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SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



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**SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO  
DIVISION DE NUEVAS CREACIONES**

**E. S. D.**

Ref.: Expediente No. 08-116.270  
Solicitud de Patente a nombre de  
**McNeil-PPC, Inc.**

Yo, JIMENA ESCOBAR URIBE, identificada como aparece al pie de mi firma, domiciliada en la Carrera 11 No. 86-53, piso 6, obrando como apoderada de la sociedad **McNeil-PPC, Inc.**, domiciliada en Skillman, New Jersey, Estados Unidos de América, solicitante de la patente de la referencia, atentamente me permito presentar las copias certificadas de la solicitud de patente números 11/957,958 presentada en Estados Unidos de América el día 17 de diciembre de 2007 y 60/983,746 de 30 de octubre de 2007, con la debida traducción de lo pertinente.

Señor Superintendente,

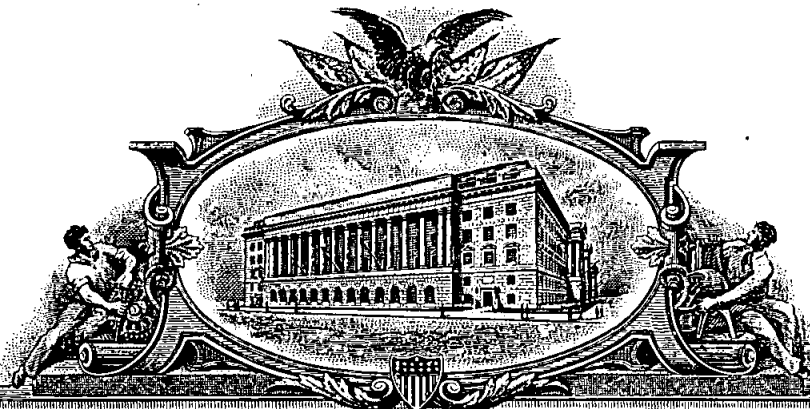
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P-1618



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APPLICATION NUMBER: 60/983,746

FILING DATE: October 30, 2007

THE COUNTRY CODE AND NUMBER OF YOUR PRIORITY APPLICATION, TO BE USED FOR FILING ABROAD UNDER THE PARIS CONVENTION, IS US60/983,746

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| <b>Title of Invention:</b>                  | ABSORBENT ARTICLE INCLUDING AN ASORBENT LAYER HAVING A PLURALITY OF SPACED BEAM ELEMENTS |
| <b>First Named Inventor/Applicant Name:</b> | KOFI AYENSU BISSAH                                                                       |
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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

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If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

**New International Application Filed with the USPTO as a Receiving Office**

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

**ABSORBENT ARTICLE INCLUDING AN ABSORBENT LAYER HAVING A  
PLURLAITY OF SPACED BEAM ELEMENTS**

5    **FIELD OF INVENTION**

The present invention generally relates to absorbent sanitary napkins and in particular to a sanitary napkin including an absorbent layer having a plurality of spaced beam elements for promoting enhanced fluid wicking within the sanitary napkin.

10   **BACKGROUND OF THE INVENTION**

In order for a sanitary napkin to efficiently absorb a large amount of fluid during use it must effectively wick fluid throughout the absorbent structure of the napkin.

Absent effective wicking properties menstrual fluid tends to pool in certain regions of the napkin as a result of which the full absorbent capacity of the napkin is not effectively

15   utilized. On the other hand, napkins that exhibit particularly efficient wicking characteristics may exhibit other problems. In particular, such napkins may wick fluid to the longitudinal edge of the absorbent structure resulting in fluid being released from the longitudinal edge of the napkin, i.e. resulting in side leakage. Accordingly, the inventors of the present invention have recognized a need to provide a sanitary napkin that

20   efficiently wicks fluid in the longitudinal direction and at the same time effectively prevents side leakage in the transverse direction of the napkin. By providing a napkin that efficiently wicks fluid in the longitudinal direction and at the same time effectively prevents side leakage in the transverse direction, the inventor's have provided a sanitary

### **SUMMARY OF THE INVENTION**

In view of the foregoing, the present invention provides, according to a first aspect of the invention, an absorbent article including a longitudinally extending centerline, transversely extending centerline, a cover layer having a body facing surface, a first absorbent layer having an upper surface and a lower surface, the layer including a plurality of beams and a plurality of material-free zones, each of the beams arranged in a spaced relationship to an adjacent beam and each of the beams being separated from an adjacent beam by a material-free zone, each of the material-free zones extending from the upper surface to the lower surface, a second absorbent layer arranged below the first absorbent layer, wherein the cover layer includes a plurality of first regions arranged in spaced relationship to the second absorbent layer and a plurality of second regions, each of the second regions located between two adjacent beams and arranged in surface to surface contact with the second absorbent layer, wherein the first absorbent layer, second absorbent layer and cover cooperate to define a plurality of longitudinally extending gutters in the body facing surface of the article.

The present invention provides, according to a second aspect of the invention, an absorbent article including a cover layer having a body facing surface, a first absorbent layer having an upper surface and a lower surface, the layer including a plurality of material-free zones, each of the material-free zones extending from the upper surface to the lower surface, a second absorbent layer arranged below the first absorbent layer, wherein the cover layer includes a plurality of first regions arranged in spaced relationship to the second absorbent layer and a plurality of second regions, each of the

second regions arranged in surface to surface contact with the second absorbent layer, and wherein the absorbent article has an RIF value greater than 15.0.

The present invention provides, according to a third aspect of the invention, an absorbent article including a longitudinally extending centerline, a transversely extending centerline, a cover layer having a body facing surface, a first absorbent layer having an upper surface and a lower surface, the layer including at least one material-free zone, the material-free zone extending from the upper surface to the lower surface, a second absorbent structure arranged below the first absorbent layer, wherein the cover layer includes a plurality of first regions arranged in spaced relationship to the second absorbent structure and a second region, the second region located within the area defined by the material free zone and arranged in surface to surface contact with the second absorbent structure.

The present invention provides, according to a fourth aspect of the invention, an absorbent article including a cover layer having a body facing surface, a first absorbent layer having an upper surface and a lower surface, the layer comprising a plurality of material-free zones, each of the material-free zones extending from the upper surface to the lower surface, a second absorbent structure arranged below the first absorbent system, wherein the cover layer includes a plurality of first regions arranged in spaced relationship to the second absorbent structure and a plurality of second regions, each of the second regions arranged in surface to surface contact with the second absorbent structure, and wherein the absorbent article has an LTWR value greater than 3.5.

**BRIEF DESCRIPTION OF THE DRAWINGS**

Examples of embodiments of the present invention will now be described with reference to the drawings, in which:

5            Fig. 1 is a top plan view of the absorbent article according to the present invention;

             Fig. 2 is a bottom plan view of the absorbent article shown in Fig. 1;

             Fig. 3a is an exploded view of the absorbent article shown in Fig. 1 according to a first embodiment of the invention;

10           Fig. 3b is an exploded view of the absorbent article shown in Fig. 1 according to a second embodiment of the invention;

             Fig. 4 is an exploded view of the second absorbent layer employed in the absorbent article shown in Fig. 1;

             Fig. 5 is a sectional view of the absorbent article shown in Fig. 1 taken along line  
15    5-5 thereof;

             Fig. 6 is a perspective view of an absorbent article according to a second embodiment of the present invention;

             Fig. 7 is a perspective view of an apparatus for measuring lateral rigidity of an absorbent article;

20           Fig. 8 is a front elevation view of the apparatus shown in Fig. 7;

             Fig. 9 is a top elevation view of the apparatus shown in Fig. 7;

Fig. 10 is a top elevation view of a test plate used to measure a  
Longitudinal/Transverse Wicking Ratio of an absorbent article and a Repeat Insult  
Failure (RIF) Value of an absorbent article; and

Fig. 11 is a schematic view depicting a stained absorbent article and the manner in  
5 which the Longitudinal/Transverse Wicking Ratio is calculated.

**DETAILED DESCRIPTION OF THE INVENTION**

The present invention generally relates to disposable absorbent articles such as sanitary napkins, pantliners, absorbent products for incontinence, and other disposable absorbent articles worn close to a wearer's body. Although the invention will be described herein with reference to a sanitary napkin 10 the invention may be utilized with other disposable sanitary absorbent articles such as absorbent products for incontinence, diapers, pantliners and the like.

Absorbent articles according to the present invention provide superior fluid handling characteristics, and more specifically are particularly adept at preventing side leakage while at the same time providing superior longitudinal wicking characteristics.

As shown in Figs. 1-5, the present invention according to one embodiment of the invention relates to a sanitary napkin 10 for absorbing bodily fluids. The sanitary napkin 10 includes a body facing surface 11, a garment facing surface 13, a longitudinally extending centerline 15, and a transversely extending centerline 17.

As best seen in the exploded view shown in Fig. 3a, the sanitary napkin 10 includes a fluid permeable cover layer 12, a first absorbent layer 14, a second absorbent layer 16, and a fluid impermeable barrier layer 18. The first absorbent layer 14 includes a plurality of longitudinally extending material-free zones 20 that extend from an upper surface 22 of the first absorbent layer 14 to a lower surface 24 of the first absorbent layer 14. Each of the material-free zones 20 preferably has a width in the range of between 1 mm and about 10 mm and a length in the range of between about 5 cm and about 40 cm. Absorbent articles according to the present invention preferably have between about 1 and about 7 longitudinally extending the material-free zones 20. Each of the

material free zones 20 is spaced from an adjacent material-free zone 20 in the transverse direction by a distance from about 0.5 cm to about 3 cm. The material-free zones 20 preferably extend over a surface area in the range of between  $50 \text{ mm}^2$  and about  $4000 \text{ mm}^2$ . In the particular embodiment of the invention shown in the Figures the  
5 material-free zones 20 are linear in shape, parallel to each other, and equally spaced.

The first absorbent layer 14 further includes a plurality of longitudinally extending beams 25, each of the beams 25 being arranged in spaced relationship to an adjacent beam 25 and each of the beams 25 being separated from an adjacent beam 25 by one of the material-free zones 20.

10 In one embodiment of the invention, as shown in Fig. 3a, each beam 25 is structured and arranged such that it has a height less than its width, in other words  $H < W$ . Also, in this particular embodiment of the invention, each beam 25 is structured and arranged such that a ratio of its height to width is less than one, in other words  $H/W < 1$ .

As best seen in Fig. 5, the cover layer 12 includes a plurality of first regions 26  
15 that are arranged in spaced relationship to the second absorbent structure 16 and a plurality of second regions 28 that are arranged in surface to surface contact with the second absorbent structure 16.

The surface to surface contact of the cover layer 12 with the second absorbent structure in the second regions 28 essentially define a plurality of longitudinally  
20 extending gutters 29 in the body facing surface 11 of the napkin 10 that are coextensive with the path of the material-free zones 20. The depth of each gutter 29 is equivalent to the thickness of the first absorbent layer 14. The first absorbent layer 14 preferably has a thickness of between about 0.5 mm and about 4 mm, thus the depth of each gutter 29 is

in the range of between about 0.5 mm and about 4 mm. The thickness and depth measurements set forth in this paragraph may be determined by using a suitable thickness gauge such as the Mitutoyo Absolute Gauge or equivalent.

In a preferred embodiment of the invention, shown in Fig. 4, the second absorbent layer 16 is a multilayer construct including a first absorbent layer 30, a second absorbent layer 32, and superabsorbent material arranged between the first 30 and second layers 32. In the particular embodiment shown in Fig. 4 the superabsorbent material is arranged in a plurality of spaced lines 36. Preferably each of the spaced lines 36 of superabsorbent material is positioned such that it is arranged in vertical alignment with one of the gutters 29.

Although not shown in the Figures, the areas of the napkin 10 in which the gutters 29 are located may be colored a different color than the remainder of the absorbent article. For example, the areas in which the gutters 29 are located may be colored blue while the remainder of the napkin 10 is generally white. By coloring the gutters 29 a different color than the remainder of the napkin 10 the enhanced wicking characteristics provided by the gutters 29 are visually communicated to a potential user of the absorbent article. The color may be imparted to the napkin 10 by providing a color (e.g., ink) to the cover layer 12 and/or the second absorbent layer 16 and/or the barrier layer 18.

Fig. 3b shows another embodiment of a sanitary napkin 10b according to the present invention. The sanitary napkin 10b further includes a transfer layer 50 arranged between the cover layer 12 and the first absorbent layer 14. The transfer layer 50 preferably includes a plurality of beams 52 and a plurality of material-free zones 54, each one of the material-free zones 54 is arranged between adjacent beams 52. Each of the

beams 52 of the transfer layer 50 are preferably arranged in vertical alignment with a corresponding beam 25 of the first absorbent layer 14 and each of the material-free zones 54 of the of the transfer layer 50 is preferably arranged in vertical alignment with a corresponding material-free zone 20 of the first absorbent layer 14. The transfer layer 50  
5 may be constructed from similar materials as those described below for the first absorbent layer 14.

Figure 6 shows another embodiment of a sanitary napkin 10c according to the present invention. In the sanitary napkin 10c the gutters 29 extend substantially in the longitudinal direction of the napkin, however the outermost gutters 29a in the transverse  
10 direction have curved end portions 60 that extend in a transverse direction toward the longitudinally extending centerline 15 of the article.

#### Cover Layer

The cover layer 12 may be a relatively low density, bulky, high-loft non-woven  
15 web material. The cover layer 12 may be composed of only one type of fiber, such as polyester or polypropylene or it may include a mixture of more than one fiber. The cover may be composed of bi-component or conjugate fibers having a low melting point component and a high melting point component. The fibers may be selected from a variety of natural and synthetic materials such as nylon, polyester, rayon (in combination  
20 with other fibers), cotton, acrylic fiber and the like and combinations thereof. Preferably, the cover layer 12 has a basis weight in the range of about 10 gsm to about 75 gsm.

Bi-component fibers may be made up of a polyester layer and a polyethylene

sheath. The use of appropriate bi-component materials results in a fusible non-woven fabric. Examples of such fusible fabrics are described in U.S. Pat. No. 4,555,430 issued Nov. 26, 1985 to Chicopee. Using a fusible fabric increases the ease with which the cover layer may be mounted to the absorbent layer and/or to the barrier layer.

5           The cover layer 12 preferably has a relatively high degree of wettability, although the individual fibers comprising the cover may not be particularly hydrophilic. The cover material should also contain a great number of relatively large pores. This is because the cover layer 12 is intended to take-up body fluid rapidly and transport it away from the body and the point of deposition. Therefore, the cover layer contributes little to the time  
10 taken for the napkin to absorb a given quantity of liquid (penetration time).

Advantageously, the fibers which make up the cover layer 12 should not lose their physical properties when they are wetted, in other words they should not collapse or lose their resiliency when subjected to water or body fluid. The cover layer 12 may be treated to allow fluid to pass through it readily. The cover layer 12 also functions to transfer the  
15 fluid quickly to the underlying layers of the napkin. Thus, the cover layer 12 is advantageously wettable, hydrophilic and porous. When composed of synthetic hydrophobic fibers such as polyester or bi-component fibers, the cover layer 12 may be treated with a surfactant to impart the desired degree of wettability.

Alternatively, the cover layer 12 can also be made of polymer film having large  
20 pores. Because of such high porosity, the film accomplishes the function of quickly transferring body fluid to the inner layers of the underlying absorbent layers. A suitable cover material of this type is commercially found on the STAYFREE Dry Max Ultrathin product distributed by McNeil-PPC, Inc.

The cover layer 12 may be attached to the underlying absorbent layers 14 and 16, and/or the barrier layer 18, by adhesion and/or other suitable means known to those of skill in the art.

5

#### First Absorbent Layer

The first absorbent layer 14 may be composed of fibrous materials, such as wood pulp, polyester, rayon, flexible foam, or the like, or combinations thereof. The first absorbent layer 14 may also optionally include a superabsorbent polymer (SAP) material.

10 The first absorbent layer 14 may also comprise thermoplastic fibers for the purpose of stabilizing the layer and maintaining its structural integrity. The first absorbent layer 14 may be treated with surfactant on one or both sides in order to increase its wettability, although generally the first absorbent layer 14 is relatively hydrophilic and may not require treatment. The first absorbent layer 14 is preferably bonded on both sides to the  
15 adjacent layers, i.e. the cover layer 12 and the underlying second absorbent layer 16.

In one specific embodiment of the invention the first absorbent layer 14 is constructed from fluff pulp commercially available as RAYFLOC J-LD-E from Rayonier Products, Jessup, Georgia.

#### 20 Second Absorbent Layer

The second absorbent layer 16 may comprise a single layer of material or may comprise multiple layers.

In one embodiment, the second absorbent layer 16 is a blend or mixture of cellulosic fibers and superabsorbent disposed therein. Cellulosic fibers that can be used in the second absorbent layer 16 are well known in the art and include wood pulp, cotton, flax and peat moss. Wood pulp is preferred. Pulps can be obtained from mechanical or  
5 chemi-mechanical, sulfite, kraft, pulping reject materials, organic solvent pulps, etc. Both softwood and hardwood species are useful. Softwood pulps are preferred. It is not necessary to treat cellulosic fibers with chemical debonding agents, cross-linking agents and the like for use in the present material. Some portion of the pulp may be chemically treated as discussed in U.S. Pat. No. 5,916,670 to improved flexibility of the product.  
10 Flexibility of the material may also be improved by mechanically working the material or tenderizing the material.

The second absorbent layer 16 can contain any superabsorbent polymer (SAP) which are well known in the art. For the purposes of the present invention, the term "superabsorbent polymer" (or "SAP") refers to materials which are capable of absorbing  
15 and retaining at least about 10 times their weight in body fluids under a 0.5 psi pressure. The superabsorbent polymer particles of the invention may be inorganic or organic crosslinked hydrophilic polymers, such as polyvinyl alcohols, polyethylene oxides, crosslinked starches, guar gum, xanthan gum, and the like. The particles may be in the form of a powder, grains, granules, or fibers. Preferred superabsorbent polymer particles  
20 for use in the present invention are crosslinked polyacrylates, such as the product offered by Sumitomo Seika Chemicals Co., Ltd. Of Osaka, Japan, under the designation of SA70N and products offered by Stockhausen Inc.. In a specific example, the second absorbent layer 16 is a material containing from 90% to about 40% percent cellulosic

fiber, about 10% to about 60% SAP. The second absorbent layer 16 may comprise a material manufactured by using air-laying means well known in the art.

In one preferred embodiment of the invention the second absorbent layer 16 is relatively thin, high swelling absorbent material such as the absorbent composite material sold under the trade name NOVATHIN ® available from EAM Corporation located in Jessup, Ga. , U.S.A.

In a preferred embodiment of the invention, shown in Fig. 4, the second absorbent layer 16 is a multilayer construct including a first absorbent layer 30, a second absorbent layer 32, and superabsorbent material 34 arranged between the first 30 and second layers 32. In the particular embodiment shown in Fig. 4 the superabsorbent material 34 is arranged in a plurality of spaced lines 36. The first absorbent layer 30 and second absorbent layer 32 are constructed from pulp tissue commercially available from Little Rapids Corporation, Green Bay, Wisconsin and the superabsorbent material 34 is a superabsorbent polymer commercially available as Aqua Keep BA40B from Sumitomo Seika Chemicals Co., Ltd., Osaka, Japan.

#### Barrier Layer

Underlying the second absorbent layer 16 is a barrier layer 18 comprising liquid-impervious film material so as to prevent liquid that is entrapped in the absorbent layer 16 from egressing the sanitary napkin and staining the wearer's undergarment. The barrier layer 18 is preferably made of polymeric film, although it may be made of liquid impervious, air-permeable material such as repellent-treated non-woven or micropore films or foams.

The barrier layer 18 may be breathable, i.e., permits vapor to transpire. Known materials for this purpose include nonwoven materials and microporous films in which microporosity is created by, inter alia, stretching an oriented film. Single or multiple layers of permeable films, fabrics, melt-blown materials, and combinations thereof that provide a tortuous path, and/or whose surface characteristics provide a liquid surface repellent to the penetration of liquids may also be used to provide a breathable backsheet. The cover layer 12 and the barrier layer 18 are preferably joined along their marginal portions so as to form an enclosure or flange seal that maintains the absorbent layers 14 and 16 captive. The joint may be made by means of adhesives, heat-bonding, ultrasonic bonding, radio frequency sealing, mechanical crimping, and the like and combinations thereof.

Positioning adhesive may be applied to a garment facing surface 13 of the barrier layer 18 for securing the napkin 10 to a garment during use. As seen in Fig. 2, the positioning adhesive may be covered with removable release paper 40 so that the positioning adhesive is covered by the removable release paper 40 prior to use.

Absorbent articles of this invention may or may not include wings, flaps or tabs for securing the absorbent article to an undergarment. Wings, also called, among other things, flaps or tabs, and their use in sanitary protection articles is described in U.S. Patent. No. 4,687,478 to Van Tilburg; U.S. Patent No. 4,589,876 also to Van Tilburg, U.S. Patent No. 4,900,320 to McCoy, and U.S. Patent No. 4,608,047 to Mattingly. The disclosures of these patents are incorporated herein by reference in their entirety. As disclosed in the above documents, wings are generally speaking flexible and configured

to be folded over the edges of the underwear so that the wings are disposed between the edges of the underwear.

### Test Procedures

5 Absorbent articles according to the present invention possess a combination of unique functional properties. The test procedures set forth below highlight each of these functional properties. Prior to conducting any of the described test procedures described below the test product should be conditioned for two hours at  $21 \pm 1^\circ \text{C}$  and  $50 \pm 2\%$  humidity.

10

### Procedure for Measuring the Thickness of Absorbent Article

Preferred embodiments of the present invention relate to "full-size" sanitary napkins. Full-size sanitary napkins as defined herein are those sanitary napkins that have a thickness of greater than 4.0 mm, according to the thickness measurement procedure set forth below. Preferably, absorbent articles according to the present invention have

15 thickness in the range of about 4.0 mm to about 10.0 mm.

The apparatus required to measure the thickness of an absorbent article is a footed dial (thickness) gauge with stand, available from Ames, with a 2" (5.08 cm) diameter foot at a pressure of 0.07 psig and a readout accurate to 0.001" (0.00254 cm). A digital type

20 apparatus is preferred. If the absorbent article sample is individually folded and wrapped, the sample is unwrapped and carefully flattened by hand. The release paper is removed from the product sample and it is repositioned back gently across the positioning

adhesive lines so as not to compress the sample, ensuring that the release paper lies flat across the sample. Flaps (if any) are not considered when taking the thickness.

The foot of the gauge is raised and the product sample is placed on the anvil such that the foot of the gauge is approximately centered over the intersection of the  
5 longitudinally extending centerline and transversely extending centerline on the product sample. When lowering the foot, care must be taken to prevent the foot from dropping onto the sample or from undue force being applied. A load of 0.07 p.s.i.g. is applied to the sample and the read out is allowed to stabilize for approximately 5 seconds. The thickness reading is then taken. This procedure is repeated for at least five product  
10 samples and the average thickness is then calculated.

