and normalcy in the eyes of the consumer. In addition, the change in color evokes emotional confidence in the wearer and also informs the wearer as to which sections or portions of his or her disposable absorbent article are being stretched. Furthermore, the colored disposable absorbent article 10 appears more similar to regular cloth underwear and it becomes more difficult for another person to recognize any difference. This factor is especially important to older adults who suffer from urinary incontinence.

Tables 1 – 6 below provide examples of the extent that the color of the elastomeric nonwoven material 30 will change as the elastomeric nonwoven material 30 is stretched 100%. One will notice that the actual colors of the first and third layers, 32 and 36 respectively, of the elastomeric nonwoven material 30 play a part in determining the amount of color change. The differences in the L Hunter values between the first and third layers, 32 and 36 respectively, also

factor into determining the amount of color change that will occur. The L Hunter values are obtained by using the American Standard Test Method (ASTM) 5001, last approved on February 24, 1997. This test method is available from ASTM International, having an office at 100 Barr Harbor Drive, P. O. Box C700, West Conshohocken, PA. 19428-2959.

The test method describes the apparatus needed, the number and dimensions of the test samples, the conditions under which the test is conducted, and the actual test procedure to follow.

Referring to Tables 1-6 below, six elastomeric nonwoven materials, each having a different color, was tested according to the ASTM 5001 test referred to above. Each elastomeric nonwoven material had a first or outside layer that was colored. The six colors were blue, dark blue, tan, pink, dark pink and gray. Each of the first layers had an L Hunter value of less than about 95. Each of the six elastomeric nonwoven materials also had an inside or third layer that had an L Hunter value of greater than about 95. In other words, the inside layer was close to "white" in appearance. Twenty five samples of each of the six colored elastomeric nonwoven materials were tested in the unstretched condition and in the 100% stretched condition. The test data reveals that the L Hunter value of each elastomeric nonwoven material in the relaxed condition was less than the L Hunter value when in the extended condition. This meant that as the elastomeric nonwoven material was stretched, it acquired a lighter color.

TABLE 1

Hunter Color

		Unstretched	Stretched 100%
Code	Specimen #	L	L
Blue (1)	1	46.00	58.30
	2	46.20	58.40
	3	46.30	58.70
	4	47.10	59.70
	5	47.10	59.70
	6	47.10	59.20
	7	46.90	59.70
	8	47.10	59.10
	9	47.20	58.90
	10	46.70	59.60
	11	46.80	58.50
	12	46.70	59.80
	13	47.20	59.30
	14	47.00	58.80
	15	47.10	59.40
	16	46.80	59.50
	17	46.40	59.20
	18	46.40	59.30
	19	46.80	59.30
	20	46.70	59.40
	21	46.60	58.80
	22	46.80	58.30
	23	46.00	57.80
	24	45.90	58.00
	25	46.30	58.30
	Avg	***46.69***	***59.00***
	Std	***0.40***	***0.58***

TABLE 2

Hunter Color

		Unstretched	Stretched 100%
Code	Specimen #	L	L
Dk. Blue (2)	1	31.80	46.20
	2	31.90	46.70
	3	31.60	48.10
	4	33.90	50.10
	5	34.00	48.50
	6	33.70	50.20
	7	33.70	49.10
	8	34.00	49.30
	9	34.10	47.90
	10	32.60	47.90
	11	32.80	48.00
	12	32.70	48.50
	13	32.50	47.30
	14	32.40	48.00
	15	32.50	48.30
	16	31.80	49.40
	17	31.50	48.80
	18	31.90	48.60
	19	31.80	48.70
	20	33.60	48.70
	21	33.70	49.10
	22	32.40	49.20
	23	32.60	49.70
	24	31.80	47.10
	25	31.80	47.80
	Avg	***32.68***	***48.45***
	Std	***0.89***	***0.99***

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TABLE 3

Hunter Color

		Unstretched	Stretched 100%
Code	Specimen #	L	L
Tan (3)	1	71.90	81.20
	2	71.70	81.30
	3	71.40	80.40
	4	71.30	81.30
	5	71.70	81.70
	6	71.50	81.30
	7	72.10	80.40
	8	72.30	80.00
	9	72.10	80.40
	10	72.00	81.00
	11	71.90	81.30
	12	71.70	81.60
	13	72.50	80.50
	14	72.40	81.30
	15	72.20	81.50
	16	71.70	81.10
	17	72.10	80.90
	18	71.80	79.70
	19	72.10	81.40
	20	72.00	81.80
	21	71.50	81.60
	22	72.40	81.90
	23	72.00	81.20
	24	71.70	80.30
	25	71.70	81.80
	Avg	***71.91***	***81.08***
	Std	***0.32***	***0.60***

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TABLE 4

Hunter Color

		Unstretched	Stretched 100%
Code	Specimen #	L	L
Dk. Pink (5)	1	39.70	52.30
	2	39.80	53.60
	3	40.80	52.30
	4	40.40	55.30
	5	39.70	53.30
	6	40.00	55.70
	7	39.00	54.90
	8	38.50	53.10
	9	38.40	53.30
	10	38.40	55.90
	11	38.30	56.10
	12	38.60	56.00
	13	37.60	53.70
	14	37.50	53.30
	15	37.30	52.80
	16	37.50	52.20
	17	37.60	51.30
	18	37.30	53.90
	19	40.10	53.40
	20	40.10	52.30
	21	40.10	52.60
	22	37.50	54.50
	23	37.50	54.50
	24	37.60	55.20
	25	37.80	52.50
	Avg	***38.68***	***53.76***
	Std	***1.17***	***1.38***

5

Specimens were cut 10", and were tested in the relaxed position for the stretched value.
Specimens were cut 10", and were stretched 10" (total of 20") for 100% stretched value.