#### Procedure for Measuring Modified Circular Bend Stiffness (MCB)

Absorbent articles according to the present invention exhibit increased multi-directional flexibility when compared to comparable prior art absorbent articles. The test  
15 method set forth below provides a method for measuring multi-directional flexibility of an absorbent article. Absorbent articles according to the present invention preferably have an MCB stiffness of less than 1000 g, more preferably less than 800 g, and most preferably less than 600 g.

Modified Circular Bend Stiffness (MCB) is determined by a test that is modeled  
20 after the ASTM D 4032-82 CIRCULAR BEND PROCEDURE, the procedure being considerably modified and performed as follows. The CIRCULAR BEND PROCEDURE is a simultaneous multi-directional deformation of a material in which one face of a specimen becomes concave and the other face becomes convex. The

CIRCULAR BEND PROCEDURE gives a force value related to flexural resistance, simultaneously averaging stiffness in all directions.

The apparatus necessary for the CIRCULAR BEND PROCEDURE is a modified Circular Bend Stiffness Tester, having the following parts:

- 5           1.       A smooth-polished steel plate platform, which is 102.0 mm by 102.0 mm by 6.35 mm having an 18.75 mm diameter orifice. The lap edge of the orifice should be at a 45 degree angle to a depth of 4.75 mm;
2.       A plunger having an overall length of 72.2 mm, a diameter of 6.25 mm, a ball nose having a radius of 2.97 mm and a needle-point extending 0.88 mm therefrom  
10       having a 0.33 mm base diameter and a point having a radius of less than 0.5 mm, the plunger being mounted concentric with the orifice and having equal clearance on all sides. Note that the needle-point is merely to prevent lateral movement of the test specimen during testing. Therefore, if the needle-point significantly adversely affects the test specimen (for example, punctures an inflatable structure), than the needle-point  
15       should not be used. The bottom of the plunger should be set well above the top of the orifice plate. From this position, the downward stroke of the ball nose is to the exact bottom of the plate orifice;
3.       A force-measurement gauge and more specifically an Instron inverted compression load cell. The load cell has a load range of from about 0.0 to about 2000.0  
20       g;
4.       An actuator and more specifically the Instron Model No. 1122 having an inverted compression load cell. The Instron 1122 is made by the Instron Engineering Corporation, Canton, Mass.

In order to perform the procedure for this test, as explained below, five representative product samples for each article to be tested are necessary. The location of the sanitary napkin, or other absorbent article, to be tested is located at the intersection of the longitudinally extending centerline and transversely extending centerline of the absorbent article. A 37.5 mm by 37.5 mm test specimen is cut from each of the five product samples. Prior to cutting the test specimens any release paper or packaging material is removed from the product sample and any exposed adhesive, such as garment positioning adhesive, is covered with a non-tacky powder such as talc or the like. The talc should not affect the MCB measurement.

The test specimens should not be folded or bent by the test person, and the handling of specimens must be kept to a minimum and to the edges to avoid affecting flexural-resistance properties.

A test specimen is centered on the orifice platform below the plunger such that the body facing layer of the test specimen is facing the plunger and the barrier layer of the specimen is facing the platform. The plunger speed is set at 50.0 cm per minute per full stroke length. The indicator zero is checked and adjusted, if necessary. The plunger is actuated. Touching the test specimen during the testing should be avoided. The maximum force reading to the nearest gram is recorded. The above steps are repeated until all five test specimens have been tested. An average is then taken from the five test values recorded to provide an average MCB stiffness.

Procedure for Measuring Lateral Rigidity Percent Change

Absorbent articles according to the present invention exhibit a lower lateral rigidity (stiffness) when compared to comparable prior art products. This reduced lateral rigidity provides enhanced comfort to the user since the article is not as easily perceived  
5 between the user's thighs during use. Lateral rigidity percent change as measured according to the method described below measures a percent change in lateral rigidity from a first compression cycle to fifth compression cycle. Absorbent articles according to the present invention exhibit a lower percent change in lateral rigidity due to the articles lower initial lateral rigidity. Absorbent articles according to the present invention  
10 preferably have a lateral rigidity percent change of less than 28.00, more preferably less than 26.50 and most preferably less than 24.00.

The method for determining percent change of lateral rigidity set forth below measures the change in flexibility of the article in the transverse direction of the article after the article has been compressed several times in the transverse direction. The  
15 apparatus 100 required for this measurement is illustrated in Figs. 7-9. The apparatus 100 includes two front metal rods 102a (diameter = 4.4 mm, length = 102.2 mm), two rear metal rods 102b (diameter = 4.4 mm, length = 102.2 mm), and one central metal rod 104 (diameter = 2.4 mm, height = 92.1 mm) mounted on a first Plexiglass arc-shaped plate 106 (diameter = 139.7 mm and height = 37.9 mm), which serves to hold the sanitary  
20 napkin 10. The napkin 10 (or other absorbent article to be tested) should be arranged such that the intersection of the longitudinally extending centerline 15 and transversely extending centerline 17 is arranged in alignment with the central metal rod 104.

The two front metal rods 102a are spaced from one another by a distance of

31.8 mm as measured from the center of one rod to the center of the other rod. The two rear metal rods 102b are also spaced from one another by a distance of 31.8 mm as measured from the center of one rod to the center of the other rod. The distance between corresponding front 102a and rear 102b rods, i.e. the front and rear rods that are in front to back alignment, is 12.7 mm.

The plate 106 is mounted on the base 108 of an inverted compression load cell 110. A second Plexiglas arc-shaped plate 112 (diameter = 139.7 mm and height = 37.9 mm) is placed upside down on the top part of the inverted compression cell and used to compress the napkin 10 in the transverse direction thereof. The load cell has a range of about 0.0 to about 2000.0 g and is used on an actuator and more specifically on an Instron Model No. 1123 (Instron Engineering Corporation, Canton, Mass).

Before starting the measurement, the napkin is removed from the packaging and unfolded. The release paper is removed and talc powder is sprinkled over the adhesive strips. Using a ruler and the central rod as a guide, the initial position of the compression cell is adjusted so that the distance between the surfaces of the plates 106 and 112 is 7.62 cm (3 inches). The napkin 10 is placed between the rods 102a, 102b, and 104, as shown in the Figure 7. The actuator is set so that during each compression cycle, it will move down by 5.08 cm at a speed of 50 cm/min. For each sample, a series of five compression cycles is executed consecutively and the peak force load is recorded during the first and the fifth cycle. The lateral rigidity percentage change between the first and the fifth cycle is calculated using the following equation:

$$\text{LR (\% drop)} = \frac{\text{peak load (1st cycle)} - \text{peak load (5th cycle)}}{\text{peak load (1st cycle)}} \times 100$$

where the peak load is highest recorded load force (g) during the relevant cycle.

This procedure is repeated with five different product samples and an average value is  
5 calculated.

Procedure for Measuring Longitudinal Transverse Wicking Ratio (LTWR)

Absorbent articles according to the present invention exhibit superior wicking in  
the longitudinal direction of the article yet at the same time control wicking in the  
10 transverse direction of the article to thereby prevent side leakage. The Longitudinal  
Transverse Wicking Ratio (LTWR) test set forth below illustrates the superior wicking  
characteristics of absorbent articles according to the present invention.

Absorbent articles according to the present invention have LTWR values greater  
than 1.5, more preferably greater than 2.5, and most preferably greater than 3.5.

15 The synthetic test fluid described below is used in the test method described  
below. The synthetic test fluid used in replacement of human menses due to its ease in  
preparation and accessibility of the ingredients.

The fluid is prepared by dissolving each of the following components into  
distilled water. Care should be taken to ensure that components are well dissolved. A  
20 rotating blade mixer or a magnetic stirrer should be used for mixing the components. In a  
large enough container, add the following components, making sure that the component  
is dissolved before adding the next one:

| Quantity/1 L | Reagent          | Grade, purity     | Supplier              | Catalog no. |
|--------------|------------------|-------------------|-----------------------|-------------|
| 9.0 g        | sodium chloride  | ACS reagent 99+%  | Sigma-Aldrich         | 223514      |
| 490.5 g      | distilled water  | N/AP              | N/AP                  | N/AP        |
| 10 g         | 2-phenoxyethanol | puriss. 99.0%     | Sigma-Aldrich (Fluka) | 77699       |
| 0.5 g        | FD&C Red #40     | Food              | A&C                   | C3465       |
| 490.5 g      | glycerol         | ACS reagent 99.5% | Sigma-Aldrich         | G7893       |

- 5 The materials required to determine the LTWR value including the following:
- a poly(methylmetracylate) (Plexiglas) template 200, shown in Fig. 10, having dimensions of 20 cm long x 6 cm wide x 1.27 cm thick and an elliptical orifice 202 (3.8 cm x 1.9 cm) in the center of the template;
  - a calibrated electronic repeater pipette (HandyStep Electronic Repeating  
10 Pipet, Brandtech) with a 50 mL combi-syringe (or combi-tip) capable of delivering 5-10 mL at a rate of approximately 4 mL/s and fixed on a stand with the end of the tip placed vertically at 2.54 cm (1 inch) from the surface of the product;
  - a calibrated stopwatch that has a precision of 0.01 s;
  - 15 • a ruler graduated in millimeters (mm);
  - a fine point permanent marker; and
  - the test fluid prepared according to the procedure described above.

39

To obtain the LTWR value, the conditioned article is removed from its packaging, unfolded, placed on a flat surface (e.g. lab table). The Plexiglas plate 200 is placed and centered over the absorbent product, light hand applied pressure is applied to flatten the article, without compressing it, such that there is no substantial bending or folding of the article under the template 200.

A 50 mL combi-syringe (or combi-tip), placed on a repeater pipette, is filled with the test fluid, positioned vertically and fixed on a stand with the end of the tip placed approximately 1 inch from the surface of the product and above the center of the elliptical hole 202 of the plate. The article should be arranged such that the intersection of the longitudinally extending and transversely extending centerlines is positioned in the center of the hole 202. Then, 10 mL of test fluid is insulted to the article at a rate of approximately 4 mL/s. The stopwatch is started as soon as the repeating pipet button is pressed to dispense the volume. After 60 s, the plate is removed and the limits of the stain, along the longitudinally extending and transversely extending axes, are marked rapidly (within less than 10 s) with a marker. Only the continuous fluid stain limits found on the article cover are marked, fluid spots not continuous or linked to the rest of the fluid flow and/or observed in the lower layers of the absorbent product are not considered in the determination of the wicking distance. Using the furthest continuous points found along the longitudinally and transversely extending axes, a rectangle is drawn as shown in Fig. 11. The length of the rectangle measured in the longitudinal direction (LW) is divided by the width of the rectangle measured in the transversal direction (TW) to give the LTWR value:

$$LTW = LW/TW$$

where the Longitudinal Wicking Distance (LW) is defined as the farthest continuous fluid displacement along the longitudinally extending axis of the article; and the Transverse Wicking Distance (TW) is the farthest continuous fluid displacement along transversely extending axis. All distance values are measured with a ruler to a precision of 1 mm.

5            If the test fluid touches or runs over the edges of the plate 200 in the transverse direction within 60 s following the fluid injection, the sample is considered to have failed and a zero (0) LTWR value is attributed to that sample. If the absorbent article being tested is smaller than the test plate 200, then failure is defined as the moment when the fluid reaches the edges of the absorbent article in the transverse direction.

10           This procedure is repeated five times using five different samples of each type of absorbent article and an average LTWR value is calculated from these five repeats. If any of the five products fails, i.e. the fluid reaches the edges of the plate, then the reported average LTWR value is zero (0).

15    Procedure for Measuring Repeat Insult Failure (RIF) Value

The ability of an absorbent article to hold repeated insults of fluid without leaking is an indication that absorbent article can deliver superior protection to a user. Absorbent articles according to the present invention preferably have a Repeat Insult Failure Value greater than 5.0, more preferably greater than 10, and most preferably greater than 15.0.

20           In the Repeat Insult Failure Value test method described below, a product fails when fluid reaches the edges of the Plexiglas template 200 shown in Fig. 10, which is centered over the article during the test.

In order to determine the RIF value, the conditioned article is removed from its packaging, unfolded, placed on a flat surface (e.g. lab table). The Plexiglas template 200 is placed and centered over the article to be tested and light hand applied pressure is applied to the template 200 to flatten the article, without compressing it, such that there is no substantial bending or folding of the article under the template 200. The article should be arranged such that the intersection of the longitudinally extending and transversely extending centerlines is positioned in the center of the hole 202.

A 50 mL combi-syringe (or combi-tip), placed on a repeater pipette, is filled with the test fluid (disclosed above), positioned vertically and fixed on a stand with the end of the tip placed approximately 1 inch from the surface of the product and above the center of the elliptical hole of the plate. Then, 7 mL of test fluid is injected on the pad with the repeater pipette at a rate of approximately 4 mL/s. The stopwatch is started at the same time as the pipette button is pressed. As soon as the cover can be observed through the fluid anywhere in the elliptical hole, the time is recorded. This time is defined as the penetration time (p-time). After approximately 30 s, a second 7 mL volume of test fluid is injected, and again, the p-time is recorded. Additional 7 mL injections and p-time measurements are carried out until the product fails. Sample failure is achieved when the test fluid reaches one of the edges of the Plexiglas plate 200. The above described procedure is repeated for five (5) samples of each article to be tested.

For each type of article, determine the average volume at which the product failed,  $V_{(failure)}$ , and the average penetration time obtained when the product failed,  $p-$   
5  $time_{(failure)}$ . Then, the RIF value is calculated using the following equation:

$$RIF = \frac{V_{(failure)}}{p-time_{(failure)}}$$

## EXAMPLES

### Inventive Example

An inventive example of a sanitary napkin according to the present invention was  
5 constructed as follows.

A cover layer was removed from a Stayfree Dry Max Ultrathin product,  
distributed by McNeil-PPC, Inc., and was laid on a conveyor belt and slot coated with  
2.85 gsm of hot melt adhesive commercially available as NW 1023 ZP from Bostik  
Corporation located in Wauwatosa, WI. A first absorbent layer was constructed from  
10 450 gsm fluff pulp commercially available as RAYFLOC J-LD-E from Rayonier  
Products, Jessup, Georgia. The layer of fluff pulp was die cut to form five longitudinally  
extending material free zones as shown in Fig. 1. Each of the material free zones had a  
length of 150 mm a width of 5 mm and each material free zone was spaced in the  
transverse direction for an adjacent material free zone by a distance 10 mm. The first  
15 absorbent layer had a thickness 5 mm. A second absorbent layer was prepared by taking  
two pulp tissue layers commercially available as Little Falls 2004 pulp tissue from Little  
Rapids Corporation, Green Bay, Wisconsin and applying a 150 gsm layer of  
superabsorbent polymer commercially available as Aqua Keep BA40B from Sumitomo  
Seika Chemicals Co., Ltd., Osaka, Japan between the tissue layers. Hot melt adhesive  
20 was then slot coated onto the second absorbent structure on a top surface thereof in the  
amount of 10 gsm to bond the first absorbent layer to the second absorbent layer. A 0.9  
mil polymeric film basksheet commercially available from Pliant Corporation,  
Schaumburg, Ill., was placed on the garment facing side of the second absorbent layer.

The cover was depressed into the into the areas defined by the material free zones to thereby form longitudinally extending gutters in the surface of the napkin and the cover bonded was bonded to the second absorbent layer in the area of the gutters by means of heat and pressure. The final composite was crimped along the peripheral edge the article  
5 and final cut.

Comparative Example #1

Stayfree Maxi Regular with Wings

10 Comparative Example #2

Always Maxi Regular with Wings

Each of the Inventive Example, Comparative Example #1 and Comparative  
Example #2 were tested acccoring to the test methods described above and the results  
15 thereof are summarized in Table 1 provided below.

**TABLE 1**

| (average of n = 5)                                       | Inventive<br>Example | Comparative<br>Example #1 | Comparative<br>Example #2 |
|----------------------------------------------------------|----------------------|---------------------------|---------------------------|
| MCB center (g)                                           | 568                  | 1125                      | 1885                      |
| Lateral rigidity (% drop)                                | 23.75                | 29.25                     | 28.45                     |
| Repeat Insult Value<br>(Volume/p-time) at failure (mL/s) | 19.3                 | 3.4                       | 5.0                       |
| Longitudinal/Transverse Wicking<br>(cm/cm)               | 3.96                 | 1.14                      | 1.49                      |
| Thickness (mm)                                           | 4.73                 | 8.59                      | 8.93                      |

5

As illustrated in the table provided above absorbent articles according to the present invention provide superior comfort and fluid handling characteristics when compared to comparable prior art articles.

CLAIMS

1. An absorbent article comprising:

a longitudinally extending centerline;

5 a transversely extending centerline;

a cover layer having a body facing surface;

a first absorbent layer having an upper surface and a lower surface, the layer comprising a plurality of beams and a plurality of material-free zones, each of the beams arranged in a spaced relationship to an adjacent beam and each of the beams being  
10 separated from an adjacent beam by a material-free zone, each of the material-free zones extending from the upper surface to the lower surface;

a second absorbent structure arranged below the first absorbent layer;

wherein the cover layer includes a plurality of first regions arranged in spaced relationship to the second absorbent structure and a plurality of second regions, each of  
15 the second regions located between two adjacent beams and arranged in surface to surface contact with the second absorbent structure; and

wherein the first absorbent layer, second absorbent layer and cover cooperate to define a plurality of longitudinally extending gutters in the body facing surface of the article.

20

2. The absorbent article according to claim 1, wherein the material-free zones extend over a surface area in the range of between about 50 mm<sup>2</sup> and about 4000 mm<sup>2</sup>.

3. The absorbent article according to claim 2, wherein the plurality of material-free zones comprise between about 3 and about 7 longitudinally extending material-free zones.

4. The absorbent article according to claim 3, wherein each one of the longitudinally extending material-free zones has a length as measured along a path of the material-free zone in the range of about 5 cm to about 40 cm and a width in the range of between about 1 mm and about 10 mm.

5. The absorbent article according to claim 4, wherein said gutters have a depth relative to body facing surface of about 0.5 mm to about 4 mm.

6. The absorbent article according to claim 5, wherein the absorbent article has a thickness greater than 4.0 mm.

7. The absorbent article according to claim 6, wherein the absorbent article has a thickness in the range of about 4.0 mm to about 10.0 mm.

8. The absorbent article according to claim 7, wherein the absorbent article has an MCB value less than 1000 g.

9. The absorbent article according to claim 8, wherein the absorbent article has an MCB value less than 800 g.

10. The absorbent article according to claim 9, wherein the absorbent article has an  
5 MCB value less than 600 g.

11. The absorbent article according to claim 10, wherein the absorbent article has a lateral rigidity percent change of less than 28.0%.

10 12. The absorbent article according to claim 11, wherein the absorbent article has a lateral rigidity percent change of less than 26.5%.

13. The absorbent article according to claim 12, wherein the absorbent article has a lateral rigidity percent change of less than 24.0%.

15

14. The absorbent article according to claim 13, wherein the absorbent article has a LTWR value greater than 1.5.

15. The absorbent article according to claim 14, wherein the absorbent article has a  
20 LTWR value greater than 2.5.

16. The absorbent article according to claim 15, wherein the absorbent article has a LTWR value greater than 3.5.

17. The absorbent article according to claim 16, wherein the absorbent article has an RIF value greater than 5.0.

18. The absorbent article according to claim 17, wherein the absorbent article has an  
5 RIF value greater than 10.0.

19. The absorbent article according to claim 18, wherein the absorbent article has an RIF value greater than 15.0.

10 20. The absorbent article according to claim 1, further comprising a transfer layer, the transfer layer comprising a plurality of beams and a plurality of material-free zones, each one of the material-free zones being arranged between adjacent beams, wherein each of the beams of the transfer layer are arranged in vertical alignment with a corresponding beam of the first absorbent layer and wherein each of the material-free zones of the of the  
15 transfer layer is arranged in vertical alignment with a corresponding material-free zone of the first absorbent layer.

21. An absorbent article comprising:

a cover layer having a body facing surface;

20 a first absorbent layer having an upper surface and a lower surface, the layer comprising a plurality of material-free zones, each of the material-free zones extending from the upper surface to the lower surface;

a second absorbent structure arranged below the first absorbent system;

wherein the cover layer includes a plurality of first regions arranged in spaced relationship to the second absorbent structure and a plurality of second regions, each of the second regions arranged in surface to surface contact with the second absorbent structure; and

5 wherein the absorbent article has an RIF value greater than 15.0.

22. The absorbent article according to claim 21, wherein the absorbent article has a thickness in the range of about 4.0 mm to about 10.0 mm.

10 23. The absorbent article according to claim 22, wherein the absorbent article has a LTWR value greater than 3.5.

24. An absorbent article comprising:

a longitudinally extending centerline;

15 a transversely extending centerline;

a cover layer having a body facing surface;

a first absorbent layer having an upper surface and a lower surface, the layer including at least one material-free zone, the material-free zone extending from the upper surface to the lower surface;

20 a second absorbent structure arranged below the first absorbent layer;

wherein the cover layer includes a plurality of first regions arranged in spaced relationship to the second absorbent structure and a second region, the second region

located within the area defined by the material free zone and arranged in surface to surface contact with the second absorbent structure.

25. An absorbent article comprising:

- 5 a cover layer having a body facing surface;
- a first absorbent layer having an upper surface and a lower surface, the layer comprising a plurality of material-free zones, each of the material-free zones extending from the upper surface to the lower surface;
- a second absorbent structure arranged below the first absorbent system;
- 10 wherein the cover layer includes a plurality of first regions arranged in spaced relationship to the second absorbent structure and a plurality of second regions, each of the second regions arranged in surface to surface contact with the second absorbent structure; and
- wherein the absorbent article has an LTWR value greater than 3.5.

15

20

**ABSTRACT**

The present invention generally relates to absorbent sanitary napkins and in particular to a sanitary napkin including an absorbent layer having a plurality of spaced  
5 beam elements for promoting enhanced fluid wicking within the sanitary napkin.

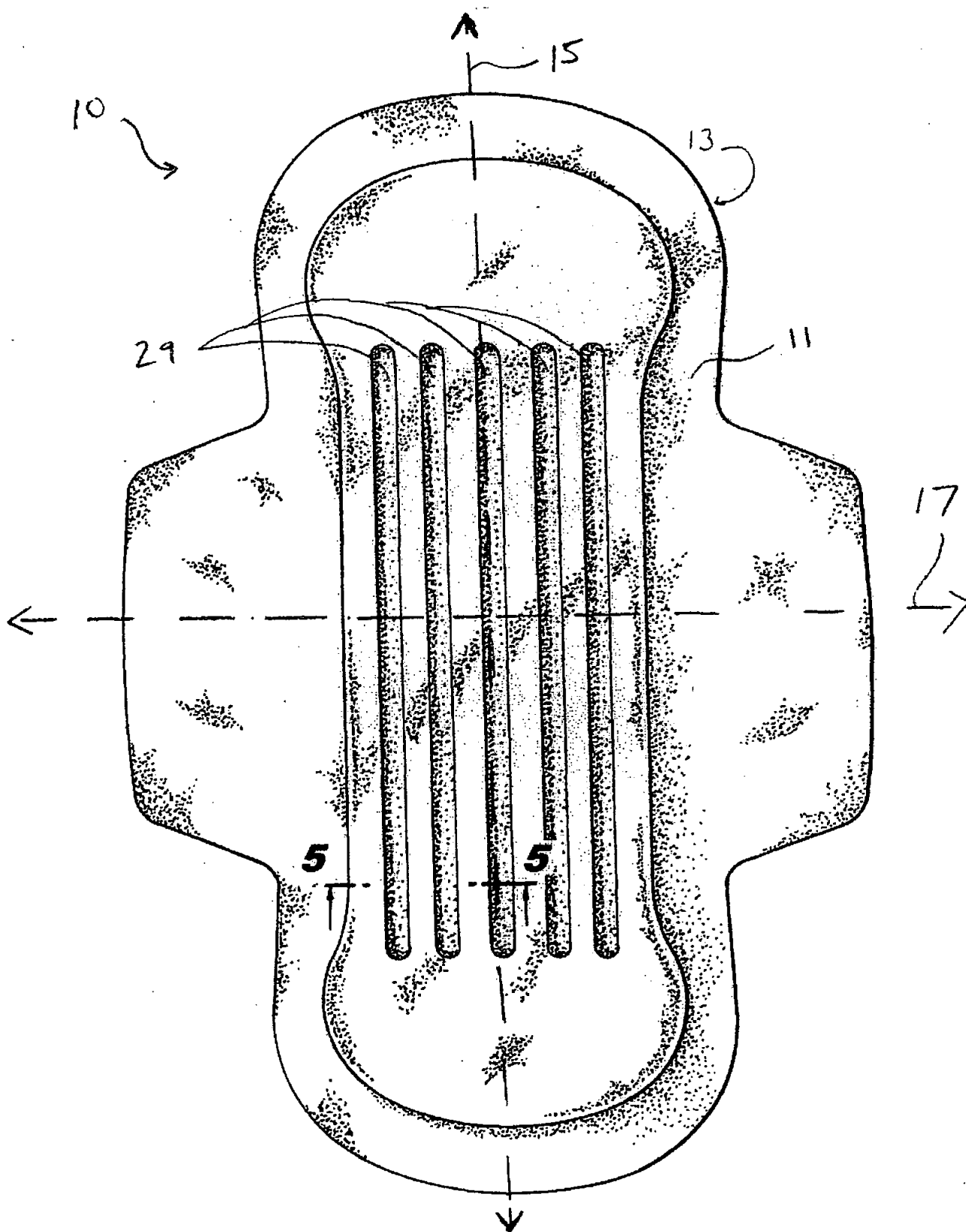


**Fig. 1**

SA

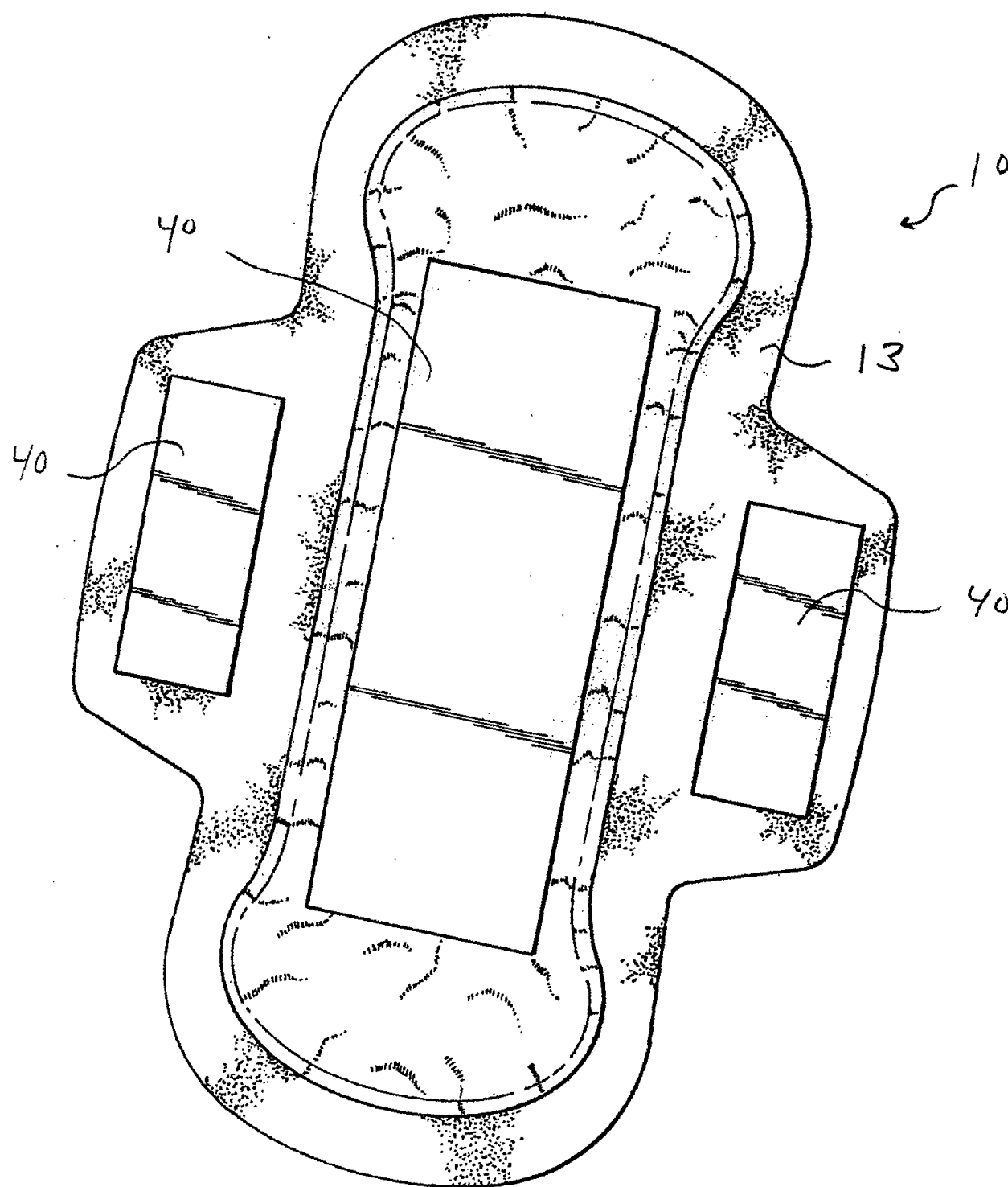


**Fig. 2**

**Fig. 3a**

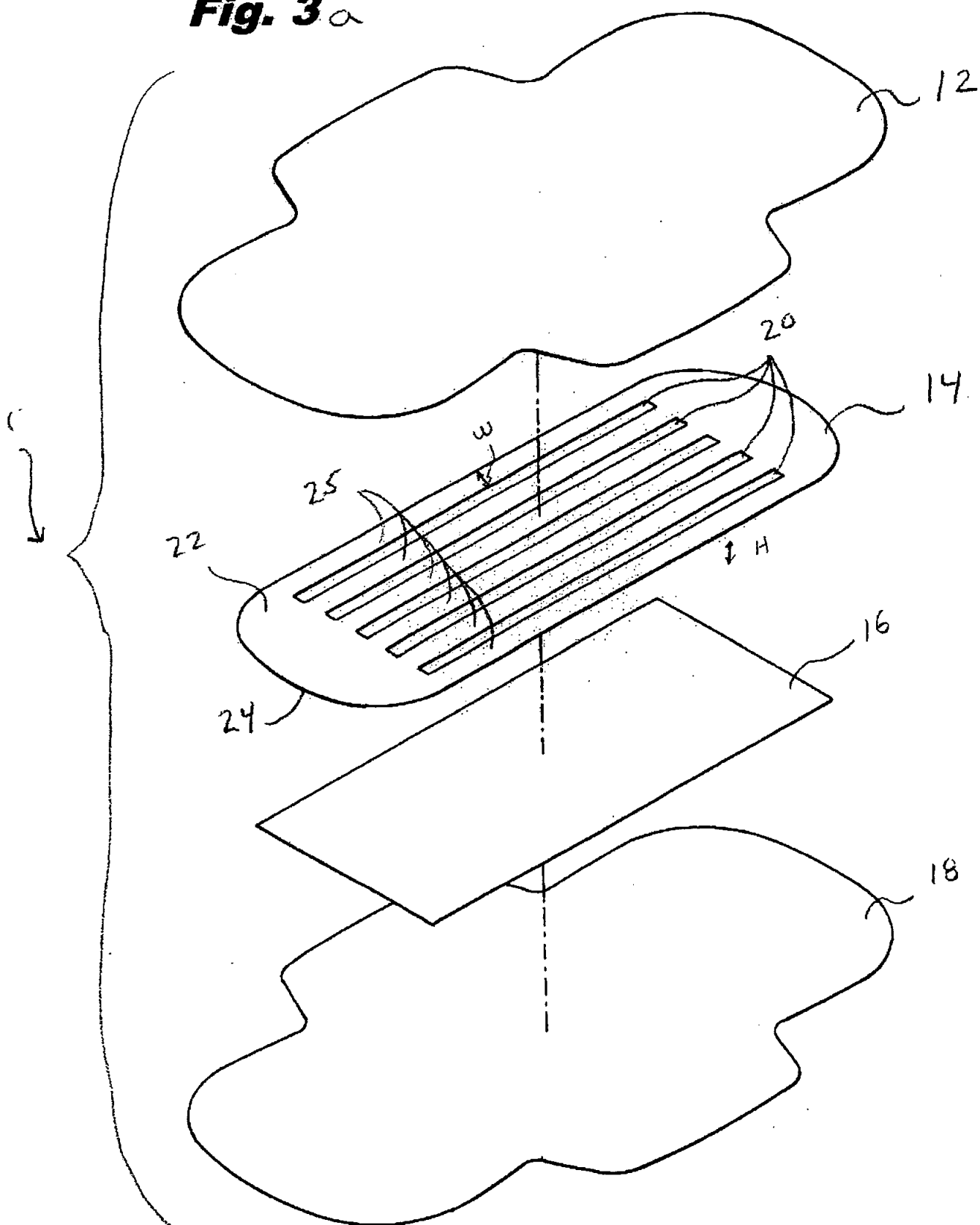
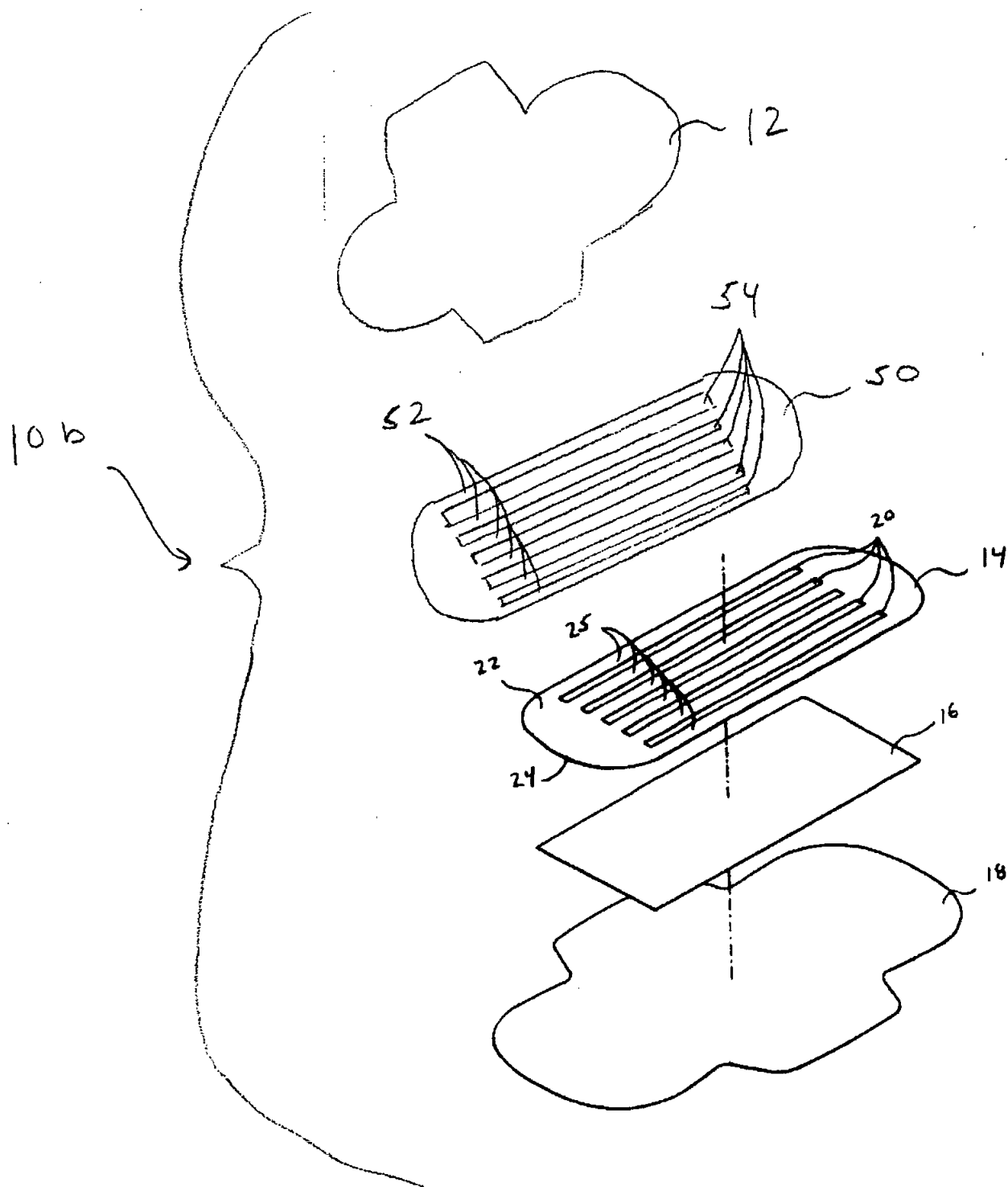
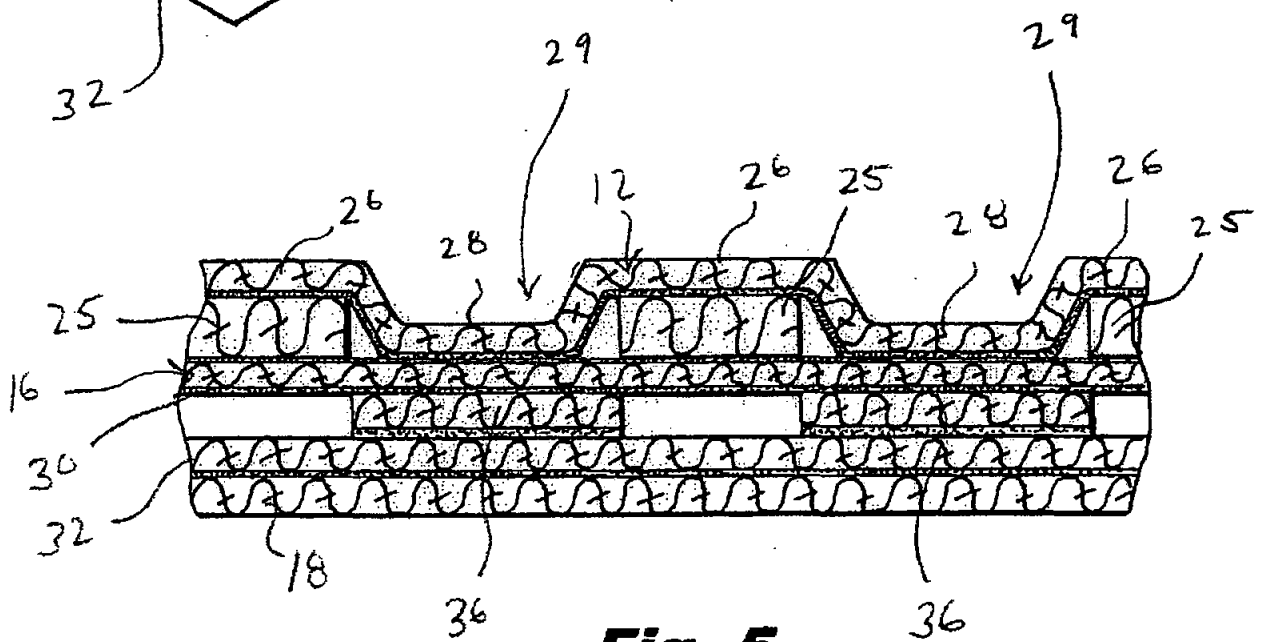
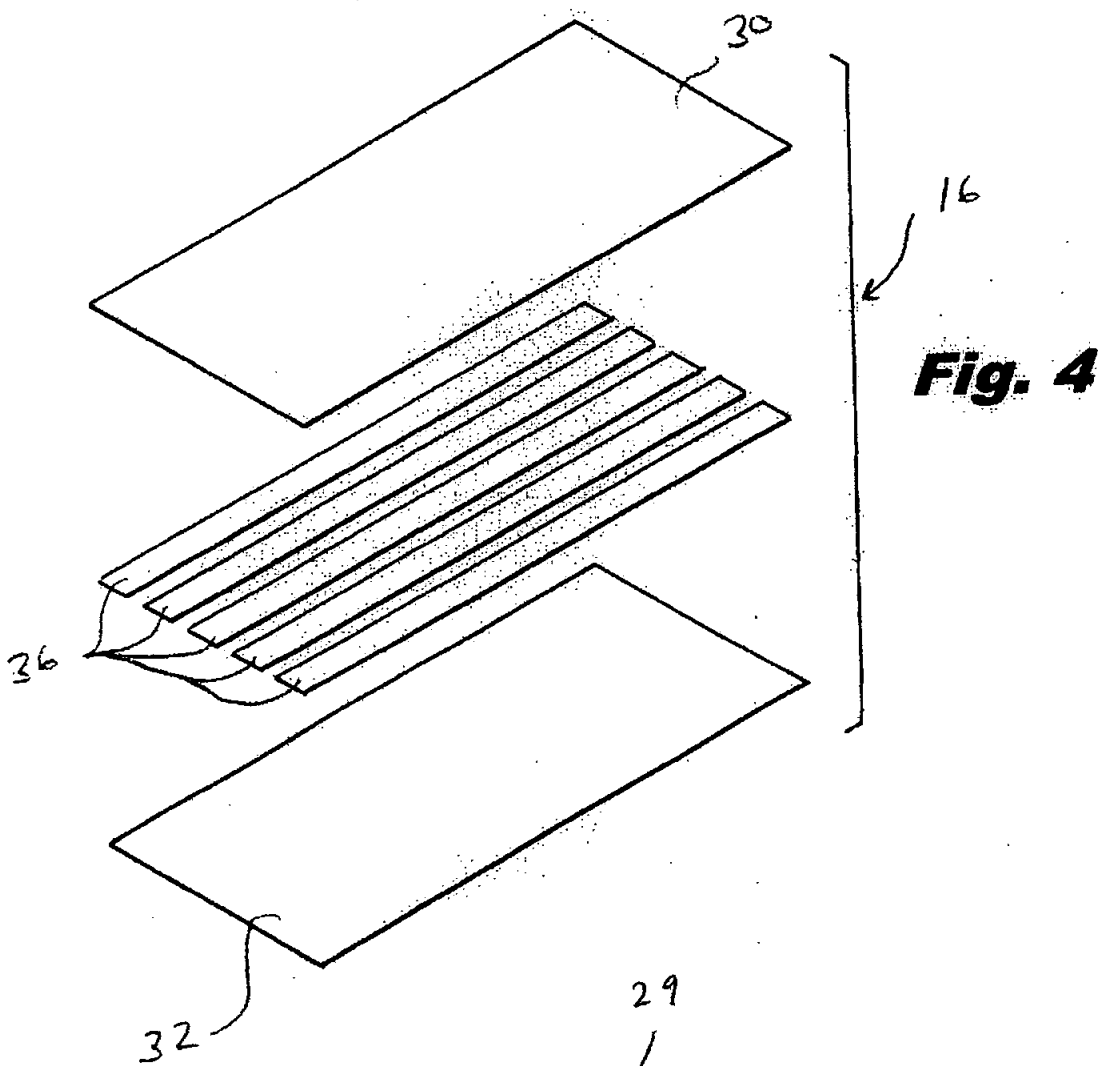