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TABLE 5

Hunter Color

		Unstretched	Stretched 100%
Code	Specimen #	L	L
Pink (4)	1	72.10	74.00
	2	72.20	73.90
	3	72.20	73.50
	4	72.30	74.30
	5	72.50	74.10
	6	72.50	74.50
	7	72.30	74.50
	8	72.60	74.20
	9	72.30	74.30
	10	72.50	74.10
	11	72.80	74.30
	12	72.80	73.90
	13	72.10	73.10
	14	72.40	73.40
	15	72.10	73.50
	16	72.40	73.60
	17	72.60	73.20
	18	72.50	73.30
	19	72.00	74.50
	20	72.00	73.90
	21	71.70	73.70
	22	71.70	73.40
	23	71.40	73.80
	24	72.00	74.20
	25	71.40	73.70
	Avg	***72.22***	***73.88***
	Std	***0.38***	***0.42***

TABLE 6

Hunter Color

		Unstretched	Stretched 100%
Code	Specimen #	L	L
Gray (6)	1	54.00	57.00
	2	55.10	57.20
	3	54.60	55.20
	4	53.50	54.50
	5	54.70	56.30
	6	54.40	57.20
	7	53.80	55.80
	8	53.80	57.90
	9	54.00	56.50
	10	53.10	56.10
	11	53.50	57.70
	12	53.20	57.60
	13	54.20	55.60
	14	54.90	56.00
	15	54.50	56.90
	16	53.00	53.40
	17	54.20	55.30
	18	54.40	57.40
	19	54.20	58.10
	20	54.30	57.80
	21	53.50	56.40
	22	53.50	57.30
	23	53.00	56.90
	24	53.10	56.00
	25	53.00	56.00
	Avg	***53.90***	***56.48***
	Std	***0.64***	***1.13***

Referring now to Table 7 below, an elastomeric nonwoven material, similar to what has existed in the prior art, was also tested according to the ASTM 5001 test referred to above. This elastomeric nonwoven material had first and third layers wherein both layers were pink in color. The two pink layers had essentially the same L Hunter value which was less than about 95 in the unstretched condition. This is different from our present invention wherein we teach that the third layer has an L Hunter value of greater than about 95 in the unstretched condition. Twenty five samples of this pink on pink elastomeric nonwoven material were tested in the unstretched condition and in the 100% stretched

condition. The test data reveals that the L Hunter value of each sample of the elastomeric nonwoven material in the relaxed condition was greater than the L Hunter value when in the extended condition. These results are just the opposite to the teachings of the present invention. In other words, the pink color did not become lighter when stretched but instead actually became darker.

TABLE 7

Hunter Color

		Unstretched	Stretched 100%
Code	Specimen #	L	L
Pink (7)	1	75.30	73.50
	2	75.20	73.90
	3	75.50	73.70
	4	75.50	73.50
	5	74.90	73.60
	6	75.50	73.60
	7	75.40	73.70
	8	75.30	73.50
	9	75.30	73.90
	10	75.20	74.20
	11	75.20	73.90
	12	75.30	73.90
	13	75.30	73.70
	14	75.40	74.10
	15	75.20	73.80
	16	75.10	73.60
	17	75.40	74.40
	18	75.20	74.10
	19	75.50	74.80
	20	75.40	74.00
	21	75.30	73.70
	22	75.50	74.20
	23	75.00	73.90
	24	75.60	74.00
	25	75.20	74.20
	Avg	***75.31***	***73.90***
	Std	***0.17***	***0.31***

Referring now to Fig. 3, a photograph is shown which compares a solid colored, disposable absorbent undergarment, on the left, to a solid colored, cotton brief or underpants on the right. The cotton brief is a reusable underpants designed to be worn by a male. The cotton brief is manufactured and sold under

the trademark JOCKEY by Jockey International, Inc., having an address of P.O. Box 1417, Kenosha, Wisconsin 53141-1417. In Fig. 3, the cotton brief is a single color, for example dark blue, having identical colored inner and outer surfaces. The cotton brief has a dark blue waistband with the word "JOCKEY" printed thereon in white. The word "JOCKEY" appears several times in a spaced apart arrangement. The cotton brief does not change color or become lighter when it is positioned around the user's torso.

The disposable absorbent article on the left of Fig. 3 is shown being at least partially constructed of an elastomeric nonwoven material having an outer layer that contains a single dark color, for example blue. The disposable absorbent article also has a dark colored waistband and has a signature waist band printed or formed thereon. The signature waistband can contain one or more letters or words that may appear in a spaced apart and/or repeating manner. The disposable absorbent article differs from the cotton brief in that the inner layer has an L Hunter value of greater than about 95. In Fig. 3, the inner layer of the disposable absorbent article appears to be much lighter than the outer layer, for example, a shade of white. The elastomeric nonwoven material is capable of becoming lighter in color as the material stretches. It has also been recognized that many consumers like to be able to identify which sections or portions of their disposable absorbent articles are being stretched. This helps confirm that the lighter portions actually appear in areas that may be more noticeable when worn under light colored clothing. For example, the stretchy side panels, the waist band, the front region and the back region will tend to become lighter in color since they tend to stretch more than the crotch region. In darker colored articles, the front region and the waist band tend to be more likely to be visible underneath light colored clothing. This is especially true if the wearer is wearing a light colored dress, skirt or shorts. In addition, the waistband of an undergarment can be exposed when worn under low cut pants, such as low cut jeans. As the waistband stretches and becomes lighter in color, it may become less noticeable.

Turning to Fig. 4, a photograph is shown of two products. On the left is a disposable absorbent undergarment which is at least partially constructed of an

elastomeric nonwoven material having colored stripes. The first or outer layer of the disposable absorbent undergarment has an L Hunter value of less than about 95. On the right, a cotton brief or underpants is depicted having a plurality of horizontal stripes. The cotton brief is manufactured and sold under the trademark JOCKEY by Jockey International, Inc., and is a reusable underpants designed to be worn by a female. In Fig. 4, the cotton brief has a white or lightly colored background on which is printed or formed a plurality of horizontal colored stripes. Three different color stripes are utilized in a repeating pattern. The L Hunter value measures the average of the colors printed on the lightly colored background. The cotton brief also has a waistband that is white or lightly colored and has the word "JOCKEY" printed or formed thereon in dark letters. The word "JOCKEY" appears several times in a spaced apart arrangement. The cotton brief does not change color or become lighter when it is positioned around the user's torso.

The disposable absorbent article, on the left of Fig. 4, is shown having an outer layer that contains a plurality of horizontal colored stripes printed or formed thereon. Three different color stripes are utilized in a repeating pattern. The disposable absorbent article also has a waistband that is white or lightly colored and has a signature waist band printed or formed thereon. The signature waistband can contain one or more letters or words that may appear in a spaced apart and/or repeating manner. The disposable absorbent article is also similar to the Jockey brief in that the inner layer is light in color and has an L Hunter value of greater than about 95. This inner layer can also have a plurality of horizontal colored strips printed or formed thereon. The elastomeric nonwoven material is capable of becoming lighter in color as it stretches. This will make the elastomeric nonwoven material less noticeable when worn under light colored clothing. For example, the stretchy side panels, the waist band, the front region and the back region will tend to become lighter since they tend to stretch more than the crotch region. In darker colored articles, the front region and the waist band tend to be more likely to be visible underneath light colored clothing. This is especially true if the wearer is wearing a light colored dress, skirt or shorts. As

these regions or sections stretch and become lighter in color, they tend to be less noticeable.

Referring now to Fig. 5, a photograph is shown which compares two disposable absorbent undergarments each having a colored waistband printed or formed thereon. The first or outer layers of each of the disposable absorbent undergarments are lightly colored with an L Hunter value of less than about 95. Each has a third or inner layer that has an L Hunter value of greater than about 95. The first layer also has a darker color pattern or strips formed adjacent to the waist opening. The disposable absorbent undergarment, on the left, has a repeating scroll pattern and multiple spots formed adjacent to the waist opening which visually convey a feminine style waistband. The disposable absorbent undergarment, on the right, has three horizontal stripes aligned adjacent to the waist opening which convey a more masculine appearance. From a distance, both disposable absorbent undergarments appear very similar, if not identical, to regular cloth underpants. The two disposable absorbent articles are at least partially constructed of an elastomeric nonwoven material such that as the material stretches, it becomes lighter in color and less noticeable when worn under light colored clothing.

Referring now to Fig. 6, a photograph is shown of a disposable absorbent undergarment having a solid dark color with a white or lightly colored signature waist band printed or formed thereon. The signature waistband can contain one or more letters or words that may appear in a spaced apart and/or repeating manner. The disposable absorbent undergarment is depicted in a relaxed condition as it would appear before being pulled up around a wearer's torso. The first or outer layer of the disposable absorbent undergarment has an L Hunter value of less than about 95. The inside or third layer of the disposable absorbent undergarment is not visible in Fig. 6. A person is holding the disposable absorbent undergarment such that her two hands extend into the waist opening but the elastomeric nonwoven material, which forms the disposable absorbent undergarment, is not being stretched beyond its normal relaxed condition. The first or outer layer of the disposable absorbent undergarment exhibits a solid dark color.

Turning now to Fig. 7, the same disposable absorbent undergarment depicted in Fig. 6 is shown when the elastomeric nonwoven material is in an extended condition. In the extended condition, the elastomeric nonwoven material has been stretched 100% from its original unstretched or relaxed condition. By comparing the color and texture of the disposable absorbent undergarment in these two conditions, one will readily recognize that the stretched elastomeric nonwoven material is much lighter in color than when it was in the unstretched condition. This lighter color is advantageous in masking or hiding the appearance of the disposable absorbent undergarment when it is worn about a person's torso. Such is true when the stretched disposable absorbent undergarment is worn under lightly colored clothing. The light color of the stretched elastomeric nonwoven material makes the disposable absorbent undergarment more discreet and provides an air of normalcy to the wearer.

Lastly, referring to Fig. 8, a photograph is shown of a solid dark colored, disposable absorbent undergarment having a white or lightly colored waistband. The front and crotch regions of the disposable absorbent undergarment are shown wherein the front region is in an extended condition, having been stretched 100%, while the crotch region is in a relaxed condition. One will readily notice that the front region is much lighter in color than the crotch region that is not stretched. This change or demarcation in color or lightness is very beneficial in that it informs the wearer as to which sections or portions of his or her undergarment have been stretched. The wearer will quickly associate the stretched regions as having a lighter color which are less visible when worn under their outer clothing. As the color of the disposable absorbent undergarment changes to a lighter hue, portions of the undergarment will become more discreet and thereby camouflage the fact that the person is wearing a disposable absorbent undergarment as opposed to regular cloth underpants. Such discretion and normalcy are important attributes demanded by today's users of disposable absorbent articles, especially adult incontinent users.

While the invention has been described in conjunction with several specific embodiments, 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.

I claim:

1. An elastomeric nonwoven material including a first layer, a second layer and a third layer all being secured together, said first layer having an L Hunter value of less than about 95 and said third layer having an L Hunter value that is greater than about 95, said elastomeric nonwoven material capable of being stretched 100% from a relaxed condition to an extended condition, and said elastomeric nonwoven material having an L Hunter value in said relaxed condition which is less than said L Hunter value when in said extended condition.

2. The elastomeric nonwoven material of claim 1 wherein said second layer is a thermoplastic film.

3. The elastomeric nonwoven material of claim 2 wherein said thermoplastic film is polyethylene.

4. The elastomeric nonwoven material of claim 1 wherein said second layer is transparent.

5. The elastomeric nonwoven material of claim 1 wherein when in said relaxed condition, said first and third layers have a difference in L Hunter values of at least about 25.

6. The elastomeric nonwoven material of claim 1 wherein when in said extended condition, said first and third layers have a difference in L Hunter values of at least about 25.

7. The elastomeric nonwoven material of claim 1 wherein each of said first and second layers has a predetermined surface area and said surface area of

said second layer is equal to said surface area of said first layer when said elastomeric nonwoven material is in said relaxed condition.

8. The elastomeric nonwoven material of claim 1 wherein each of said first and second layers has a predetermined surface area and said surface area of said second layer is equal to said surface area of said first layer when said elastomeric nonwoven material is in said extended condition.

9. The elastomeric nonwoven material of claim 1 wherein said first layer is printed using ink jet printing.

10. An absorbent article at least partially formed from an elastomeric nonwoven material, said elastomeric nonwoven material including a first layer, a second layer and a third layer all being secured together, said first layer having an L Hunter value of less than about 95 and said third layer having an L Hunter value that is greater than about 95, said elastomeric nonwoven material capable of being stretched 100% from a relaxed condition to an extended condition, and said elastomeric nonwoven material having an L Hunter value in said relaxed condition which is at least 5% less than its L Hunter value when in said extended condition, whereby the difference in L Hunter values indicates that said elastomeric nonwoven material is conforming to a user's body.