Fig 3b



5x



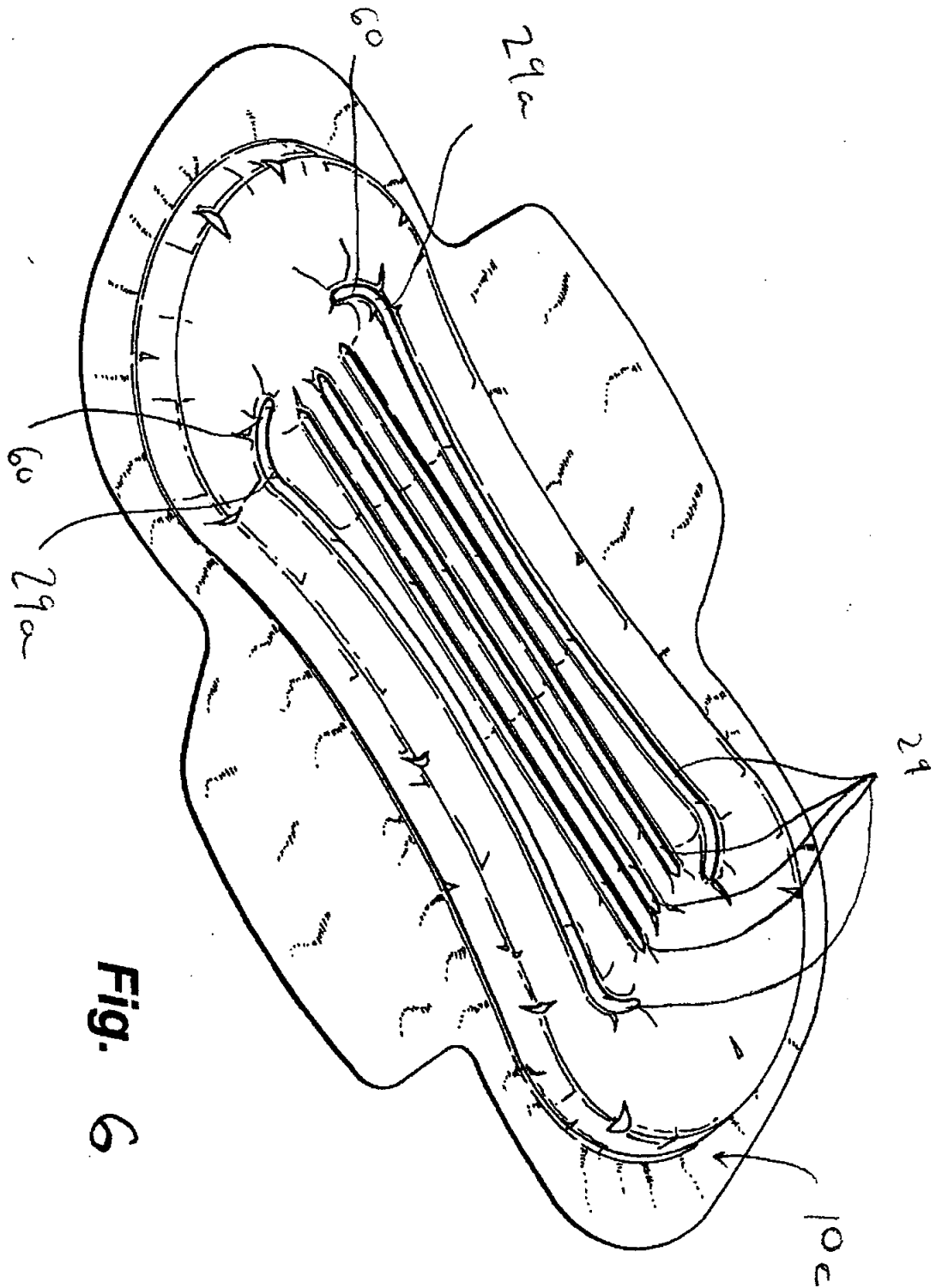


Fig. 6

Fig. 7

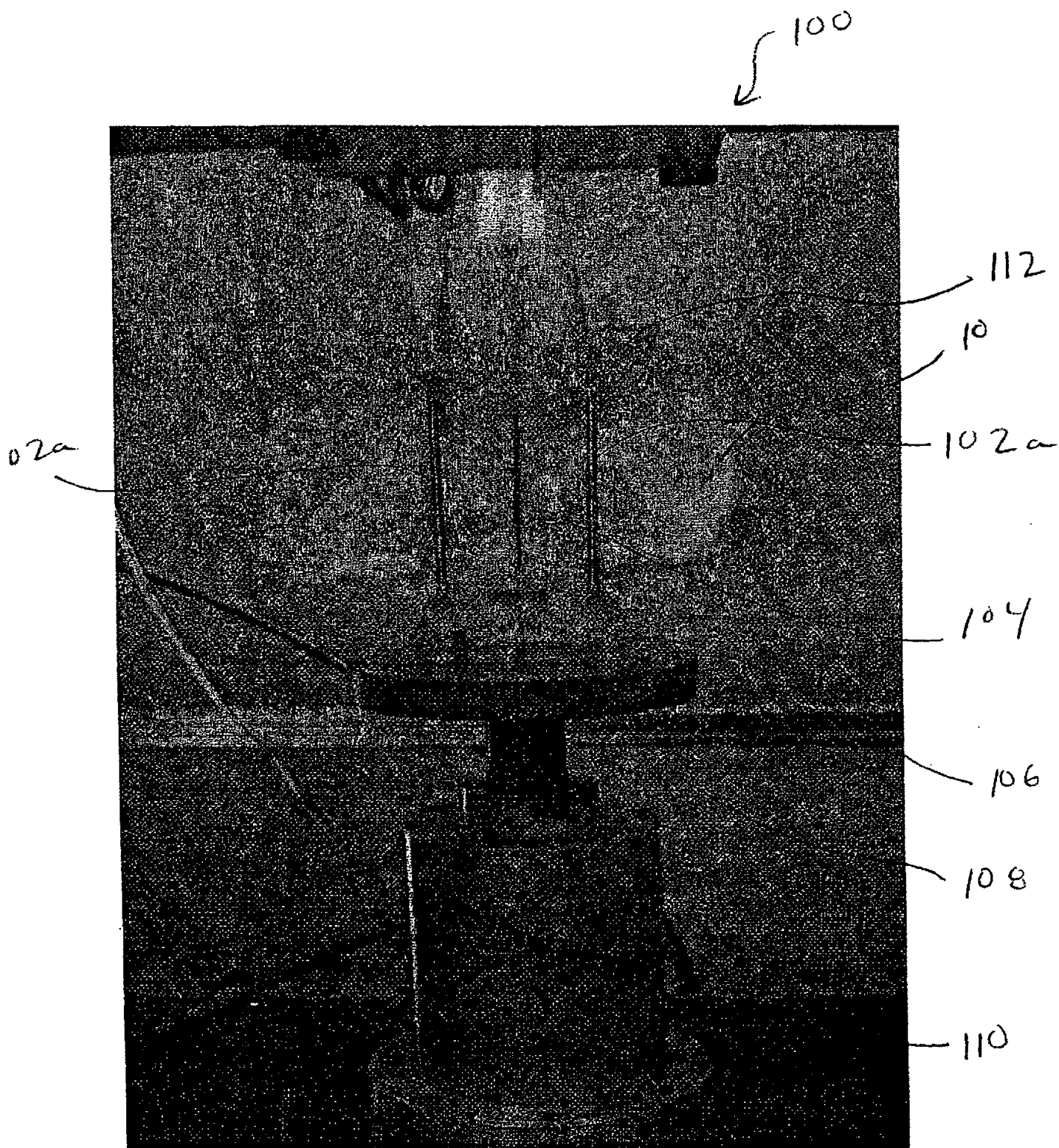


Fig. 8

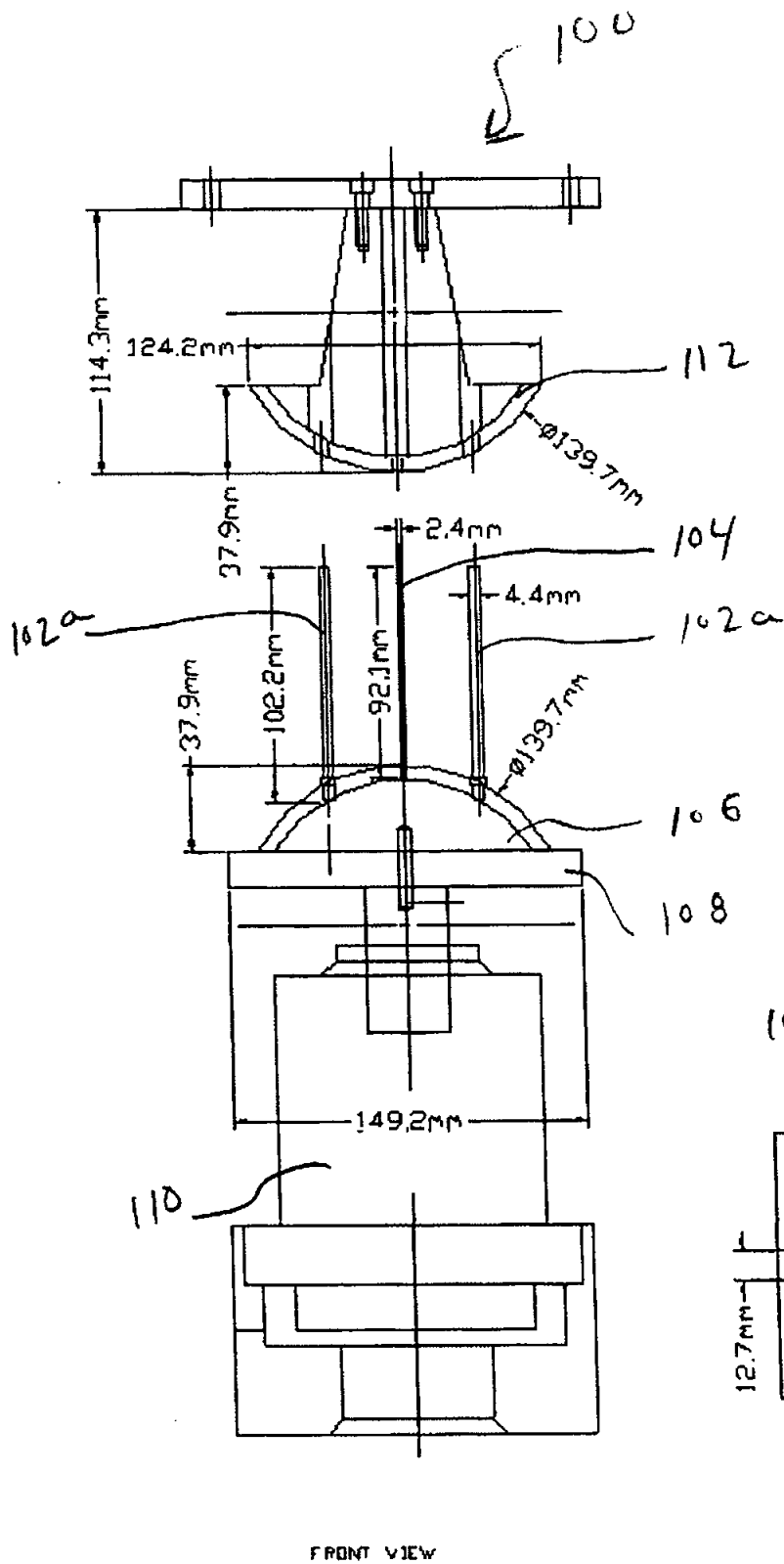


Fig. 9

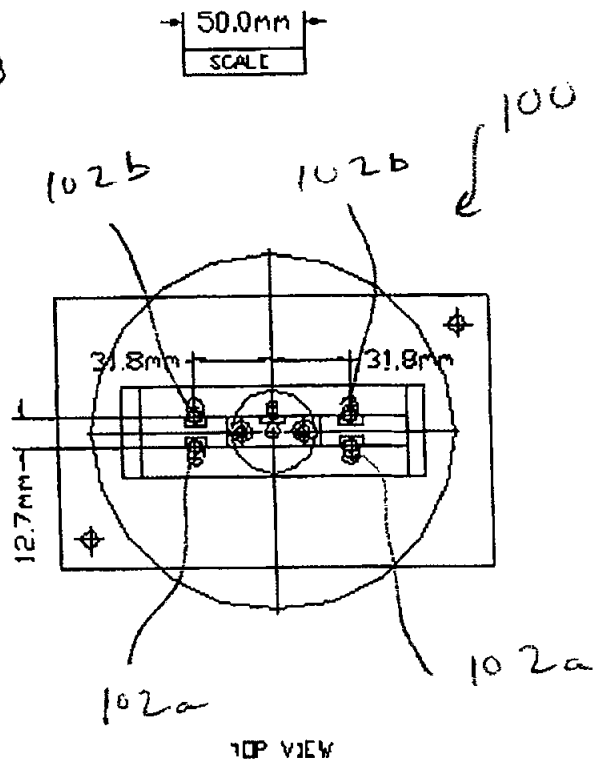
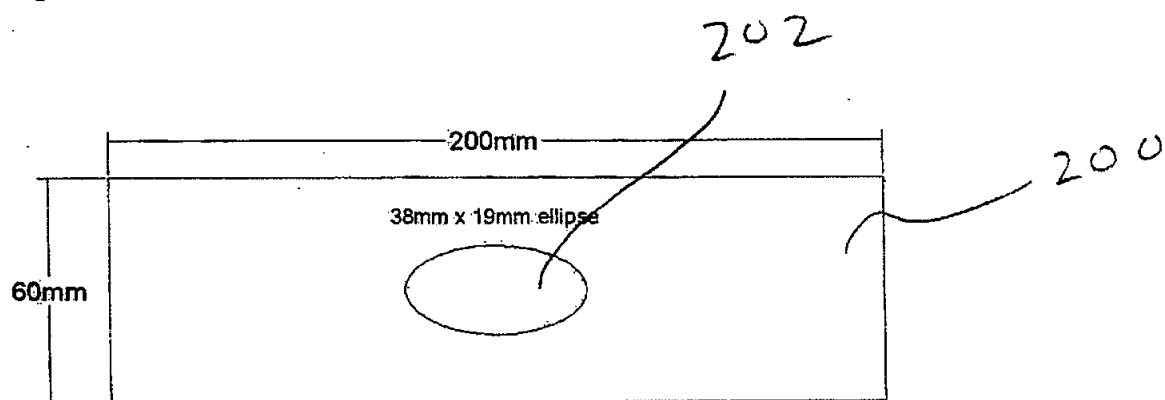
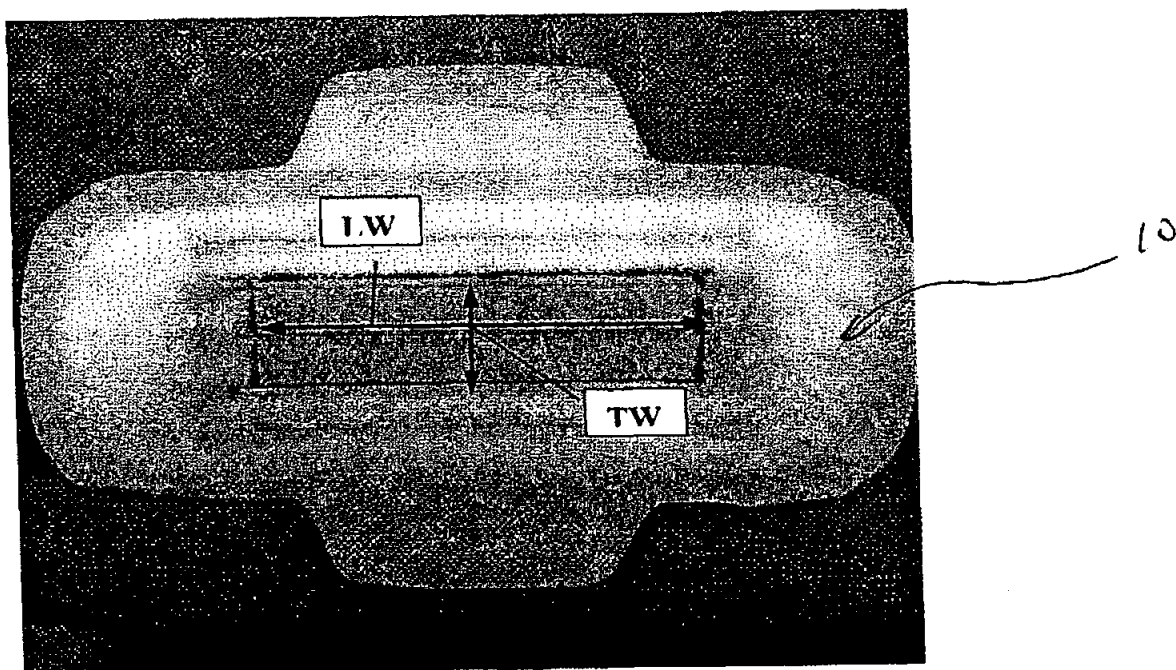


Fig. 10



Thickness = 127 mm

Fig. 11



ESTADOS UNIDOS DE AMÉRICA  
A TODOS AQUELLOS A QUIENES EL PRESENTE LLEGUE:

DEPARTAMENTO DE COMERCIO DE LOS ESTADOS UNIDOS  
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Octubre 27, 2008

Por medio del presente se certifica que adjunto se encuentra una copia de los archivos de la Oficina de Patentes y Marcas de los Estados Unidos de aquellos papeles de la solicitud de patente abajo identificada, la cual cumplió con los requisitos para que se le otorgara una fecha de presentación bajo 35 USC 111.

Número de Solicitud: 11/957,958

Fecha de Presentación: Diciembre 17, 2007

El código del país y el número de su solicitud de prioridad para ser usado en presentación en el extranjero bajo la Convención de París, es US11/957,958

Por la autoridad del  
Comisionado de Patentes y Marcas

(fdo) T. WALLACE

Oficial Certificador

Sello oficial de la Oficina de Patentes y Marcas de los  
Estados Unidos de América.

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CA

## **REIVINDICACIONES**

1. Un artículo absorbente comprende:

una línea central que se extiende longitudinalmente;

una línea central que se extiende transversalmente;

una capa de cubierta que tiene una superficie que da  
contra el cuerpo;

una primera capa absorbente que tiene una superficie superior y una superficie inferior, la capa comprende una pluralidad de rayos y una pluralidad de zonas libres de material, cada uno de los rayos está dispuesto en una relación separada con respecto a un rayo adyacente y cada uno de los rayos está separado de un rayo adyacente mediante una zona libre de material, cada una de las zonas libres de material se extienden desde la superficie superior hasta la superficie inferior;

una segunda estructura absorbente dispuesta por debajo de la primera capa absorbente;

en donde la capa de cubierta incluye una pluralidad de primeras regiones dispuestas en una relación separada con respecto a la segunda estructura absorbente y una pluralidad de segundas regiones, cada una de las segundas regiones está localizada entre dos rayos adyacentes y dispuesta en contacto de superficie contra superficie con la segunda estructura absorbentes; y

en donde la primera capa absorbente, la segunda capa absorbente y la cubierta cooperan para definir una pluralidad de canales que se extienden longitudinalmente por la superficie del artículo que da contra el cuerpo.

2. El artículo absorbente de acuerdo con la reivindicación 1, en donde las zonas libres de material se extienden sobre un área de superficie en el rango entre  $50 \text{ mm}^2$  y cerca de  $4,000 \text{ mm}^2$ .

3. El artículo absorbente de acuerdo con la reivindicación 2, en donde la pluralidad de zonas libres de material

comprende entre 3 a cerca de 7 zonas libres de material que se extienden longitudinalmente.

4. El artículo absorbente de acuerdo con la reivindicación 3, en donde cada una de las zonas libres de material que se extienden longitudinalmente tiene una longitud según se midió a lo largo del trayecto de la zona libre de material en el rango entre cerca de 5 cm a cerca de 40 cm y un ancho en el rango entre cerca de 1 mm hasta cerca de 10 mm.

5. El artículo absorbente de acuerdo con la reivindicación 4, en donde dichos canales tienen una profundidad relativa a la superficie que da contra el cuerpo de cerca de 0,5 mm hasta cerca de 4 mm.

6. El artículo absorbente de acuerdo con la reivindicación 5, en donde el artículo absorbente tiene un espesor mayor a 4,0 mm.

7. El artículo absorbente de acuerdo con la reivindicación 6, en donde el artículo absorbente tiene un espesor en el rango entre cerca de 4,0 mm hasta cerca de 10,0 mm.

8. El artículo absorbente de acuerdo con la reivindicación 7, en donde el artículo absorbente tiene un valor MCB menor que 1000 g.

9. El artículo absorbente de acuerdo con la reivindicación 8, en donde el artículo absorbente tiene un valor MCB menor que 800 g.

10. El artículo absorbente de acuerdo con la reivindicación 9, en donde el artículo absorbente tiene un valor MCB menor a 600 g.

11. El artículo absorbente de acuerdo con la reivindicación 10, en donde el artículo absorbente tiene un cambio en porcentaje de rigidez lateral de menos de 28,0%.

12. El artículo absorbente de acuerdo con la reivindicación 11, en donde el artículo absorbente tiene un cambio en porcentaje de rigidez lateral de menos de 26,5%.

13. El artículo absorbente de acuerdo con la reivindicación 12, en donde el artículo absorbente tiene un cambio en porcentaje de rigidez lateral de menos de 24,0%.

14. El artículo absorbente de acuerdo con la reivindicación 13, en donde el artículo absorbente tiene un valor LTWR mayor a 1,5.

15. El artículo absorbente de acuerdo con la reivindicación 14, en donde el artículo absorbente tiene un valor LTWR mayor a 2,5.

16. El artículo absorbente de acuerdo con la reivindicación 15, en donde el artículo absorbente tiene un valor LTWR mayor a 3,5.

17. El artículo absorbente de acuerdo con la reivindicación 16, en donde el artículo absorbente tiene un valor LTWR mayor a 5,0.

18. El artículo absorbente de acuerdo con la reivindicación 17, en donde el artículo absorbente tiene un valor LTWR mayor a 10,0.

19. El artículo absorbente de acuerdo con la reivindicación 18, en donde el artículo absorbente tiene un valor LTWR mayor a 15,0.

20. El artículo absorbente de acuerdo con la reivindicación 1, que comprende adicionalmente una capa de transferencia, la capa de transferencia comprende una pluralidad de rayos y una pluralidad de zonas libres de material, cada una de las zonas libres de material está dispuesta entre los rayos adyacentes, en donde cada uno de los rayos de la capa de transferencia están dispuestos en alineación vertical con un rayo correspondiente de la primera capa absorbente y en donde cada una de las zonas libres de material de la capa de transferencia están dispuestas en una alineación vertical con cada zona libre de material correspondiente de la primera capa absorbente.

21. Un artículo absorbente comprende:

una capa de cubierta que tiene una superficie que da contra el cuerpo;

una primera capa absorbente que tiene una superficie superior y una superficie inferior, la capa comprende una pluralidad de zonas libres de material, cada una de las zonas libres de material se extiende desde la superficie superior hasta la superficie inferior;

una segunda estructura absorbente dispuesta por debajo del primer sistema absorbente;

en donde la capa de cubierta incluye una pluralidad de primeras regiones dispuestas en relación separada a la segunda estructura absorbente y una pluralidad de segundas regiones, cada una de las segundas regiones está dispuesta en contacto de superficie contra superficie con la segunda estructura absorbente; y

en donde el artículo absorbente tiene un valor RIF mayor a 15,0.

22. El artículo absorbente de acuerdo con la reivindicación 21, en donde el artículo absorbente tiene un espesor en el rango entre cerca de 4,0 mm a cerca de 10,0 mm.

23. El artículo absorbente de acuerdo con la reivindicación 22, en donde el artículo absorbente tiene un valor LTWR mayor a 3,5.

24. Un artículo absorbente comprende:

una línea central que se extiende longitudinalmente;

una línea central que se extiende transversalmente;

una capa de cubierta que tiene una superficie que da contra el cuerpo;

una primera capa absorbente que tiene una superficie superior y una superficie inferior, la capa incluye por lo menos una zona libre de material, la zona libre de material se extiende desde la superficie superior a la superficie inferior;

una segunda estructura absorbente dispuesta por debajo de la primera capa absorbente;

en donde la capa de cubierta incluye una pluralidad de primeras regiones dispuestas en una relación separada respecto de la segunda estructura absorbente y una segunda región, la segunda región está localizada dentro del área definida por la zona libre de material y dispuesta en contacto de superficie con superficie con la segunda estructura absorbente.