11. The absorbent article of claim 10 wherein said elastomeric nonwoven material has an L Hunter value in said relaxed condition which is at least 10% less than its L Hunter value when in said extended condition.

12. The absorbent article of claim 11 wherein said elastomeric nonwoven material has an L Hunter value in said relaxed condition which is at least 15% less than its L Hunter value when in said extended condition.

13. The absorbent article of claim 10 wherein said elastomeric nonwoven material has an L Hunter value in said relaxed condition which is at least 1.5 less than its L Hunter value when in said extended condition.

14. The absorbent article of claim 10 wherein said first layer is spunbond and said second layer is a thermoplastic film.

15. The absorbent article of claim 14 wherein said third layer is spunbond.

16. An absorbent article at least partially formed from an elastomeric nonwoven material, said elastomeric nonwoven material including a first layer, a second layer and a third layer all being secured together, said first layer having an L Hunter value of less than about 95 and said third layer having an L Hunter value which is greater than about 95, said elastomeric nonwoven material capable of being stretched 100% from a relaxed condition to an extended condition, and said elastomeric nonwoven material having an L Hunter value in said relaxed condition which is at least 10% less than its L Hunter value when in said extended condition, whereby the difference in L Hunter values indicates that said elastomeric nonwoven material is conforming to a user's body.

17. The absorbent article of claim 16 wherein each of said first and second layers has a predetermined surface area and said surface area of said second layer is equal to said surface area of said first layer when said elastomeric nonwoven material is in said relaxed condition.

18. The absorbent article of claim 16 wherein each of said first and second layers has a predetermined surface area and said surface area of said second layer is equal to said surface area of said first layer when said elastomeric nonwoven material is in said extended condition.

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19. The absorbent article of claim 16 wherein said first layer is printed using ink jet printing to obtain an L Hunter value of less than about 75.

20. The absorbent article of claim 16 wherein said first layer is printed using wax jet printing to obtain an L Hunter value of less than about 75.

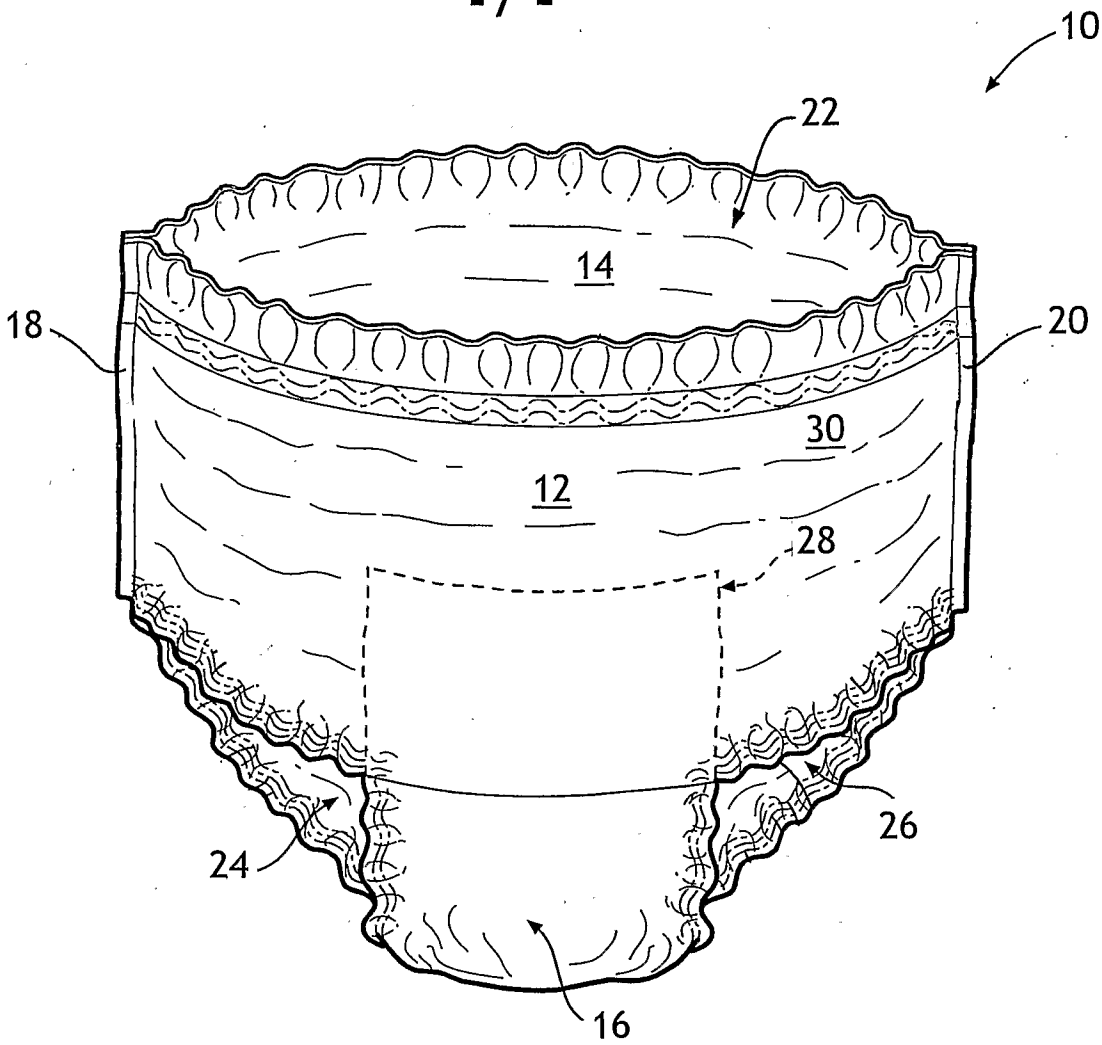

FIG. 1

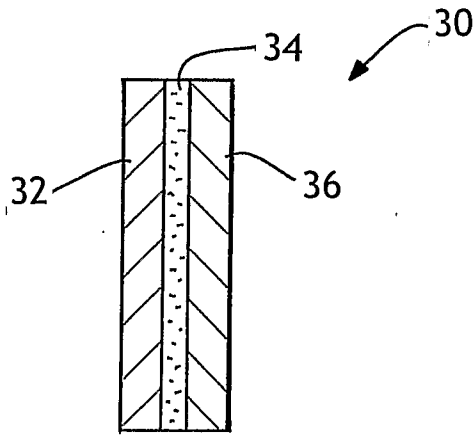

FIG. 2

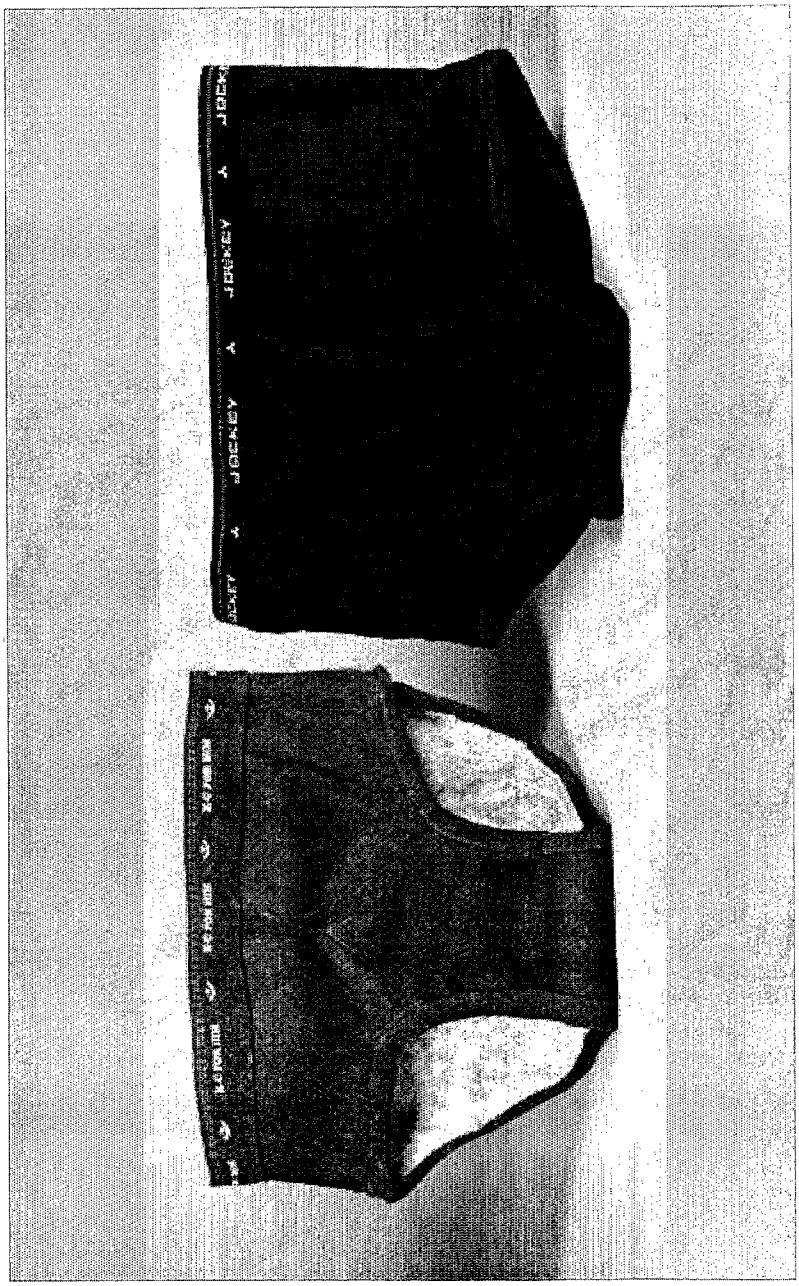

FIG. 3

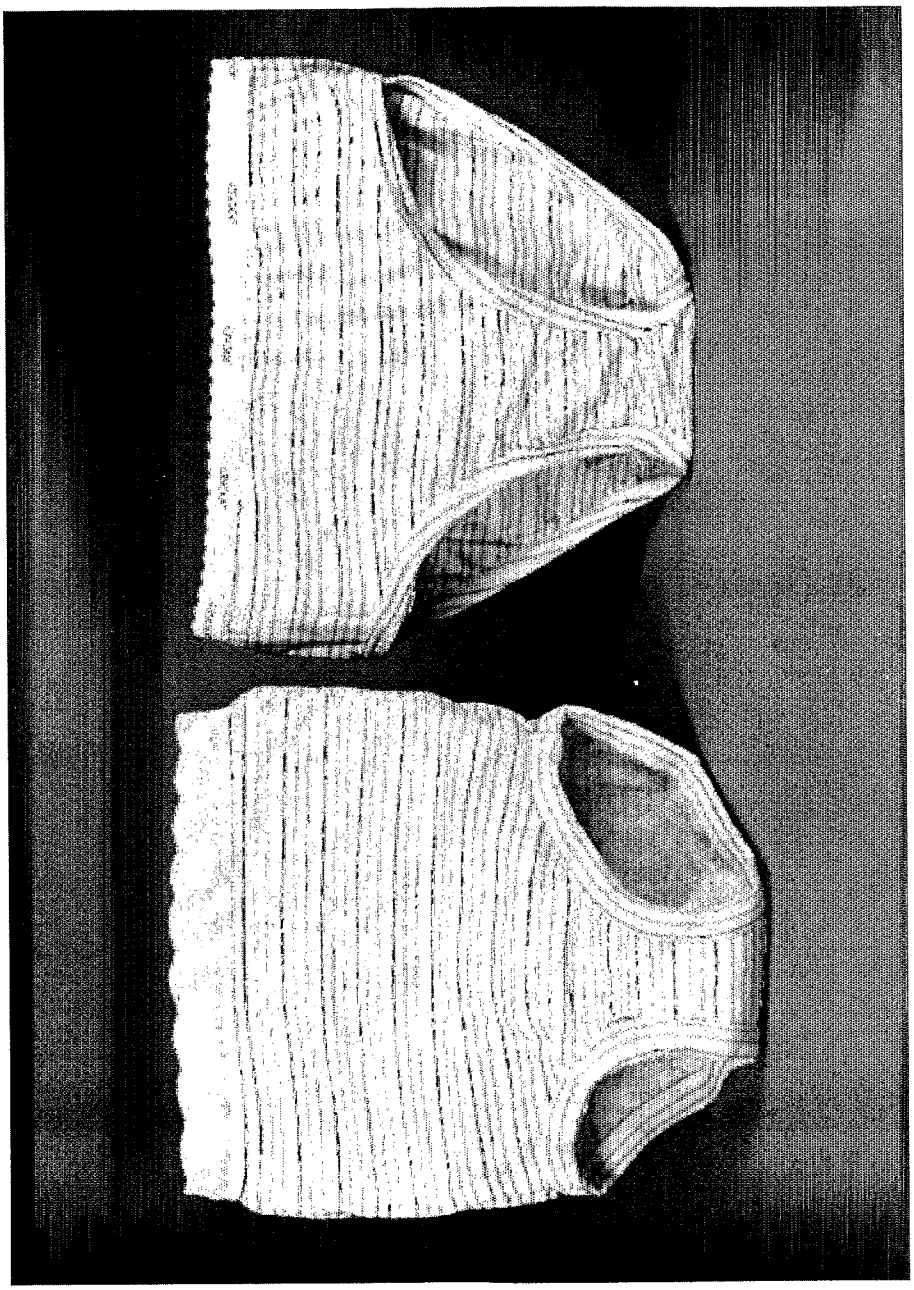

FIG. 4

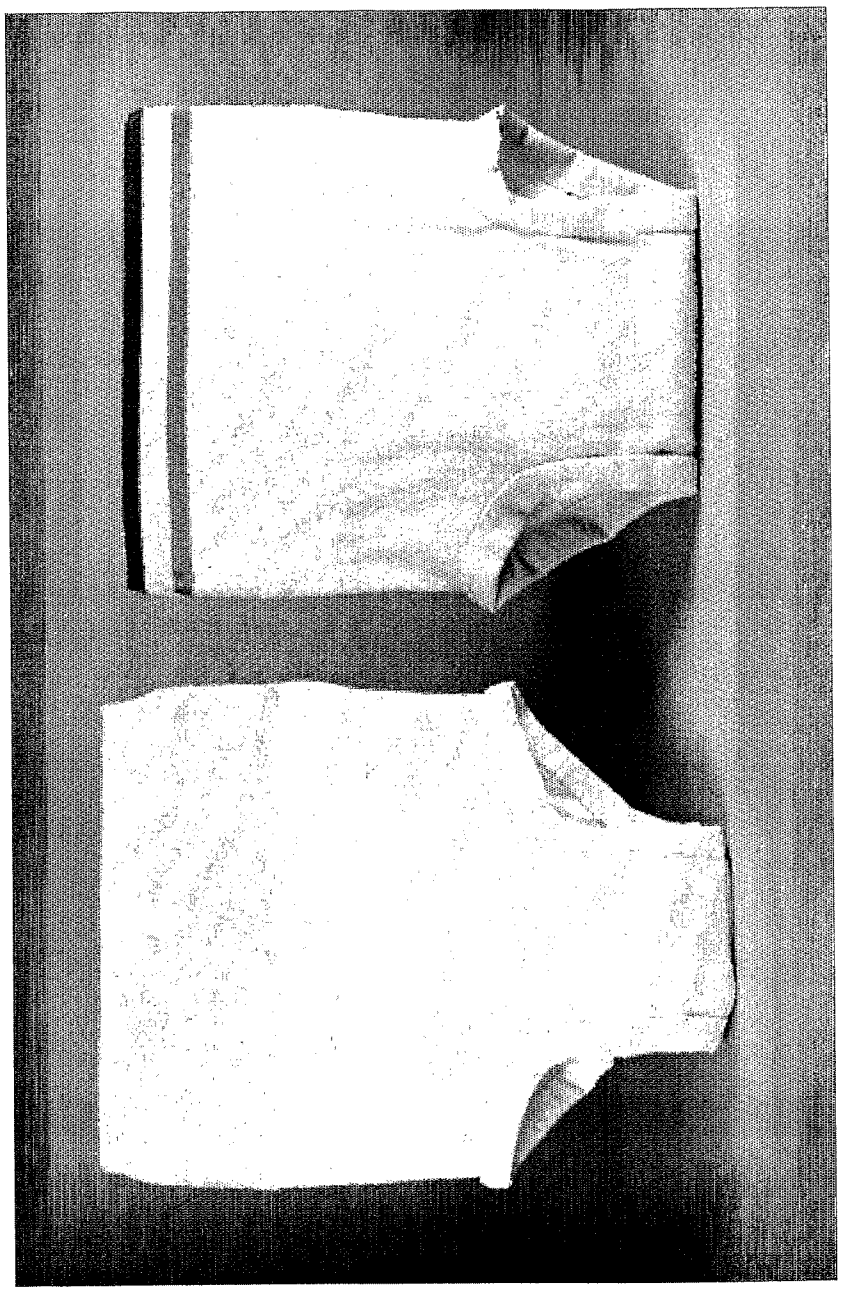

FIG. 5

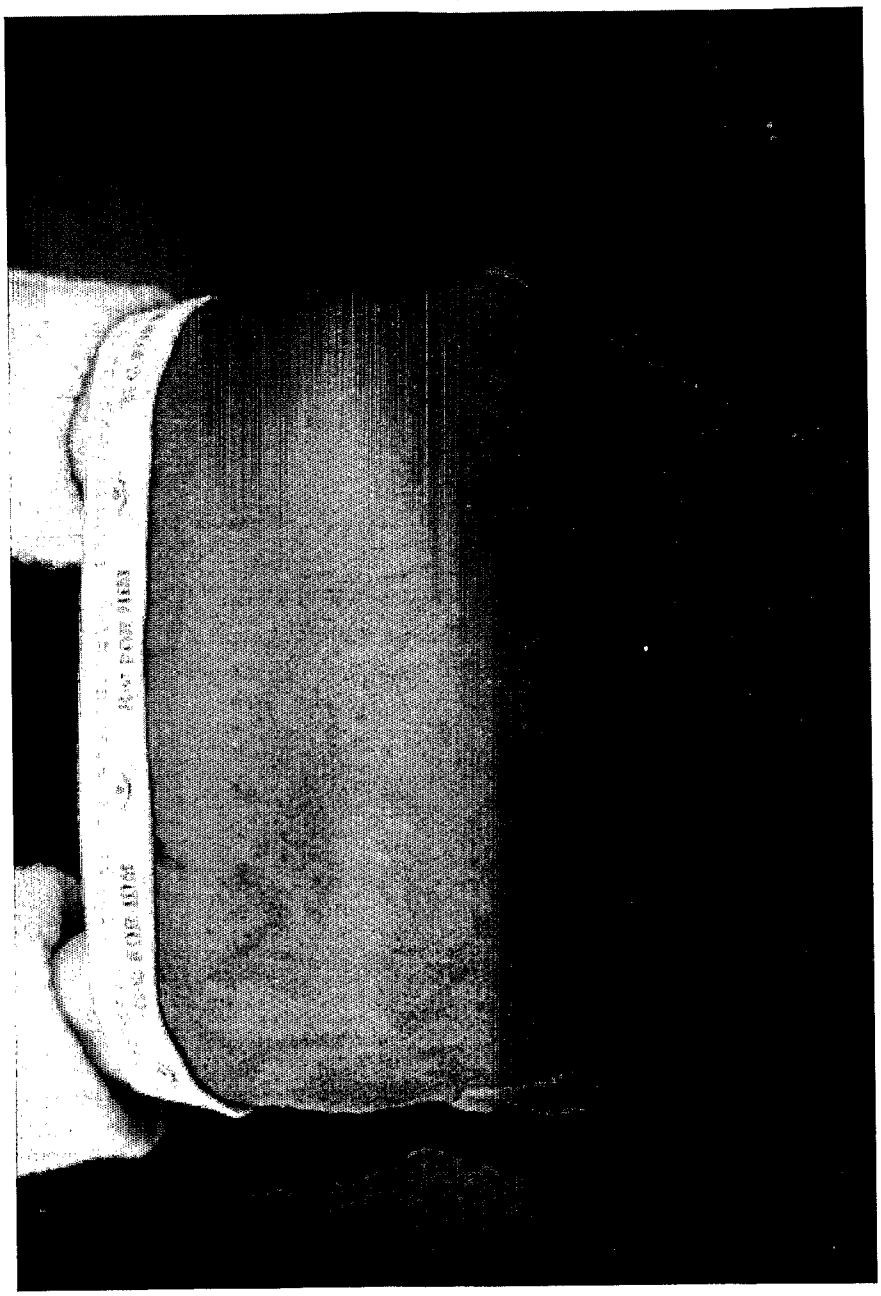

FIG. 6

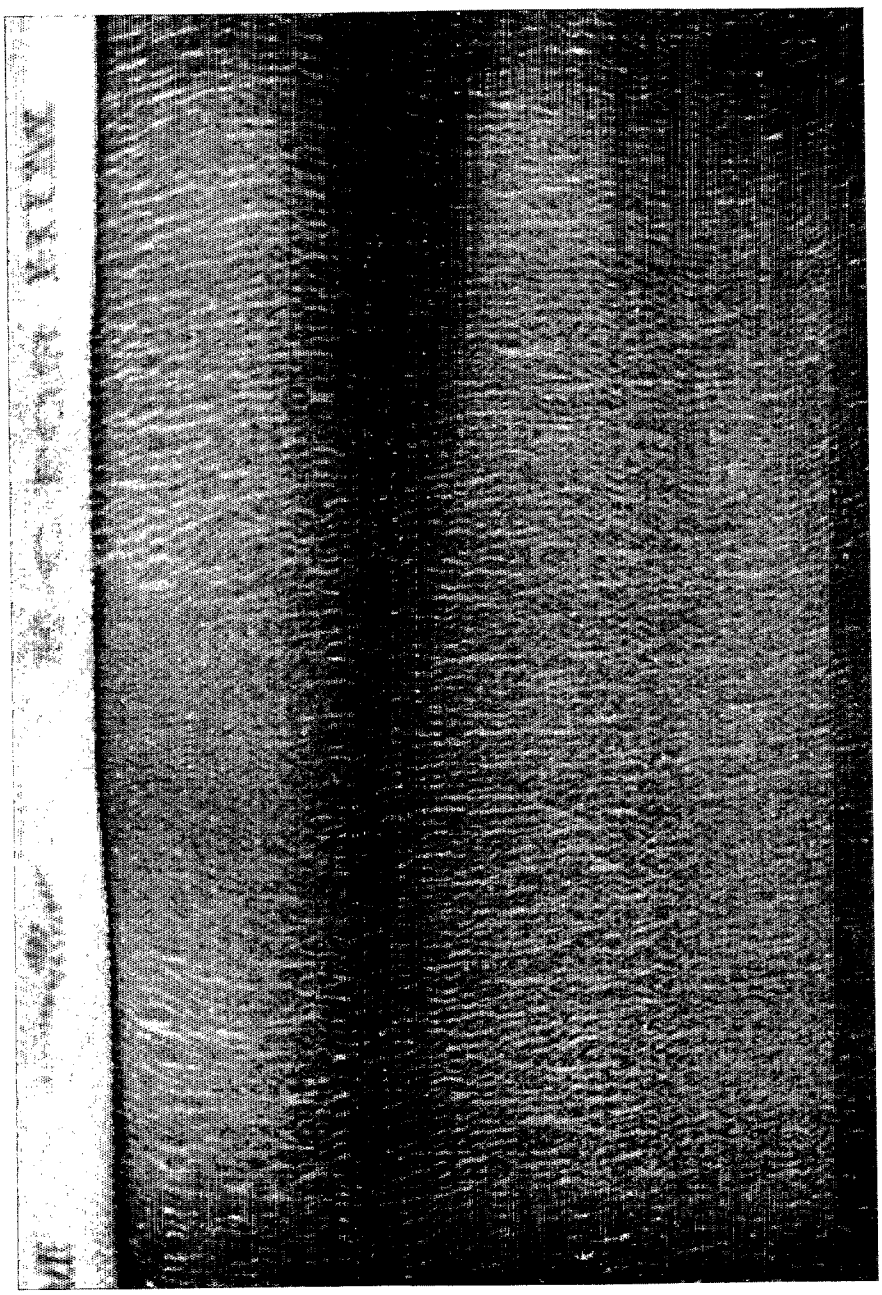

FIG. 7

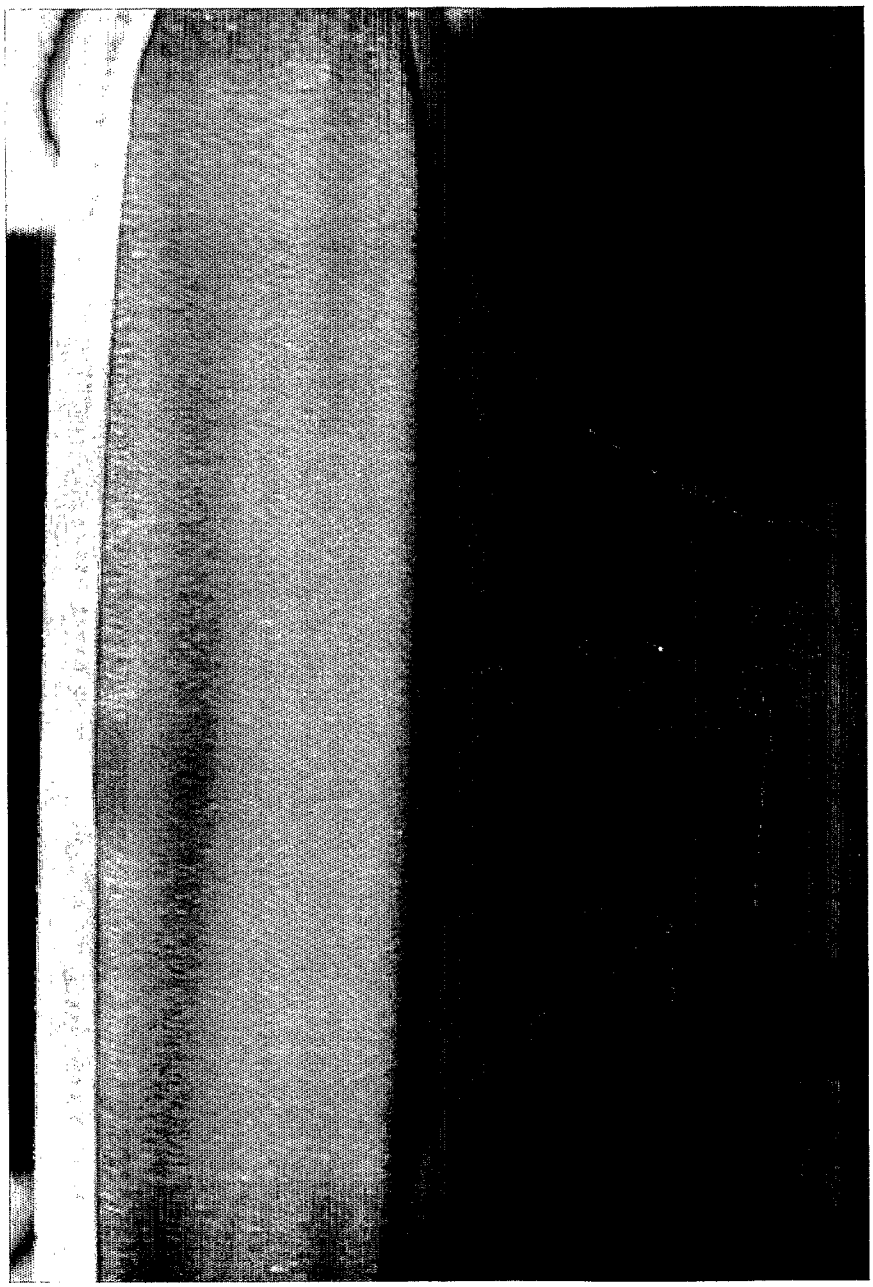

FIG. 8

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2006/024381

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61F13/49 A61L15/16 B32B25/04

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A61L A61F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