25. Un artículo absorbente comprende:

una capa de cubierta que tiene una superficie que da contra el cuerpo;

una primera capa absorbente que tiene una superficie superior y una superficie inferior, la capa comprende una pluralidad de zonas libres de material, cada una de las zonas libres de material se extiende desde la superficie superior a la superficie inferior;

una segunda estructura absorbente dispuesta por debajo del primer sistema absorbente;

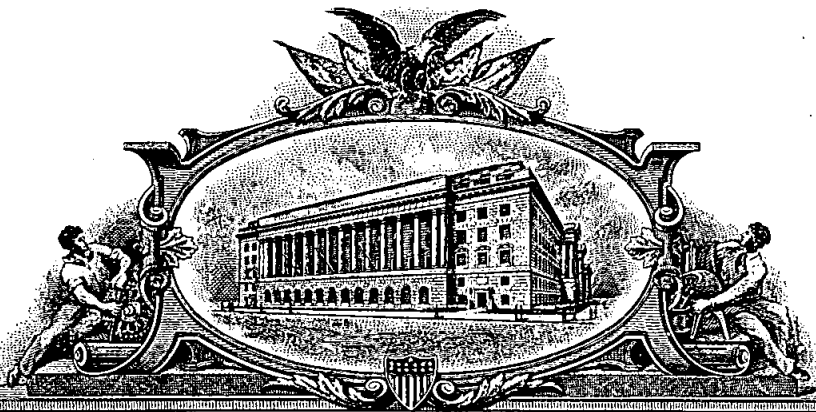
en donde la capa de cubierta incluye una pluralidad de primeras regiones dispuestas en relación separada con respecto a la segunda estructura absorbente y una pluralidad de segundas regiones, cada una de las segundas regiones está dispuesta en contacto de superficie con superficie con la segunda estructura absorbente; y

en donde el artículo absorbente tiene un valor LTWR mayor a 3,5.

7A

P-1618

PA 1725682



# THE UNITED STATES OF AMERICA

**TO ALL TO WHOM THESE PRESENTS SHALL COME:**

**UNITED STATES DEPARTMENT OF COMMERCE**

**United States Patent and Trademark Office**

**October 27, 2008**

**THIS IS TO CERTIFY THAT ANNEXED HERETO IS A TRUE COPY FROM THE RECORDS OF THE UNITED STATES PATENT AND TRADEMARK OFFICE OF THOSE PAPERS OF THE BELOW IDENTIFIED PATENT APPLICATION THAT MET THE REQUIREMENTS TO BE GRANTED A FILING DATE UNDER 35 USC 111.**

**APPLICATION NUMBER: 11/957,958**

**FILING DATE: December 17, 2007**

**THE COUNTRY CODE AND NUMBER OF YOUR PRIORITY APPLICATION, TO BE USED FOR FILING ABROAD UNDER THE PARIS CONVENTION, IS US11/957,958**

**By Authority of the  
Under Secretary of Commerce for Intellectual Property  
and Director of the United States Patent and Trademark Office**



*T. Wallace*  
**T. WALLACE**

**Certifying Officer**

25

## Electronic Acknowledgement Receipt

|                                             |                                                                                              |
|---------------------------------------------|----------------------------------------------------------------------------------------------|
| <b>EFS ID:</b>                              | 2600820                                                                                      |
| <b>Application Number:</b>                  | 11957958                                                                                     |
| <b>International Application Number:</b>    |                                                                                              |
| <b>Confirmation Number:</b>                 | 1249                                                                                         |
| <b>Title of Invention:</b>                  | ABSORBENT ARTICLE INCLUDING AN ABSORBENT LAYER<br>HAVING A PLURALITY OF SPACED BEAM ELEMENTS |
| <b>First Named Inventor/Applicant Name:</b> | Kofi Ayensu Bissah                                                                           |
| <b>Customer Number:</b>                     | 27777                                                                                        |
| <b>Filer:</b>                               | Paul J. Higgins./Kristine Kingsbury                                                          |
| <b>Filer Authorized By:</b>                 | Paul J. Higgins.                                                                             |
| <b>Attorney Docket Number:</b>              | PPC-5271-USNP                                                                                |
| <b>Receipt Date:</b>                        | 17-DEC-2007                                                                                  |
| <b>Filing Date:</b>                         |                                                                                              |
| <b>Time Stamp:</b>                          | 16:25:25                                                                                     |
| <b>Application Type:</b>                    | Utility under 35 USC 111(a)                                                                  |

### Payment information:

|                                          |                 |
|------------------------------------------|-----------------|
| Submitted with Payment                   | yes             |
| Payment Type                             | Deposit Account |
| Payment was successfully received in RAM | \$ 1490         |
| RAM confirmation Number                  | 1779            |
| Deposit Account                          | 100750          |
| Authorized User                          |                 |

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

# File Listing:

| Document Number              | Document Description                                | File Name                           | File Size(Bytes) /Message Digest                   | Multi Part /.zip | Pages (if appl.) |
|------------------------------|-----------------------------------------------------|-------------------------------------|----------------------------------------------------|------------------|------------------|
| 1                            |                                                     | PPC5271USNPAPPLICATION.pdf          | 271954<br>1d187287811802c107d653c6c2a407be08d29265 | yes              | 36               |
|                              | Multipart Description/PDF files in .zip description |                                     |                                                    |                  |                  |
|                              | Document Description                                |                                     | Start                                              |                  | End              |
|                              | Specification                                       |                                     | 1                                                  |                  | 29               |
|                              | Claims                                              |                                     | 30                                                 |                  | 35               |
|                              | Abstract                                            |                                     | 36                                                 |                  | 36               |
| Warnings:                    |                                                     |                                     |                                                    |                  |                  |
| Information:                 |                                                     |                                     |                                                    |                  |                  |
| 2                            | Transmittal of New Application                      | PPC5271USNPAPPLNTRANSLTR.pdf        | 467638<br>412bcd11443d624e97198330a5dcdbb0e306f80  | no               | 4                |
| Warnings:                    |                                                     |                                     |                                                    |                  |                  |
| Information:                 |                                                     |                                     |                                                    |                  |                  |
| 3                            | Drawings-only black and white line drawings         | PPC5271USNPDRAWINGS.pdf             | 318156<br>52156683a3a50e4b343cb9b31ca1764382881719 | no               | 9                |
| Warnings:                    |                                                     |                                     |                                                    |                  |                  |
| Information:                 |                                                     |                                     |                                                    |                  |                  |
| 4                            | Oath or Declaration filed                           | PPC5271USNPEXECUTED DECLARATION.pdf | 161807<br>c7ebd0cbb3ee959fbeb8632ff3ed13722dbd7d0a | no               | 3                |
| Warnings:                    |                                                     |                                     |                                                    |                  |                  |
| Information:                 |                                                     |                                     |                                                    |                  |                  |
| 5                            | Fee Worksheet (PTO-06)                              | fee-info.pdf                        | 8605<br>31ecb32527e820cd7ff3727de431eafb78175d7c   | no               | 2                |
| Warnings:                    |                                                     |                                     |                                                    |                  |                  |
| Information:                 |                                                     |                                     |                                                    |                  |                  |
| Total Files Size (in bytes): |                                                     |                                     | 1228160                                            |                  |                  |

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This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

**New Applications Under 35 U.S.C. 111**

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

**National Stage of an International Application under 35 U.S.C. 371**

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

**New International Application Filed with the USPTO as a Receiving Office**

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

|                                                       |  |                                                                                                    |
|-------------------------------------------------------|--|----------------------------------------------------------------------------------------------------|
| <b>UTILITY<br/>PATENT APPLICATION<br/>TRANSMITTAL</b> |  | Attorney Docket No.<br>PPC-5271-USNP                                                               |
|                                                       |  | First Inventor<br>Kofi Ayensu Bissah                                                               |
|                                                       |  | Title<br>ABSORBENT ARTICLE INCLUDING AN ABSORBENT LAYER HAVING A PLURALITY OF SPACED BEAM ELEMENTS |

|                                                                                                            |                                                                                           |
|------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| <b>APPLICATION ELEMENTS</b><br><i>See MPEP Chapter 600 concerning utility patent application contents.</i> | <b>ADDRESS TO:</b> Commissioner for Patents<br>P.O. Box 1450<br>Alexandria, VA 22313-1450 |
|------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. <input checked="" type="checkbox"/> Fee Transmittal Form (e.g., PTO/SB/17)<br><i>(submit an original and a duplicate for fee processing)</i><br>2. <input type="checkbox"/> Applicant claims small entity status.<br>3. <input checked="" type="checkbox"/> Specification [Total Pages 36]<br><i>(Preferred arrangement set forth below)</i><br>- Descriptive Title of the Invention<br>- Cross Reference to Related Applications<br>- Statement Regarding Fed sponsored R&D<br>- Reference to sequence listing, a table, or a computer program listing appendix<br>- Background of the Invention<br>- Brief Summary of the Invention<br>- Brief Description of the Drawings <i>(if filed)</i><br>- Detailed Description<br>- Claim(s)<br>- Abstract of the Disclosure<br>4. <input checked="" type="checkbox"/> Drawing(s) (35 USC 113) [Total Sheets 9]<br>5. Oath or Declaration [Total Pages 3]<br>a. <input checked="" type="checkbox"/> Newly executed (original or copy)<br>b. <input type="checkbox"/> Copy from a prior application (37 CFR 1.63(d))<br><i>(for continuation/divisional with Box 18 completed)</i><br>i. <input type="checkbox"/> <b>DELETION OF INVENTOR(S)</b><br>Signed statement attached deleting inventor(s) named in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).<br>6. <input type="checkbox"/> Application Data Sheet. See 37 CFR 1.76 | 7. <input type="checkbox"/> CD-ROM or CD-R in duplicate, large table or Computer Program (Appendix)<br>8. Nucleotide and/or Amino Acid Sequence Submission (if applicable, all necessary)<br>a. <input type="checkbox"/> Computer Readable Form (CRF)<br>b. <input type="checkbox"/> Specification Sequence Listing on:<br>i. <input type="checkbox"/> CD-ROM or CD-R (2 copies); or<br>ii. <input type="checkbox"/> paper<br>c. <input type="checkbox"/> Statement verifying identity of above copies<br><br><b>ACCOMPANYING APPLICATION PARTS</b><br>9. <input type="checkbox"/> Assignment Papers (cover sheet & document(s))<br>10. <input type="checkbox"/> 37 CFR 3.73(b) Statement <input type="checkbox"/> Power of Attorney<br><i>(when there is an assignee)</i><br>11. <input type="checkbox"/> English Translation Document <i>(if applicable)</i><br>12. <input type="checkbox"/> Information Disclosure Statement<br>(IDS)/PTO-1449 <input type="checkbox"/> Copies of IDS Citations<br>13. <input type="checkbox"/> Preliminary Amendment<br>14. <input type="checkbox"/> Return Receipt Postcard (MPEP 503)<br><i>(Should be specifically itemized)</i><br>15. <input type="checkbox"/> Certified Copy of Priority Document(s)<br><i>(if foreign priority is claimed)</i><br>16. <input type="checkbox"/> Request and Certifications under 35 U.S.C. 122<br>(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or its equivalent.<br>17. <input type="checkbox"/> Other |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| 18. <input type="checkbox"/> If a CONTINUING APPLICATION, check appropriate box and supply the requisite information below and in a preliminary amendment, or in an Application Data Sheet under 37 CFR 1.76:<br><input type="checkbox"/> Continuation <input type="checkbox"/> Divisional <input type="checkbox"/> Continuation-in-Part (CIP) of prior application No.: , filed .<br>Prior application information: Examiner Group Art Unit:<br>For CONTINUATION or DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 5b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation <u>can only</u> be relied upon when a portion has been inadvertently omitted from the submitted application parts. |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|

|                                                                                                                                                 |                                                                                      |
|-------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <b>19. CORRESPONDENCE ADDRESS</b>                                                                                                               |                                                                                      |
| <input checked="" type="checkbox"/> Customer Number or Bar Code Label <b>000027777</b> or <input type="checkbox"/> Correspondence Address below |                                                                                      |
| Name:                                                                                                                                           | Philip S. Johnson, Esq.                                                              |
| Address:                                                                                                                                        | Johnson & Johnson<br>One Johnson & Johnson Plaza<br>New Brunswick, NJ 08933-7003 USA |

|                                                                       |                |
|-----------------------------------------------------------------------|----------------|
| <b>20. TELEPHONE CONTACT</b>                                          |                |
| Please direct all telephone calls or telefaxes to Paul J. Higgins at: |                |
| Telephone:                                                            | (732) 524-1728 |
| Fax:                                                                  | (732) 524-2808 |

|                                                                |                                 |
|----------------------------------------------------------------|---------------------------------|
| <b>21. SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED</b> |                                 |
| NAME                                                           | Paul J. Higgins Reg. No. 44,152 |
| SIGNATURE                                                      | /Paul J. Higgins/               |
| DATE                                                           | December 17, 2007               |

|                        |                          |                    |
|------------------------|--------------------------|--------------------|
| <b>FEE TRANSMITTAL</b> | <i>Complete if Known</i> |                    |
|                        | Application Number       | Unassigned         |
|                        | Filing Date              | December 17, 2007  |
|                        | First Named Inventor     | Kofi Ayensu Bissah |
|                        | Group Art Unit           | Unassigned         |
|                        | Examiner Name            | Unassigned         |
|                        | Attorney Docket Number   | PPC-5271-USNP      |

## FEE CALCULATION

### CLAIMS AS FILED

| (1)                                                                                                                                                                                                                                                       | (2)                      | (3)          | (4)                                                                                                                        | (5)                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------|----------------------------------------------------------------------------------------------------------------------------|-----------------------|
| FOR:                                                                                                                                                                                                                                                      | NUMBER FILED             | NUMBER EXTRA | RATE                                                                                                                       | BASIC FEE<br>\$310.00 |
| TOTAL CLAIMS                                                                                                                                                                                                                                              | 25 - 20 =                | 5            | x 50.00                                                                                                                    | \$250.00              |
| INDEPENDENT CLAIMS                                                                                                                                                                                                                                        | 4 - 3 =                  | 1            | x 210.00                                                                                                                   | \$210.00              |
| SEARCH FEE                                                                                                                                                                                                                                                | NA                       | NA           | NA                                                                                                                         | \$ 510.00             |
| EXAMINATION FEE                                                                                                                                                                                                                                           | NA                       | NA           | NA                                                                                                                         | \$ 210.00             |
| APPLICATION SIZE FEE<br><br>If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 25 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s). | 0 - 100 =                | /50          | x 250.00 (If the specification and drawings exceed 100 sheets of paper, for each additional 50 sheets or fraction thereof) | \$                    |
| MULTIPLE DEPENDENT CLAIMS                                                                                                                                                                                                                                 | <input type="checkbox"/> | N/A          | \$360.00                                                                                                                   |                       |
|                                                                                                                                                                                                                                                           |                          |              | <b>TOTAL FEES</b>                                                                                                          | <b>\$1,490.00</b>     |

## METHOD OF PAYMENT

- ☒ Please charge our Deposit Account as indicated on the Fee Transmittal Sheet filed via EFS in the amount of \$1,490.00.
- ☒ The Commissioner is hereby authorized to charge any additional fees which may be required in connection with the filing of this communication, or credit any overpayment, to our Deposit Account.

|                       |                         |                                 |
|-----------------------|-------------------------|---------------------------------|
| <b>SUBMITTED BY:</b>  |                         | <i>Complete (if applicable)</i> |
| Typed or Printed Name | Paul J. Higgins         | Reg. No. 44,152                 |
| Signature             | /Paul J. Higgins/       | Deposit Account No. 10-0750     |
|                       | Date: December 17, 2007 |                                 |

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|                                                                                                                                                                                              |  |                               |                                                                                                 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-------------------------------|-------------------------------------------------------------------------------------------------|
| <b>AUTHORIZATION TO PERMIT<br/>ACCESS TO APPLICATION BY<br/>PARTICIPATING OFFICES</b><br><br>Send completed form to: Commissioner for<br>Patents<br>P.O. Box 1450, Alexandria, VA 22313-1450 |  | <b>COMPLETE IF KNOWN</b>      |                                                                                                 |
|                                                                                                                                                                                              |  | <b>Application Number</b>     | Unassigned                                                                                      |
|                                                                                                                                                                                              |  | <b>Filing Date</b>            | December 17, 2007                                                                               |
|                                                                                                                                                                                              |  | <b>First Named Inventor</b>   | Kofi Ayensu Bissah                                                                              |
|                                                                                                                                                                                              |  | <b>Attorney Docket Number</b> | PPC-5271-USNP                                                                                   |
|                                                                                                                                                                                              |  | <b>Title<br/>(Required)</b>   | ABSORBENT ARTICLE INCLUDING AN<br>ABSORBENT LAYER HAVING A<br>PLURALITY OF SPACED BEAM ELEMENTS |

The undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), and any other intellectual property offices in which a foreign application claiming priority to the above-identified application is filed access to the above-identified patent application. See 37 CFR 1.14(c) and (h).

In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the application-as-filed with respect to: 1) the above-identified application, 2) any foreign application to which the above-identified application claims priority under 35 USC 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the above-identified US application, and 3) any U.S. application from which benefit is sought in the above-identified application.

This written authorization should be submitted prior to the filing of a subsequent foreign application, in which priority is claimed to the above-identified patent application, with any intellectual property office (e.g., the EPO or JPO).

No fee will be charged under 37 CFR 1.19(b)(1) for providing a participating intellectual property office with an electronic copy of the above-identified application.

**This form must be signed by an authorized party in accordance with 37 CFR 1.14(c).**

/Paul J. Higgins/

December 17, 2007

Signature

Date

Paul J. Higgins  
Printed or Typed Name

732-524-1728  
Telephone Number

Attorney for Applicants  
Title

44,152  
Registration Number, if applicable

This collection of information is required by 37 CFR 1.14(h). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process an application). Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 6 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

## Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

**ABSORBENT ARTICLE INCLUDING AN ABSORBENT LAYER HAVING A  
PLURALITY OF SPACED BEAM ELEMENTS**

5                   **CROSS REFERENCE TO RELATED APPLICATIONS**

This application claims priority to Application No. 60/983,746 filed on October 30, 2007, the entire contents of which are incorporated by reference herein.

**FIELD OF INVENTION**

10           The present invention generally relates to absorbent sanitary napkins and in particular to a sanitary napkin including an absorbent layer having a plurality of spaced beam elements for promoting enhanced fluid wicking within the sanitary napkin.

**BACKGROUND OF THE INVENTION**

15           In order for a sanitary napkin to efficiently absorb a large amount of fluid during use it must effectively wick fluid throughout the absorbent structure of the napkin. Absent effective wicking properties menstrual fluid tends to pool in certain regions of the napkin as a result of which the full absorbent capacity of the napkin is not effectively utilized. On the other hand, napkins that exhibit particularly efficient wicking

20           characteristics may exhibit other problems. In particular, such napkins may wick fluid to the longitudinal edge of the absorbent structure resulting in fluid being released from the longitudinal edge of the napkin, i.e. resulting in side leakage. Accordingly, the inventors of the present invention have recognized a need to provide a sanitary napkin that efficiently wicks fluid in the longitudinal direction and at the same time effectively

prevents side leakage in the transverse direction of the napkin. By providing a napkin that efficiently wicks fluid in the longitudinal direction and at the same time effectively prevents side leakage in the transverse direction, the inventors have provided a sanitary napkin that exhibits superior fluid handling characteristics and effectively utilizes the full

5 absorbent capacity of the napkin.

### SUMMARY OF THE INVENTION

In view of the foregoing, the present invention provides, according to a first aspect of the invention, an absorbent article including a longitudinally extending centerline, transversely extending centerline, a cover layer having a body facing surface, a first absorbent layer having an upper surface and a lower surface, the layer including a plurality of beams and a plurality of material-free zones, each of the beams arranged in a spaced relationship to an adjacent beam and each of the beams being separated from an adjacent beam by a material-free zone, each of the material-free zones extending from the upper surface to the lower surface, a second absorbent layer arranged below the first absorbent layer, wherein the cover layer includes a plurality of first regions arranged in spaced relationship to the second absorbent layer and a plurality of second regions, each of the second regions located between two adjacent beams and arranged in surface to surface contact with the second absorbent layer, wherein the first absorbent layer, second absorbent layer and cover cooperate to define a plurality of longitudinally extending gutters in the body facing surface of the article.

The present invention provides, according to a second aspect of the invention, an absorbent article including a cover layer having a body facing surface, a first absorbent layer having an upper surface and a lower surface, the layer including a plurality of material-free zones, each of the material-free zones extending from the upper surface to the lower surface, a second absorbent layer arranged below the first absorbent layer, wherein the cover layer includes a plurality of first regions arranged in spaced relationship to the second absorbent layer and a plurality of second regions, each of the

second regions arranged in surface to surface contact with the second absorbent layer,  
and wherein the absorbent article has an RIF value greater than 15.0.

The present invention provides, according to a third aspect of the invention, an  
absorbent article including a longitudinally extending centerline, a transversely extending  
5 centerline, a cover layer having a body facing surface, a first absorbent layer having an  
upper surface and a lower surface, the layer including at least one material-free zone, the  
material-free zone extending from the upper surface to the lower surface, a second  
absorbent structure arranged below the first absorbent layer, wherein the cover layer  
includes a plurality of first regions arranged in spaced relationship to the second  
10 absorbent structure and a second region, the second region located within the area defined  
by the material free zone and arranged in surface to surface contact with the second  
absorbent structure.

The present invention provides, according to a fourth aspect of the invention, an  
absorbent article including a cover layer having a body facing surface, a first absorbent  
15 layer having an upper surface and a lower surface, the layer comprising a plurality of  
material-free zones, each of the material-free zones extending from the upper surface to  
the lower surface, a second absorbent structure arranged below the first absorbent system,  
wherein the cover layer includes a plurality of first regions arranged in spaced  
relationship to the second absorbent structure and a plurality of second regions, each of  
20 the second regions arranged in surface to surface contact with the second absorbent  
structure, and wherein the absorbent article has an LTWR value greater than 3.5.

**BRIEF DESCRIPTION OF THE DRAWINGS**

Examples of embodiments of the present invention will now be described with reference to the drawings, in which:

5        Fig. 1 is a top plan view of the absorbent article according to the present invention;

         Fig. 2 is a bottom plan view of the absorbent article shown in Fig. 1;

         Fig. 3a is an exploded view of the absorbent article shown in Fig. 1 according to a first embodiment of the invention;

10       Fig. 3b is an exploded view of the absorbent article shown in Fig. 1 according to a second embodiment of the invention;

         Fig. 4 is an exploded view of the second absorbent layer employed in the absorbent article shown in Fig. 1;

         Fig. 5 is a sectional view of the absorbent article shown in Fig. 1 taken along line  
15    5-5 thereof;

         Fig. 6 is a perspective view of an absorbent article according to a second embodiment of the present invention;

         Fig. 7 is a perspective view of an apparatus for measuring lateral rigidity of an absorbent article;

20       Fig. 8 is a front elevation view of the apparatus shown in Fig. 7;

         Fig. 9 is a top elevation view of the apparatus shown in Fig. 7;

Fig. 10 is a top elevation view of a test plate used to measure a  
Longitudinal/Transverse Wicking Ratio of an absorbent article and a Repeat Insult  
Failure (RIF) Value of an absorbent article; and

Fig. 11 is a schematic view depicting a stained absorbent article and the manner in  
5 which the Longitudinal/Transverse Wicking Ratio is calculated.

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**DETAILED DESCRIPTION OF THE INVENTION**

The present invention generally relates to disposable absorbent articles such as sanitary napkins, pantliners, absorbent products for incontinence, and other disposable absorbent articles worn close to a wearer's body. Although the invention will be described herein with reference to a sanitary napkin 10, the invention may be utilized with other disposable sanitary absorbent articles such as absorbent products for incontinence, diapers, pantliners and the like.

Absorbent articles according to the present invention provide superior fluid handling characteristics, and more specifically are particularly adept at preventing side leakage while at the same time providing superior longitudinal wicking characteristics.

As shown in Figs. 1-5, the present invention according to one embodiment of the invention relates to a sanitary napkin 10 for absorbing bodily fluids. The sanitary napkin 10 includes a body facing surface 11, a garment facing surface 13, a longitudinally extending centerline 15, and a transversely extending centerline 17.

As best seen in the exploded view shown in Fig. 3a, the sanitary napkin 10 includes a fluid permeable cover layer 12, a first absorbent layer 14, a second absorbent layer 16, and a fluid impermeable barrier layer 18. The first absorbent layer 14 includes a plurality of longitudinally extending material-free zones 20 that extend from an upper surface 22 of the first absorbent layer 14 to a lower surface 24 of the first absorbent layer 14. Each of the material-free zones 20 preferably has a width in the range of between 1 mm and about 10 mm and a length in the range of between about 5 cm and about 40 cm. Absorbent articles according to the present invention preferably have between about 1 and about 7 longitudinally extending the material-free zones 20. Each of the

material free zones 20 is spaced from an adjacent material-free zone 20 in the transverse direction by a distance from about 0.5 cm to about 3 cm. The material-free zones 20 preferably extend over a surface area in the range of between 50 mm<sup>2</sup> and about 4000 mm<sup>2</sup>. In the particular embodiment of the invention shown in the Figures the material-free zones 20 are linear in shape, parallel to each other, and equally spaced.

The first absorbent layer 14 further includes a plurality of longitudinally extending beams 25, each of the beams 25 being arranged in spaced relationship to an adjacent beam 25 and each of the beams 25 being separated from an adjacent beam 25 by one of the material-free zones 20.

In one embodiment of the invention, as shown in Fig. 3a, each beam 25 is structured and arranged such that it has a height less than its width, in other words  $H < W$ . Also, in this particular embodiment of the invention, each beam 25 is structured and arranged such that a ratio of its height to width is less than one, in other words  $H/W < 1$ .

As best seen in Fig. 5, the cover layer 12 includes a plurality of first regions 26 that are arranged in spaced relationship to the second absorbent structure 16 and a plurality of second regions 28 that are arranged in surface to surface contact with the second absorbent structure 16.

The surface to surface contact of the cover layer 12 with the second absorbent structure in the second regions 28 essentially define a plurality of longitudinally extending gutters 29 in the body facing surface 11 of the napkin 10 that are coextensive with the path of the material-free zones 20. The depth of each gutter 29 is equivalent to the thickness of the first absorbent layer 14. The first absorbent layer 14 preferably has a thickness of between about 0.5 mm and about 4 mm, thus the depth of each gutter 29 is

in the range of between about 0.5 mm and about 4 mm. The thickness and depth measurements set forth in this paragraph may be determined by using a suitable thickness gauge such as the Mitutoyo Absolute Gauge or equivalent.

In a preferred embodiment of the invention, shown in Fig. 4, the second absorbent layer 16 is a multilayer construct including a first absorbent layer 30, a second absorbent layer 32, and superabsorbent material arranged between the first 30 and second layers 32. In the particular embodiment shown in Fig. 4 the superabsorbent material is arranged in a plurality of spaced lines 36. Preferably each of the spaced lines 36 of superabsorbent material is positioned such that it is arranged in vertical alignment with one of the gutters 29.

Although not shown in the Figures, the areas of the napkin 10 in which the gutters 29 are located may be colored a different color than the remainder of the absorbent article. For example, the areas in which the gutters 29 are located may be colored blue while the remainder of the napkin 10 is generally white. By coloring the gutters 29 a different color than the remainder of the napkin 10, the enhanced wicking characteristics provided by the gutters 29 are visually communicated to a potential user of the absorbent article. The color may be imparted to the napkin 10 by providing a color (e.g., ink) to the cover layer 12 and/or the second absorbent layer 16 and/or the barrier layer 18.

Fig. 3b shows another embodiment of a sanitary napkin 10b according to the present invention. The sanitary napkin 10b further includes a transfer layer 50 arranged between the cover layer 12 and the first absorbent layer 14. The transfer layer 50 preferably includes a plurality of beams 52 and a plurality of material-free zones 54, each one of the material-free zones 54 is arranged between adjacent beams 52. Each of the

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beams 52 of the transfer layer 50 are preferably arranged in vertical alignment with a corresponding beam 25 of the first absorbent layer 14 and each of the material-free zones 54 of the of the transfer layer 50 is preferably arranged in vertical alignment with a corresponding material-free zone 20 of the first absorbent layer 14. The transfer layer 50  
5 may be constructed from similar materials as those described below for the first absorbent layer 14.

Figure 6 shows another embodiment of a sanitary napkin 10c according to the present invention. In the sanitary napkin 10c the gutters 29 extend substantially in the longitudinal direction of the napkin, however the outermost gutters 29a in the transverse  
10 direction have curved end portions 60 that extend in a transverse direction toward the longitudinally extending centerline 15 of the article.

#### Cover Layer

The cover layer 12 may be a relatively low density, bulky, high-loft non-woven  
15 web material. The cover layer 12 may be composed of only one type of fiber, such as polyester or polypropylene or it may include a mixture of more than one fiber. The cover may be composed of bi-component or conjugate fibers having a low melting point component and a high melting point component. The fibers may be selected from a variety of natural and synthetic materials such as nylon, polyester, rayon (in combination  
20 with other fibers), cotton, acrylic fiber and the like and combinations thereof. Preferably, the cover layer 12 has a basis weight in the range of about 10 gsm to about 75 gsm.

Bi-component fibers may be made up of a polyester layer and a polyethylene

sheath. The use of appropriate bi-component materials results in a fusible non-woven fabric. Examples of such fusible fabrics are described in U.S. Pat. No. 4,555,430 issued Nov. 26, 1985 to Chicopee. Using a fusible fabric increases the ease with which the cover layer may be mounted to the absorbent layer and/or to the barrier layer.

5           The cover layer 12 preferably has a relatively high degree of wettability, although the individual fibers comprising the cover may not be particularly hydrophilic. The cover material should also contain a great number of relatively large pores. This is because the cover layer 12 is intended to take-up body fluid rapidly and transport it away from the body and the point of deposition. Therefore, the cover layer contributes little to the time  
10   taken for the napkin to absorb a given quantity of liquid (penetration time).

          Advantageously, the fibers which make up the cover layer 12 should not lose their physical properties when they are wetted, in other words they should not collapse or lose their resiliency when subjected to water or body fluid. The cover layer 12 may be treated to allow fluid to pass through it readily. The cover layer 12 also functions to transfer the  
15   fluid quickly to the underlying layers of the napkin. Thus, the cover layer 12 is advantageously wettable, hydrophilic and porous. When composed of synthetic hydrophobic fibers such as polyester or bi-component fibers, the cover layer 12 may be treated with a surfactant to impart the desired degree of wettability.

          Alternatively, the cover layer 12 can also be made of polymer film having large  
20   pores. Because of such high porosity, the film accomplishes the function of quickly transferring body fluid to the inner layers of the underlying absorbent layers. A suitable cover material of this type is commercially found on the STAYFREE Dry Max Ultrathin product distributed by McNeil-PPC, Inc.

The cover layer 12 may be attached to the underlying absorbent layers 14 and 16, and/or the barrier layer 18, by adhesion and/or other suitable means known to those of skill in the art.

5    First Absorbent Layer

The first absorbent layer 14 may be composed of fibrous materials, such as wood pulp, polyester, rayon, flexible foam, or the like, or combinations thereof. The first absorbent layer 14 may also optionally include a superabsorbent polymer (SAP) material. The first absorbent layer 14 may also comprise thermoplastic fibers for the purpose of  
10    stabilizing the layer and maintaining its structural integrity. The first absorbent layer 14 may be treated with surfactant on one or both sides in order to increase its wettability, although generally the first absorbent layer 14 is relatively hydrophilic and may not require treatment. The first absorbent layer 14 is preferably bonded on both sides to the adjacent layers, i.e. the cover layer 12 and the underlying second absorbent layer 16.

15        In one specific embodiment of the invention, the first absorbent layer 14 is constructed from fluff pulp commercially available as RAYFLOC J-LD-E from Rayonier Products, Jessup, Georgia.

Second Absorbent Layer

20        The second absorbent layer 16 may comprise a single layer of material or may comprise multiple layers.

In one embodiment, the second absorbent layer 16 is a blend or mixture of cellulosic fibers and superabsorbent disposed therein. Cellulosic fibers that can be used

in the second absorbent layer 16 are well known in the art and include wood pulp, cotton, flax and peat moss. Wood pulp is preferred. Pulps can be obtained from mechanical or chemi-mechanical, sulfite, kraft, pulping reject materials, organic solvent pulps, etc. Both softwood and hardwood species are useful. Softwood pulps are preferred. It is not  
5 necessary to treat cellulosic fibers with chemical debonding agents, cross-linking agents and the like for use in the present material. Some portion of the pulp may be chemically treated as discussed in U.S. Pat. No. 5,916,670 to improved flexibility of the product. Flexibility of the material may also be improved by mechanically working the material or tenderizing the material.

10 The second absorbent layer 16 can contain any superabsorbent polymer (SAP) which are well known in the art. For the purposes of the present invention, the term "superabsorbent polymer" (or "SAP") refers to materials which are capable of absorbing and retaining at least about 10 times their weight in body fluids under a 0.5 psi pressure. The superabsorbent polymer particles of the invention may be inorganic or organic  
15 crosslinked hydrophilic polymers, such as polyvinyl alcohols, polyethylene oxides, crosslinked starches, guar gum, xanthan gum, and the like. The particles may be in the form of a powder, grains, granules, or fibers. Preferred superabsorbent polymer particles for use in the present invention are crosslinked polyacrylates, such as the product offered by Sumitomo Seika Chemicals Co., Ltd. Of Osaka, Japan, under the designation of  
20 SA70N and products offered by Stockhausen Inc.. In a specific example, the second absorbent layer 16 is a material containing from 90% to about 40% percent cellulosic fiber, about 10% to about 60% SAP. The second absorbent layer 16 may comprise a material manufactured by using air-laying means well known in the art.

In one preferred embodiment of the invention the second absorbent layer 16 is relatively thin, high swelling absorbent material such as the absorbent composite material sold under the trade name NOVATHIN® available from EAM Corporation located in Jessup, Ga., U.S.A.

5 In a preferred embodiment of the invention shown in Fig. 4, the second absorbent layer 16 is a multilayer construct including a first absorbent layer 30, a second absorbent layer 32, and superabsorbent material 34 arranged between the first 30 and second layers 32. In the particular embodiment shown in Fig. 4 the superabsorbent material 34 is arranged in a plurality of spaced lines 36. The first absorbent layer 30 and second  
10 absorbent layer 32 are constructed from pulp tissue commercially available from Little Rapids Corporation, Green Bay, Wisconsin and the superabsorbent material 34 is a superabsorbent polymer commercially available as Aqua Keep BA40B from Sumitomo Seika Chemicals Co., Ltd., Osaka, Japan.

#### 15 Barrier Layer

Underlying the second absorbent layer 16 is a barrier layer 18 comprising liquid-impervious film material so as to prevent liquid that is entrapped in the absorbent layer 16 from egressing the sanitary napkin and staining the wearer's undergarment. The barrier layer 18 is preferably made of polymeric film, although it may be made of liquid  
20 impervious, air-permeable material such as repellent-treated non-woven or micropore films or foams.

The barrier layer 18 may be breathable, i.e., permits vapor to transpire. Known materials for this purpose include nonwoven materials and microporous films in which

microporosity is created by, inter alia, stretching an oriented film. Single or multiple layers of permeable films, fabrics, melt-blown materials, and combinations thereof that provide a tortuous path, and/or whose surface characteristics provide a liquid surface repellent to the penetration of liquids may also be used to provide a breathable backsheet.

5 The cover layer 12 and the barrier layer 18 are preferably joined along their marginal portions so as to form an enclosure or flange seal that maintains the absorbent layers 14 and 16 captive. The joint may be made by means of adhesives, heat-bonding, ultrasonic bonding, radio frequency sealing, mechanical crimping, and the like and combinations thereof.

10 Positioning adhesive may be applied to a garment facing surface 13 of the barrier layer 18 for securing the napkin 10 to a garment during use. As seen in Fig. 2, the positioning adhesive may be covered with removable release paper 40 so that the positioning adhesive is covered by the removable release paper 40 prior to use.

Absorbent articles of this invention may or may not include wings, flaps or tabs  
15 for securing the absorbent article to an undergarment. Wings, also called, among other things, flaps or tabs, and their use in sanitary protection articles is described in U.S. Patent. No. 4,687,478 to Van Tilburg; U.S. Patent No. 4,589,876 also to Van Tilburg, U.S. Patent No. 4,900,320 to McCoy, and U.S. Patent No. 4,608,047 to Mattingly. The disclosures of these patents are incorporated herein by reference in their entirety. As  
20 disclosed in the above documents, wings are generally speaking flexible and configured to be folded over the edges of the underwear so that the wings are disposed between the edges of the underwear.

### Test Procedures

Absorbent articles according to the present invention possess a combination of unique functional properties. The test procedures set forth below highlight each of these functional properties. Prior to conducting any of the described test procedures described  
5 below the test product should be conditioned for two hours at  $21 \pm 1^\circ \text{C}$  and  $50 \pm 2\%$  humidity.

### Procedure for Measuring the Thickness of Absorbent Article

Preferred embodiments of the present invention relate to "full-size" sanitary  
10 napkins. Full-size sanitary napkins as defined herein are those sanitary napkins that have a thickness of greater than 4.0 mm, according to the thickness measurement procedure set forth below. Preferably, absorbent articles according to the present invention have thickness in the range of about 4.0 mm to about 10.0 mm.

The apparatus required to measure the thickness of an absorbent article is a footed  
15 dial (thickness) gauge with stand, available from Ames, with a 2" (5.08 cm) diameter foot at a pressure of 0.07 psig and a readout accurate to 0.001" (0.00254 cm). A digital type apparatus is preferred. If the absorbent article sample is individually folded and wrapped, the sample is unwrapped and carefully flattened by hand. The release paper is removed from the product sample and it is repositioned back gently across the positioning  
20 adhesive lines so as not to compress the sample, ensuring that the release paper lies flat across the sample. Flaps (if any) are not considered when taking the thickness.

The foot of the gauge is raised and the product sample is placed on the anvil such that the foot of the gauge is approximately centered over the intersection of the

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longitudinally extending centerline and transversely extending centerline on the product sample. When lowering the foot, care must be taken to prevent the foot from dropping onto the sample or from undue force being applied. A load of 0.07 p.s.i.g. is applied to the sample and the read out is allowed to stabilize for approximately 5 seconds. The thickness reading is then taken. This procedure is repeated for at least five product samples and the average thickness is then calculated.

#### Procedure for Measuring Modified Circular Bend Stiffness (MCB)

Absorbent articles according to the present invention exhibit increased multi-directional flexibility when compared to comparable prior art absorbent articles. The test method set forth below provides a method for measuring multi-directional flexibility of an absorbent article. Absorbent articles according to the present invention preferably have an MCB stiffness of less than 1000 g, more preferably less than 800 g, and most preferably less than 600 g.

Modified Circular Bend Stiffness (MCB) is determined by a test that is modeled after the ASTM D 4032-82 CIRCULAR BEND PROCEDURE, the procedure being considerably modified and performed as follows. The CIRCULAR BEND PROCEDURE is a simultaneous multi-directional deformation of a material in which one face of a specimen becomes concave and the other face becomes convex. The CIRCULAR BEND PROCEDURE gives a force value related to flexural resistance, simultaneously averaging stiffness in all directions.

The apparatus necessary for the CIRCULAR BEND PROCEDURE is a modified Circular Bend Stiffness Tester, having the following parts:

1. A smooth-polished steel plate platform, which is 102.0 mm by 102.0 mm by 6.35 mm having an 18.75 mm diameter orifice. The lap edge of the orifice should be at a 45 degree angle to a depth of 4.75 mm;

2. A plunger having an overall length of 72.2 mm, a diameter of 6.25 mm, a ball nose having a radius of 2.97 mm and a needle-point extending 0.88 mm therefrom having a 0.33 mm base diameter and a point having a radius of less than 0.5 mm, the plunger being mounted concentric with the orifice and having equal clearance on all sides. Note that the needle-point is merely to prevent lateral movement of the test specimen during testing. Therefore, if the needle-point significantly adversely affects the test specimen (for example, punctures an inflatable structure), than the needle-point should not be used. The bottom of the plunger should be set well above the top of the orifice plate. From this position, the downward stroke of the ball nose is to the exact bottom of the plate orifice;

3. A force-measurement gauge and more specifically an Instron inverted compression load cell. The load cell has a load range of from about 0.0 to about 2000.0 g;

4. An actuator and more specifically the Instron Model No. 1122 having an inverted compression load cell. The Instron 1122 is made by the Instron Engineering Corporation, Canton, Mass.

20 In order to perform the procedure for this test, as explained below, five representative product samples for each article to be tested are necessary. The location of the sanitary napkin, or other absorbent article, to be tested is located at the intersection of the longitudinally extending centerline and transversely extending centerline of the

absorbent article. A 37.5 mm by 37.5 mm test specimen is cut from each of the five product samples. Prior to cutting the test specimens any release paper or packaging material is removed from the product sample and any exposed adhesive, such as garment positioning adhesive, is covered with a non-tacky powder such as talc or the like. The talc should not affect the MCB measurement.

The test specimens should not be folded or bent by the test person, and the handling of specimens must be kept to a minimum and to the edges to avoid affecting flexural-resistance properties.

A test specimen is centered on the orifice platform below the plunger such that the body facing layer of the test specimen is facing the plunger and the barrier layer of the specimen is facing the platform. The plunger speed is set at 50.0 cm per minute per full stroke length. The indicator zero is checked and adjusted, if necessary. The plunger is actuated. Touching the test specimen during the testing should be avoided. The maximum force reading to the nearest gram is recorded. The above steps are repeated until all five test specimens have been tested. An average is then taken from the five test values recorded to provide an average MCB stiffness.

#### Procedure for Measuring Lateral Rigidity Percent Change

Absorbent articles according to the present invention exhibit a lower lateral rigidity (stiffness) when compared to comparable prior art products. This reduced lateral rigidity provides enhanced comfort to the user since the article is not as easily perceived between the user's thighs during use. Lateral rigidity percent change as measured according to the method described below measures a percent change in lateral rigidity

from a first compression cycle to fifth compression cycle. Absorbent articles according to the present invention exhibit a lower percent change in lateral rigidity due to the articles lower initial lateral rigidity. Absorbent articles according to the present invention preferably have a lateral rigidity percent change of less than 28.00, more preferably less than 26.50 and most preferably less than 24.00.

The method for determining percent change of lateral rigidity set forth below measures the change in flexibility of the article in the transverse direction of the article after the article has been compressed several times in the transverse direction. The apparatus 100 required for this measurement is illustrated in Figs. 7-9. The apparatus 100 includes two front metal rods 102a (diameter = 4.4 mm, length = 102.2 mm), two rear metal rods 102b (diameter = 4.4 mm, length = 102.2 mm), and one central metal rod 104 (diameter = 2.4 mm, height = 92.1 mm) mounted on a first Plexiglass arc-shaped plate 106 (diameter = 139.7 mm and height = 37.9 mm), which serves to hold the sanitary napkin 10. The napkin 10 (or other absorbent article to be tested) should be arranged such that the intersection of the longitudinally extending centerline 15 and transversely extending centerline 17 is arranged in alignment with the central metal rod 104.

The two front metal rods 102a are spaced from one another by a distance of 31.8 mm as measured from the center of one rod to the center of the other rod. The two rear metal rods 102b are also spaced from one another by a distance of 31.8 mm as measured from the center of one rod to the center of the other rod. The distance between corresponding front 102a and rear 102b rods, i.e. the front and rear rods that are in front to back alignment, is 12.7 mm.

The plate 106 is mounted on the base 108 of an inverted compression load cell 110. A second Plexiglas arc-shaped plate 112 (diameter = 139.7 mm and height = 37.9 mm) is placed upside down on the top part of the inverted compression cell and used to compress the napkin 10 in the transverse direction thereof. The load cell has a range of about 0.0 to about 2000.0 g and is used on an actuator and more specifically on an Instron Model No. 1123 (Instron Engineering Corporation, Canton, Mass).

Before starting the measurement, the napkin is removed from the packaging and unfolded. The release paper is removed and talc powder is sprinkled over the adhesive strips. Using a ruler and the central rod as a guide, the initial position of the compression cell is adjusted so that the distance between the surfaces of the plates 106 and 112 is 7.62 cm (3 inches). The napkin 10 is placed between the rods 102a, 102b, and 104, as shown in the Figure 7. The actuator is set so that during each compression cycle, it will move down by 5.08 cm at a speed of 50 cm/min. For each sample, a series of five compression cycles is executed consecutively and the peak force load is recorded during the first and the fifth cycle. The lateral rigidity percentage change between the first and the fifth cycle is calculated using the following equation:

$$\text{LR (\% drop)} = \frac{\text{peak load (1st cycle)} - \text{peak load (5th cycle)}}{\text{peak load (1st cycle)}} \times 100$$

where the peak load is highest recorded load force (g) during the relevant cycle.

This procedure is repeated with five different product samples and an average value is calculated.

Procedure for Measuring Longitudinal Transverse Wicking Ratio (LTWR)

Absorbent articles according to the present invention exhibit superior wicking in the longitudinal direction of the article yet at the same time control wicking in the transverse direction of the article to thereby prevent side leakage. The Longitudinal Transverse Wicking Ratio (LTWR) test set forth below illustrates the superior wicking characteristics of absorbent articles according to the present invention.

Absorbent articles according to the present invention have LTWR values greater than 1.5, more preferably greater than 2.5, and most preferably greater than 3.5.

The synthetic test fluid described below is used in the test method described below. The synthetic test fluid used in replacement of human menses due to its ease in preparation and accessibility of the ingredients.