E	WO 2006/127519 A (PROCTER & GAMBLE [US]; ROE DONALD CARROLL [US]; PANNING CYNTHIA JEAN [) 30 November 2006 (2006-11-30) page 44, paragraph 5 - page 47, paragraph 1	1-20
P,A	WO 2006/038837 A (SCA HYGIENE PROD AB [SE]; KARLSSON TOMAS [SE]; GUSTAFSSON ANDERS [SE];) 13 April 2006 (2006-04-13) page 3, line 8 - line 21 page 7, line 1 - page 9, line 30 page 11, line 31 - page 12, line 3	1-20
A	WO 03/047488 A (TREDEGAR FILM PROD CORP [US]; HUTSON RANDELL OWEN [US]; PEACOCK ANDREW) 12 June 2003 (2003-06-12) claims 1-34	1-20

-/--

[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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10 January 2007	22/01/2007

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Schnack, Anne

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2006/024381

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 01/87212 A (KIMBERLY CLARK CO [US]) 22 November 2001 (2001-11-22) page 16, line 6 - page 18, line 12 figures 5-8	1-20
A	WO 03/057481 A (KIMBERLY CLARK CO [US]) 17 July 2003 (2003-07-17) claims 1-21	1-20
A	US 2004/127128 A1 (THOMAS OOMMAN P [US]) 1 July 2004 (2004-07-01) claims 1-71	1-20

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2006/024381

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2006127519 A	30-11-2006	US 2006264858 A1	23-11-2006
WO 2006038837 A	13-04-2006	NONE	
WO 03047488 A	12-06-2003	AU 2002365898 A1	17-06-2003
		BR 0214807 A	14-09-2004
		CA 2465620 A1	12-06-2003
		CN 1596094 A	16-03-2005
		EP 1448135 A1	25-08-2004
		HU 0402517 A2	28-04-2005
		JP 2005511345 T	28-04-2005
		MX PA04004582 A	13-08-2004
WO 0187212 A	22-11-2001	AU 6168801 A	26-11-2001
		EP 1284701 A1	26-02-2003
		MX PA02011156 A	10-03-2003
		US 2004019343 A1	29-01-2004
WO 03057481 A	17-07-2003	AU 2002357148 A1	24-07-2003
		BR 0214941 A	14-12-2004
		EP 1458565 A1	22-09-2004
		MX PA04005541 A	10-09-2004
		US 2003124306 A1	03-07-2003
US 2004127128 A1	01-07-2004	AU 2003270890 A1	29-07-2004
		BR 0317800 A	29-11-2005
		CN 1720361 A	11-01-2006
		EP 1579047 A1	28-09-2005
		JP 2006512491 T	13-04-2006
		KR 20050096112 A	05-10-2005
		MX PA05007223 A	12-09-2005
		WO 2004061181 A1	22-07-2004