The fluid is prepared by dissolving each of the following components into distilled water. Care should be taken to ensure that components are well dissolved. A rotating blade mixer or a magnetic stirrer should be used for mixing the components. In a large enough container, add the following components, making sure that the component is dissolved before adding the next one:

| Quantity/1 L | Reagent          | Grade, purity     | Supplier              | Catalog no. |
|--------------|------------------|-------------------|-----------------------|-------------|
| 9.0 g        | sodium chloride  | ACS reagent 99+%  | Sigma-Aldrich         | 223514      |
| 490.5 g      | distilled water  | N/AP              | N/AP                  | N/AP        |
| 10 g         | 2-phenoxyethanol | puriss. 99.0%     | Sigma-Aldrich (Fluka) | 77699       |
| 0.5 g        | FD&C Red #40     | Food              | A&C                   | C3465       |
| 490.5 g      | glycerol         | ACS reagent 99.5% | Sigma-Aldrich         | G7893       |

The materials required to determine the LTWR value including the following:

- a poly(methylmetracylate) (Plexiglas) template 200, shown in Fig. 10, having dimensions of 20 cm long x 6 cm wide x 1.27 cm thick and an elliptical orifice 202 (3.8 cm x 1.9 cm) in the center of the template;
- a calibrated electronic repeater pipette (HandyStep Electronic Repeating Pipet, Brandtech) with a 50 mL combi-syringe (or combi-tip) capable of delivering 5-10 mL at a rate of approximately 4 mL/s and fixed on a stand with the end of the tip placed vertically at 2.54 cm (1 inch) from the surface of the product;
- a calibrated stopwatch that has a precision of 0.01 s;
- a ruler graduated in millimeters (mm);
- a fine point permanent marker; and
- the test fluid prepared according to the procedure described above.

To obtain the LTWR value, the conditioned article is removed from its packaging, unfolded, placed on a flat surface (e.g. lab table). The Plexiglas plate 200 is placed and centered over the absorbent product, light hand applied pressure is applied to flatten the article, without compressing it, such that there is no substantial bending or folding of the article under the template 200.

A 50 mL combi-syringe (or combi-tip), placed on a repeater pipette, is filled with the test fluid, positioned vertically and fixed on a stand with the end of the tip placed approximately 1 inch from the surface of the product and above the center of the elliptical

hole 202 of the plate. The article should be arranged such that the intersection of the longitudinally extending and transversely extending centerlines is positioned in the center of the hole 202. Then, 10 mL of test fluid is insulted to the article at a rate of approximately 4 mL/s. The stopwatch is started as soon as the repeating pipet button is pressed to dispense the volume. After 60 s, the plate is removed and the limits of the stain, along the longitudinally extending and transversely extending axes, are marked rapidly (within less than 10 s) with a marker. Only the continuous fluid stain limits found on the article cover are marked, fluid spots not continuous or linked to the rest of the fluid flow and/or observed in the lower layers of the absorbent product are not considered in the determination of the wicking distance. Using the furthest continuous points found along the longitudinally and transversely extending axes, a rectangle is drawn as shown in Fig. 11. The length of the rectangle measured in the longitudinal direction (LW) is divided by the width of the rectangle measured in the transversal direction (TW) to give the LTWR value:

$$LTWR = LW/TW$$

where the Longitudinal Wicking Distance (LW) is defined as the farthest continuous fluid displacement along the longitudinally extending axis of the article; and the Transverse Wicking Distance (TW) is the farthest continuous fluid displacement along transversely extending axis. All distance values are measured with a ruler to a precision of 1 mm.

If the test fluid touches or runs over the edges of the plate 200 in the transverse direction within 60 s following the fluid injection, the sample is considered to have failed and a zero (0) LTWR value is attributed to that sample. If the absorbent article being

tested is smaller than the test plate 200, then failure is defined as the moment when the fluid reaches the edges of the absorbent article in the transverse direction.

This procedure is repeated five times using five different samples of each type of absorbent article and an average LTWR value is calculated from these five repeats. If  
5 any of the five products fails, i.e. the fluid reaches the edges of the plate, then the reported average LTWR value is zero (0).

#### Procedure for Measuring Repeat Insult Failure (RIF) Value

The ability of an absorbent article to hold repeated insults of fluid without leaking  
10 is an indication that absorbent article can deliver superior protection to a user. Absorbent articles according to the present invention preferably have a Repeat Insult Failure Value greater than 5.0, more preferably greater than 10, and most preferably greater than 15.0.

In the Repeat Insult Failure Value test method described below, a product fails  
15 when fluid reaches the edges of the Plexiglas template 200 shown in Fig. 10, which is centered over the article during the test.

In order to determine the RIF value, the conditioned article is removed from its packaging, unfolded, placed on a flat surface (e.g. lab table). The Plexiglas template 200 is placed and centered the over the article to tested and light hand applied pressure is applied to the template 200 to flatten the article, without compressing it, such that there is  
20 no substantial bending or folding of the article under the template 200. The article should be arranged such that the intersection of the longitudinally extending and transversely extending centerlines is positioned in the center of the hole 202.

A 50 mL combi-syringe (or combi-tip), placed on a repeater pipette, is filled with the test fluid (disclosed above), positioned vertically and fixed on a stand with the end of the tip placed approximately 1 inch from the surface of the product and above the center of the elliptical hole of the plate. Then, 7 mL of test fluid is injected on the pad with the  
 5 repeater pipette at a rate of approximately 4 mL/s. The stopwatch is started at the same time as the pipette button is pressed. As soon as the cover can be observed through the fluid anywhere in the elliptical hole, the time is recorded. This time is defined as the penetration time (p-time). After approximately 30 s, a second 7 mL volume of test fluid is injected, and again, the p-time is recorded. Additional 7 mL insults and p-time  
 10 measurements are carried out until the product fails. Sample failure is achieved when the test fluid reaches one of the edges of the Plexiglas plate 200. The above described procedure is repeated for five (5) samples of each article to be tested.

For each type of article, determine the average volume at which the product  
 15 failed,  $V_{(failure)}$ , and the average penetration time obtained when the product failed,  $p-time_{(failure)}$ . Then, the RIF value is calculated using the following equation:

$$RIF = \frac{V_{(failure)}}{p-time_{(failure)}}$$

### EXAMPLES

#### Inventive Example

An inventive example of a sanitary napkin according to the present invention was  
5 constructed as follows.

A cover layer was removed from a Stayfree Dry Max Ultrathin product,  
distributed by McNeil-PPC, Inc., and was laid on a conveyor belt and slot coated with  
2.85 gsm of hot melt adhesive commercially available as NW 1023 ZP from Bostik  
Corporation located in Wauwatosa, WI. A first absorbent layer was constructed from  
10 450 gsm fluff pulp commercially available as RAYFLOC J-LD-E from Rayonier  
Products, Jessup, Georgia. The layer of fluff pulp was die cut to form five longitudinally  
extending material free zones as shown in Fig. 1. Each of the material free zones had a  
length of 150 mm a width of 5 mm and each material free zone was spaced in the  
transverse direction for an adjacent material free zone by a distance 10 mm. The first  
15 absorbent layer had a thickness 5 mm. A second absorbent layer was prepared by taking  
two pulp tissue layers commercially available as Little Falls 2004 pulp tissue from Little  
Rapids Corporation, Green Bay, Wisconsin and applying a 150 gsm layer of  
superabsorbent polymer commercially available as Aqua Keep BA40B from Sumitomo  
Seika Chemicals Co., Ltd., Osaka, Japan between the tissue layers. Hot melt adhesive  
20 was then slot coated onto the second absorbent structure on a top surface thereof in the  
amount of 10 gsm to bond the first absorbent layer to the second absorbent layer. A 0.9  
mil polymeric film basksheet commercially available from Pliant Corporation,  
Schaumburg, Ill., was placed on the garment facing side of the second absorbent layer.

The cover was depressed into the into the areas defined by the material free zones to thereby form longitudinally extending gutters in the surface of the napkin and the cover bonded was bonded to the second absorbent layer in the area of the gutters by means of heat and pressure. The final composite was crimped along the peripheral edge the article  
5 and final cut.

Comparative Example #1

Stayfree Maxi Regular with Wings

10 Comparative Example #2

Always Maxi Regular with Wings

Each of the Inventive Example, Comparative Example #1 and Comparative  
Example #2 were tested acccoring to the test methods described above and the results  
15 thereof are summarized in Table 1 provided below.

**TABLE 1**

| (average of n = 5)                                       | <b>Inventive<br/>Example</b> | <b>Comparative<br/>Example #1</b> | <b>Comparative<br/>Example #2</b> |
|----------------------------------------------------------|------------------------------|-----------------------------------|-----------------------------------|
| MCB center (g)                                           | 568                          | 1125                              | 1885                              |
| Lateral rigidity (% drop)                                | 23.75                        | 29.25                             | 28.45                             |
| Repeat Insult Value<br>(Volume/p-time) at failure (mL/s) | 19.3                         | 3.4                               | 5.0                               |
| Longitudinal/Transverse Wicking<br>(cm/cm)               | 3.96                         | 1.14                              | 1.49                              |
| Thickness (mm)                                           | 4.73                         | 8.59                              | 8.93                              |

5

As illustrated in the table provided above absorbent articles according to the present invention provide superior comfort and fluid handling characteristics when compared to comparable prior art articles.

CLAIMS

1. An absorbent article comprising:

a longitudinally extending centerline;

5 a transversely extending centerline;

a cover layer having a body facing surface;

a first absorbent layer having an upper surface and a lower surface, the layer comprising a plurality of beams and a plurality of material-free zones, each of the beams arranged in a spaced relationship to an adjacent beam and each of the beams being  
10 separated from an adjacent beam by a material-free zone, each of the material-free zones extending from the upper surface to the lower surface;

a second absorbent structure arranged below the first absorbent layer;

wherein the cover layer includes a plurality of first regions arranged in spaced relationship to the second absorbent structure and a plurality of second regions, each of  
15 the second regions located between two adjacent beams and arranged in surface to surface contact with the second absorbent structure; and

wherein the first absorbent layer, second absorbent layer and cover cooperate to define a plurality of longitudinally extending gutters in the body facing surface of the article.

20

2. The absorbent article according to claim 1, wherein the material-free zones extend over a surface area in the range of between about 50 mm<sup>2</sup> and about 4000 mm<sup>2</sup>.

3. The absorbent article according to claim 2, wherein the plurality of material-free zones comprise between about 3 and about 7 longitudinally extending material-free zones.

4. The absorbent article according to claim 3, wherein each one of the longitudinally extending material-free zones has a length as measured along a path of the material-free zone in the range of about 5 cm to about 40 cm and a width in the range of between about 1 mm and about 10 mm.

5. The absorbent article according to claim 4, wherein said gutters have a depth relative to body facing surface of about 0.5 mm to about 4 mm.

6. The absorbent article according to claim 5, wherein the absorbent article has a thickness greater than 4.0 mm.

7. The absorbent article according to claim 6, wherein the absorbent article has a thickness in the range of about 4.0 mm to about 10.0 mm.

8. The absorbent article according to claim 7, wherein the absorbent article has an MCB value less than 1000 g.

9. The absorbent article according to claim 8, wherein the absorbent article has an MCB value less than 800 g.

10. The absorbent article according to claim 9, wherein the absorbent article has an  
5 MCB value less than 600 g.

11. The absorbent article according to claim 10, wherein the absorbent article has a lateral rigidity percent change of less than 28.0%.

10 12. The absorbent article according to claim 11, wherein the absorbent article has a lateral rigidity percent change of less than 26.5%.

13. The absorbent article according to claim 12, wherein the absorbent article has a lateral rigidity percent change of less than 24.0%.

15

14. The absorbent article according to claim 13, wherein the absorbent article has a LTWR value greater than 1.5.

15. The absorbent article according to claim 14, wherein the absorbent article has a  
20 LTWR value greater than 2.5.

16. The absorbent article according to claim 15, wherein the absorbent article has a LTWR value greater than 3.5.

17. The absorbent article according to claim 16, wherein the absorbent article has an RIF value greater than 5.0.

18. The absorbent article according to claim 17, wherein the absorbent article has an  
5 RIF value greater than 10.0.

19. The absorbent article according to claim 18, wherein the absorbent article has an RIF value greater than 15.0.

10 20. The absorbent article according to claim 1, further comprising a transfer layer, the transfer layer comprising a plurality of beams and a plurality of material-free zones, each one of the material-free zones being arranged between adjacent beams, wherein each of the beams of the transfer layer are arranged in vertical alignment with a corresponding beam of the first absorbent layer and wherein each of the material-free zones of the of the  
15 transfer layer is arranged in vertical alignment with a corresponding material-free zone of the first absorbent layer.

21. An absorbent article comprising:

a cover layer having a body facing surface;

20 a first absorbent layer having an upper surface and a lower surface, the layer comprising a plurality of material-free zones, each of the material-free zones extending from the upper surface to the lower surface;

a second absorbent structure arranged below the first absorbent system;

wherein the cover layer includes a plurality of first regions arranged in spaced relationship to the second absorbent structure and a plurality of second regions, each of the second regions arranged in surface to surface contact with the second absorbent structure; and

5 wherein the absorbent article has an RIF value greater than 15.0.

22. The absorbent article according to claim 21, wherein the absorbent article has a thickness in the range of about 4.0 mm to about 10.0 mm.

10 23. The absorbent article according to claim 22, wherein the absorbent article has a LTWR value greater than 3.5.

24. An absorbent article comprising:

a longitudinally extending centerline;

15 a transversely extending centerline;

a cover layer having a body facing surface;

a first absorbent layer having an upper surface and a lower surface, the layer including at least one material-free zone, the material-free zone extending from the upper surface to the lower surface;

20 a second absorbent structure arranged below the first absorbent layer;

wherein the cover layer includes a plurality of first regions arranged in spaced relationship to the second absorbent structure and a second region, the second region

located within the area defined by the material free zone and arranged in surface to surface contact with the second absorbent structure.

25. An absorbent article comprising:

5 a cover layer having a body facing surface;

a first absorbent layer having an upper surface and a lower surface, the layer comprising a plurality of material-free zones, each of the material-free zones extending from the upper surface to the lower surface;

a second absorbent structure arranged below the first absorbent system;

10 wherein the cover layer includes a plurality of first regions arranged in spaced relationship to the second absorbent structure and a plurality of second regions, each of the second regions arranged in surface to surface contact with the second absorbent structure; and

wherein the absorbent article has an LTWR value greater than 3.5.

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PTO/SB/01 (10-00)

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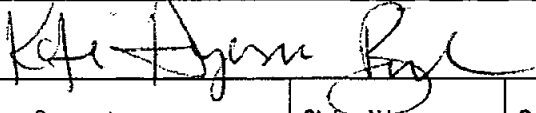
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                          |                                     |                                                                                                              |                                                                                                                                                                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-------------------------------------|--------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>DECLARATION<br/>AND<br/>POWER OF ATTORNEY<br/>FOR UTILITY OR DESIGN<br/>PATENT APPLICATION<br/>(37 CFR 1.63)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Attorney Docket Number   | PPC-5271-USNP                       |                                                                                                              |                                                                                                                                                                                                                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | First Named Inventor     | Kofi Ayensu Bissah                  |                                                                                                              |                                                                                                                                                                                                                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <i>COMPLETE IF KNOWN</i> |                                     |                                                                                                              |                                                                                                                                                                                                                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Application Number       | Unassigned                          |                                                                                                              |                                                                                                                                                                                                                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Filing Date              | Herewith                            |                                                                                                              |                                                                                                                                                                                                                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Group Art Unit           | Unassigned                          |                                                                                                              |                                                                                                                                                                                                                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Examiner Name            | Unassigned                          |                                                                                                              |                                                                                                                                                                                                                  |
| <p><input checked="" type="checkbox"/> Declaration Submitted with Initial Filing      <input type="checkbox"/> Declaration Submitted after Initial Filing (Surcharge (37 CFR 1.16(e)) required)      OR</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                          |                                     |                                                                                                              |                                                                                                                                                                                                                  |
| <p><b>As a below named inventor, I hereby declare that:</b></p> <p>My residence, mailing address, and citizenship are as stated below next to my name.<br/>I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                          |                                     |                                                                                                              |                                                                                                                                                                                                                  |
| <p><b>ABSORBENT ARTICLE INCLUDING AN ABSORBENT LAYER HAVING A PLURALITY OF SPACED BEAM ELEMENTS</b><br/>(Title of the Invention)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                          |                                     |                                                                                                              |                                                                                                                                                                                                                  |
| <p>the specification of which</p> <p><input checked="" type="checkbox"/> is attached hereto</p> <p>OR</p> <p><input type="checkbox"/> was filed on (MM/DD/YYYY) <input type="text"/> as United States Application Number or PCT International Application Number <input type="text"/> and was amended on (MM/DD/YYYY) <input type="text"/></p> <p>I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.</p> <p>I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.</p> |                          |                                     |                                                                                                              |                                                                                                                                                                                                                  |
| <p>I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or any PCT international application having a filing date before that of the application on which priority is claimed.</p>                                                                                                                                                                                                                                                                                                                                                               |                          |                                     |                                                                                                              |                                                                                                                                                                                                                  |
| Prior Foreign<br>Application<br>Number(s)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Country                  | Foreign Filing Date<br>(MM/DD/YYYY) | Priority<br>Not Claimed                                                                                      | Certified Copy<br>Attached?<br>YES      NO                                                                                                                                                                       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                          |                                     | <input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/><br><input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/><br><input type="checkbox"/> <input type="checkbox"/><br><input type="checkbox"/> <input type="checkbox"/><br><input type="checkbox"/> <input type="checkbox"/> |
| <p><input type="checkbox"/> Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto:</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                          |                                     |                                                                                                              |                                                                                                                                                                                                                  |

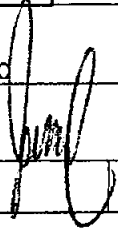
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| DECLARATION - Utility or Design Patent Application                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                 |                                                                                                                                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                 |                                                                                                                                                  |
| <b>Application Number(s)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Filing Date (MM/DD/YYYY)</b> | <input type="checkbox"/> Additional provisional application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto. |
| 60/983,746                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 10/30/2007                      |                                                                                                                                                  |
| I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, § 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application: |                                 |                                                                                                                                                  |
| <b>Application Serial No.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>Filing Date</b>              | <b>Status</b>                                                                                                                                    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                 | Patented<br>Patented<br>Patented                                                                                                                 |
| I hereby appoint:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                 |                                                                                                                                                  |
| <input checked="" type="checkbox"/> Practitioners at Customer Number <span style="border: 1px solid black; padding: 0 20px;">000027777</span> --                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                 | Place Customer<br>Number Bar Code<br>Label Here                                                                                                  |
| AND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                 |                                                                                                                                                  |
| <input type="checkbox"/> Practitioner(s) named below:<br><div style="display: flex; justify-content: space-between;"> <span><u>Name</u></span> <span><u>Registration Number</u></span> </div>                                                                                                                                                                                                                                                                                                                                                                                                                  |                                 |                                                                                                                                                  |
| as my/our attorney(s) or agent(s) to prosecute the application identified above, and to transact all business in the United States Patent and Trademark Office connected therewith.                                                                                                                                                                                                                                                                                                                                                                                                                            |                                 |                                                                                                                                                  |
| Address all telephone calls to Paul J. Higgins at telephone number (732) 524-1728.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                 |                                                                                                                                                  |
| Direct all correspondence to: <input checked="" type="checkbox"/> Customer Number <span style="border: 1px solid black; padding: 0 20px;">000027777</span> OR <input type="checkbox"/> Correspondence address below                                                                                                                                                                                                                                                                                                                                                                                            |                                 |                                                                                                                                                  |
| Name:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                 |                                                                                                                                                  |
| Address:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                 |                                                                                                                                                  |
| Address:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                 |                                                                                                                                                  |
| City:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | State:                          | ZIP                                                                                                                                              |
| Country                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Telephone:                      | Fax:                                                                                                                                             |

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

|                                                                                                           |          |                                                                               |                 |
|-----------------------------------------------------------------------------------------------------------|----------|-------------------------------------------------------------------------------|-----------------|
| <b>NAME OF SOLE OR FIRST INVENTOR:</b>                                                                    |          | <input type="checkbox"/> A petition has been filed for this unsigned inventor |                 |
| Given Name<br>(first and middle [if any]) KOFI AYENSU                                                     |          | Family Name<br>or Surname BISSAH                                              |                 |
| Inventor's<br>Signature  |          | Date 12/11/2007                                                               |                 |
| Residence: City Somerset                                                                                  | State NJ | Country USA                                                                   | Citizenship USA |
| Mailing Address 16 Patton Drive                                                                           |          |                                                                               |                 |
| City Somerset                                                                                             | State NJ | ZIP 08873                                                                     | Country USA     |

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

|                                                                                                            |          |                                                                               |                    |
|------------------------------------------------------------------------------------------------------------|----------|-------------------------------------------------------------------------------|--------------------|
| <b>NAME OF SECOND INVENTOR:</b>                                                                            |          | <input type="checkbox"/> A petition has been filed for this unsigned inventor |                    |
| Given Name<br>(first and middle [if any]) RICARDO                                                          |          | Family Name<br>or Surname DE OLIVEIRA                                         |                    |
| Inventor's<br>Signature  |          | Date 12/10/2007                                                               |                    |
| Residence: City New Hope                                                                                   | State PA | Country USA                                                                   | Citizenship Brazil |
| Mailing Address 516 Clydesdale Drive                                                                       |          |                                                                               |                    |
| City New Hope                                                                                              | State PA | ZIP 18938                                                                     | Country USA        |

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

|                                           |       |                                                                               |             |
|-------------------------------------------|-------|-------------------------------------------------------------------------------|-------------|
| <b>NAME OF THIRD INVENTOR:</b>            |       | <input type="checkbox"/> A petition has been filed for this unsigned inventor |             |
| Given Name<br>(first and middle [if any]) |       | Family Name<br>or Surname                                                     |             |
| Inventor's<br>Signature                   |       | Date                                                                          |             |
| Residence: City                           | State | Country                                                                       | Citizenship |
| Mailing Address                           |       |                                                                               |             |
| City                                      | State | ZIP                                                                           | Country     |

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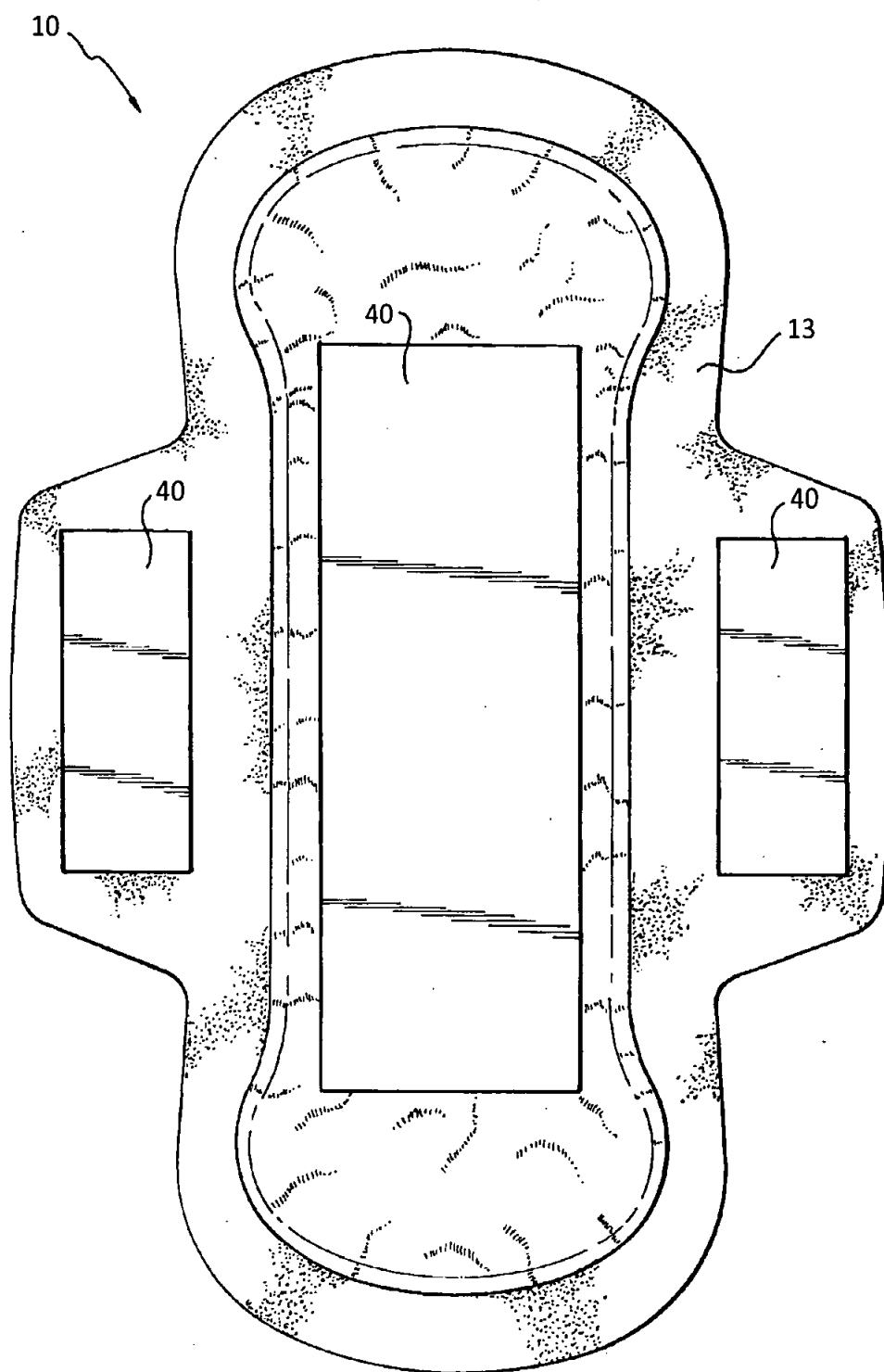


**Fig. 2**

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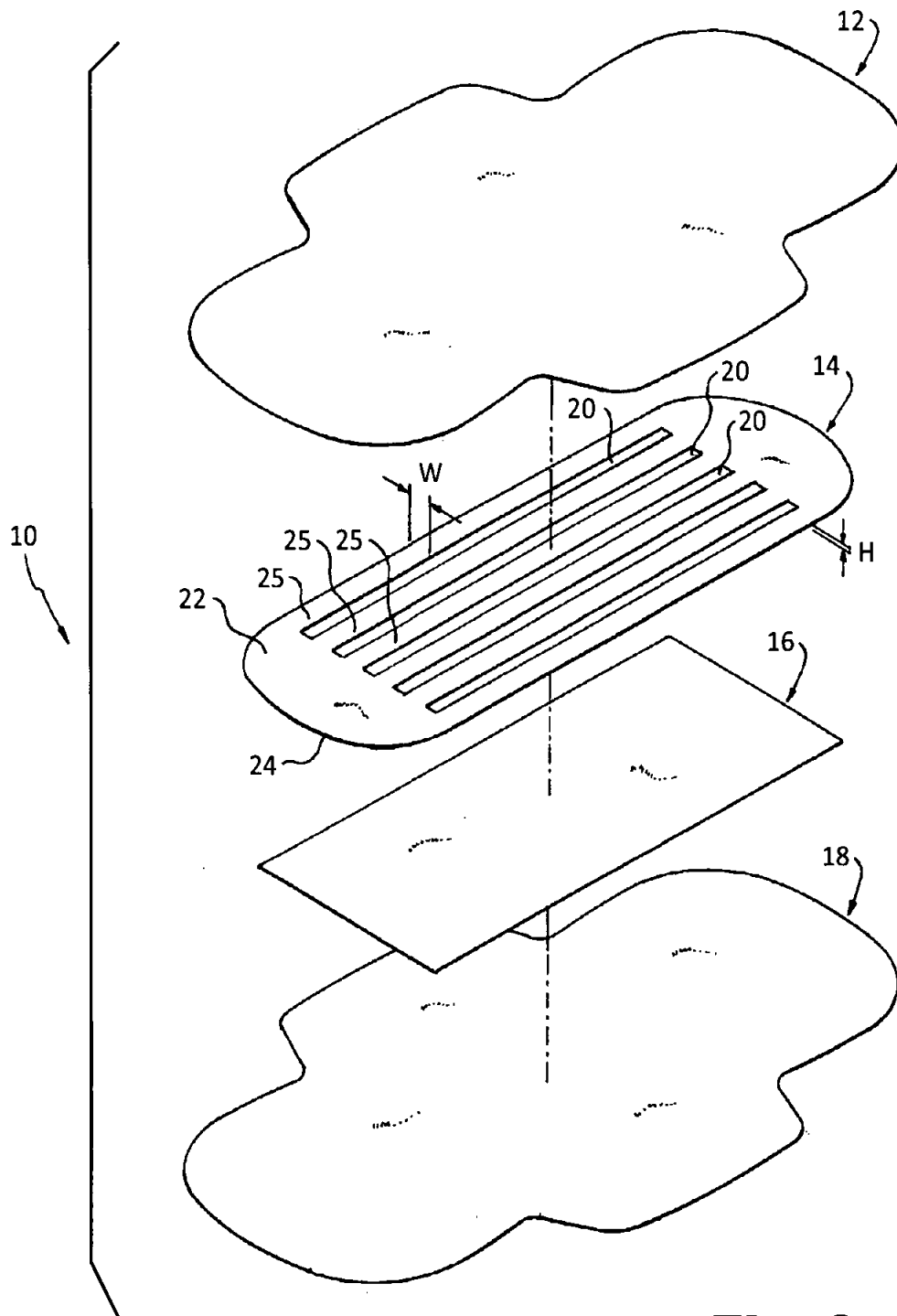


**Fig. 3a**

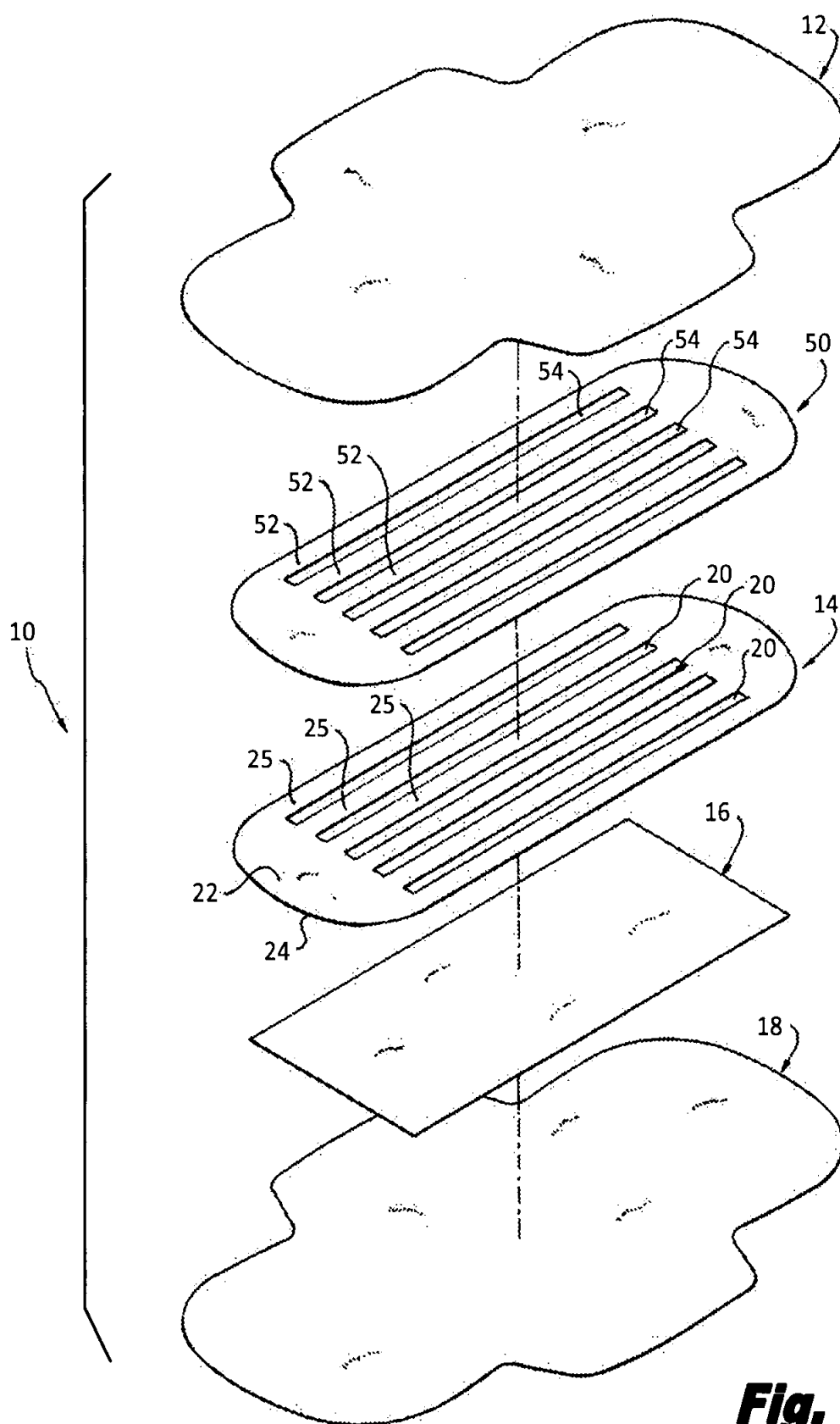


**Fig. 3b**

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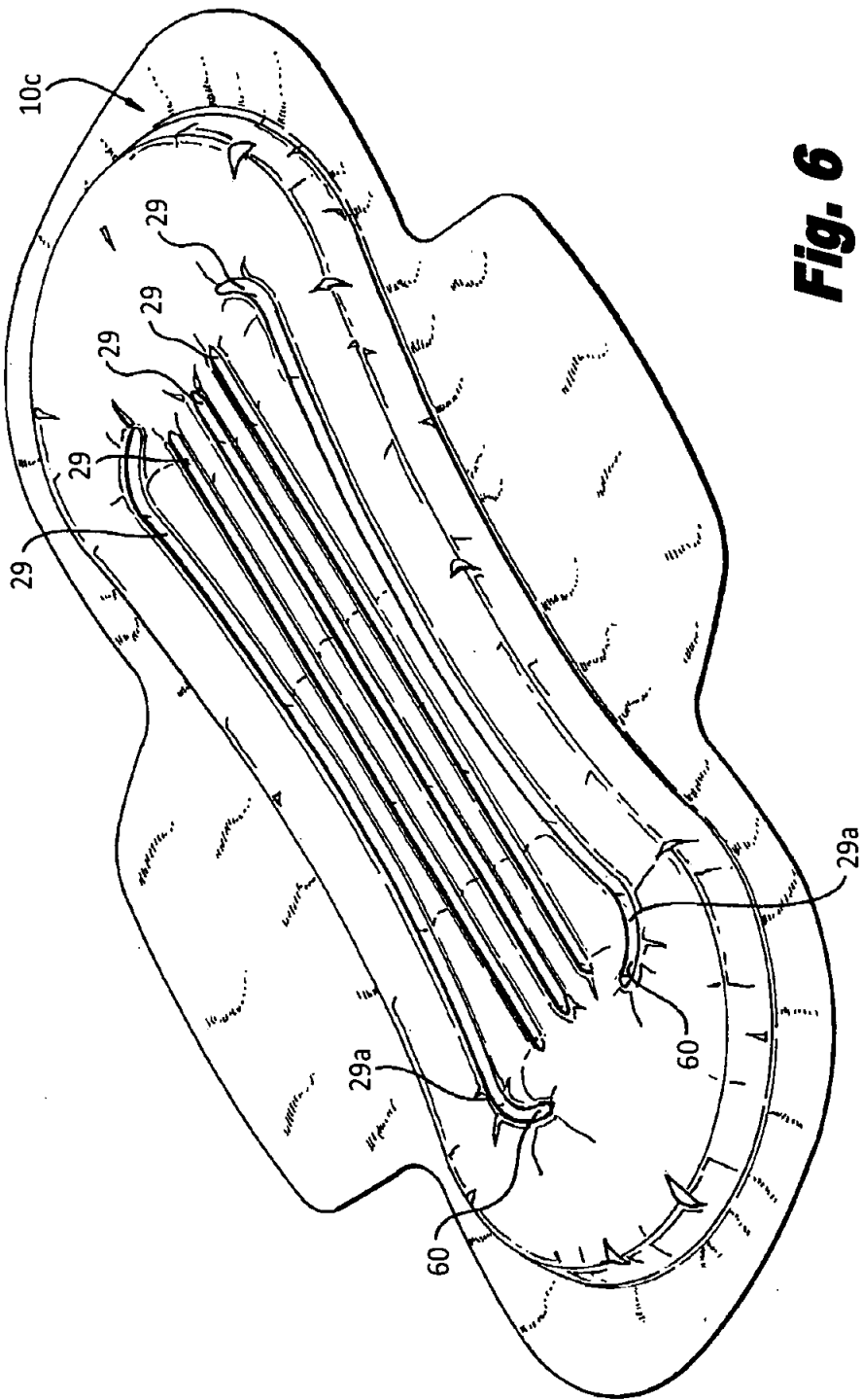


**Fig. 6**

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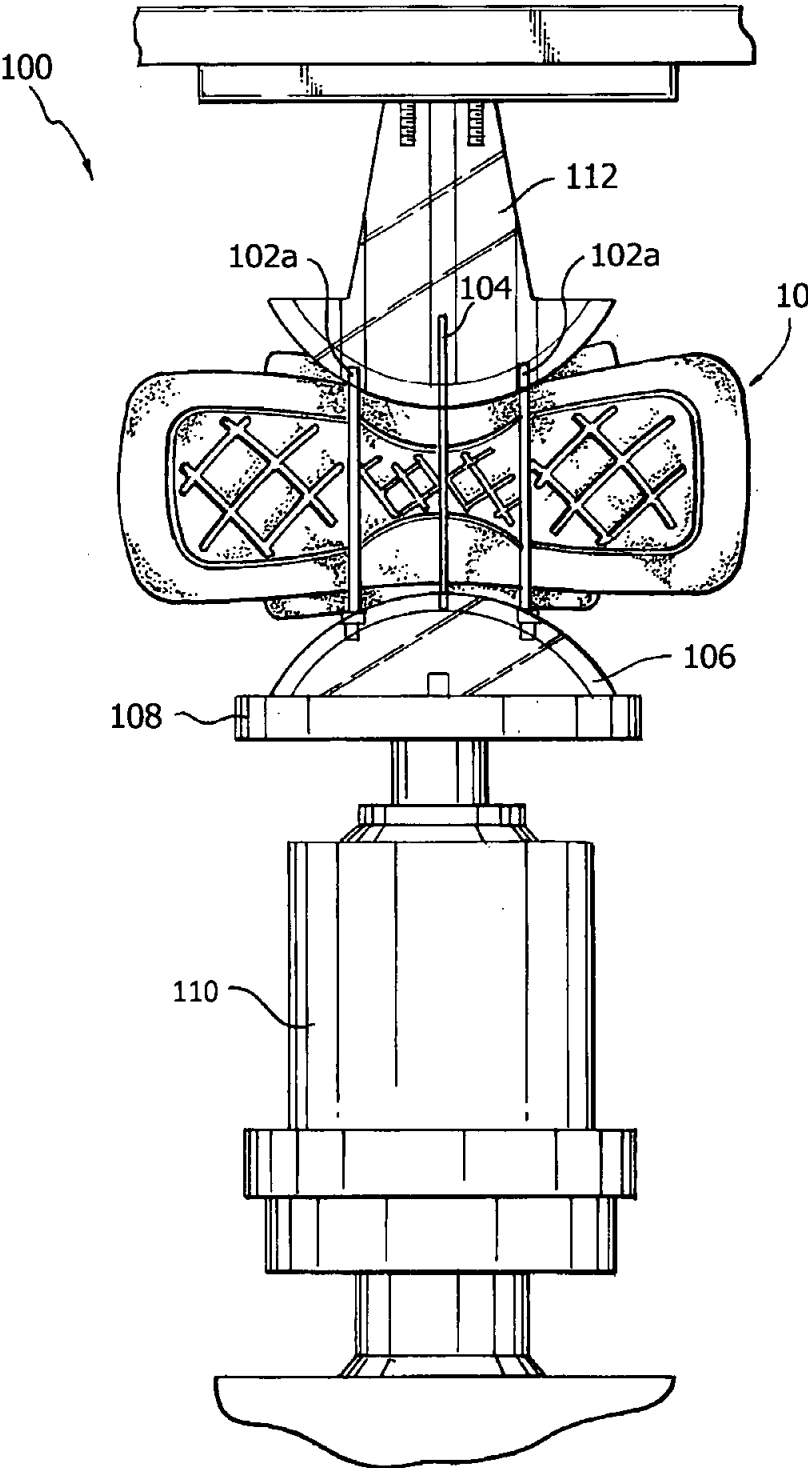


**Fig. 7**

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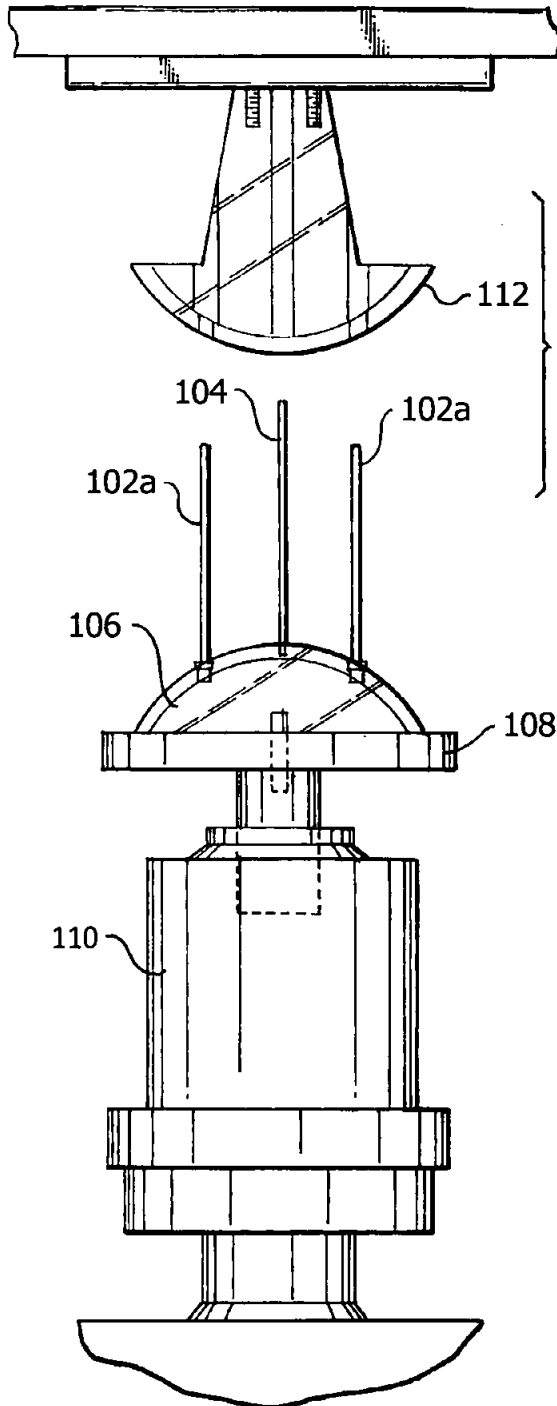


**Fig. 8**

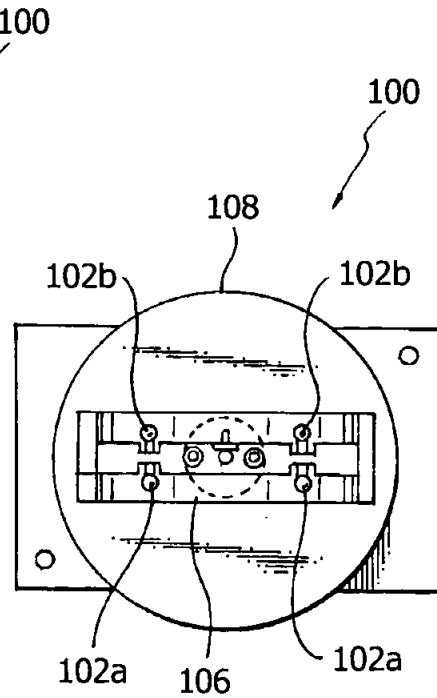


**Fig. 9**

FD

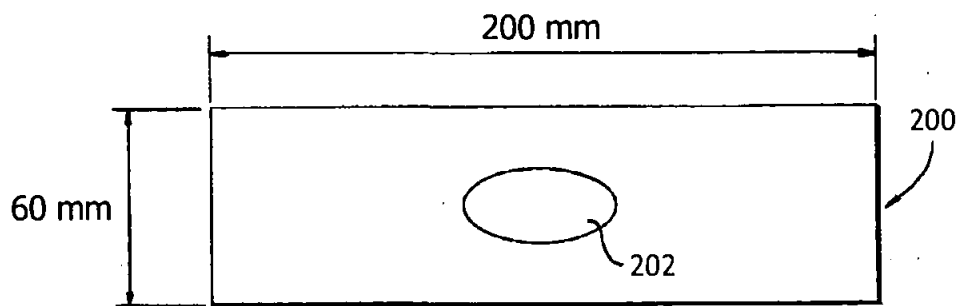


**Fig. 10**

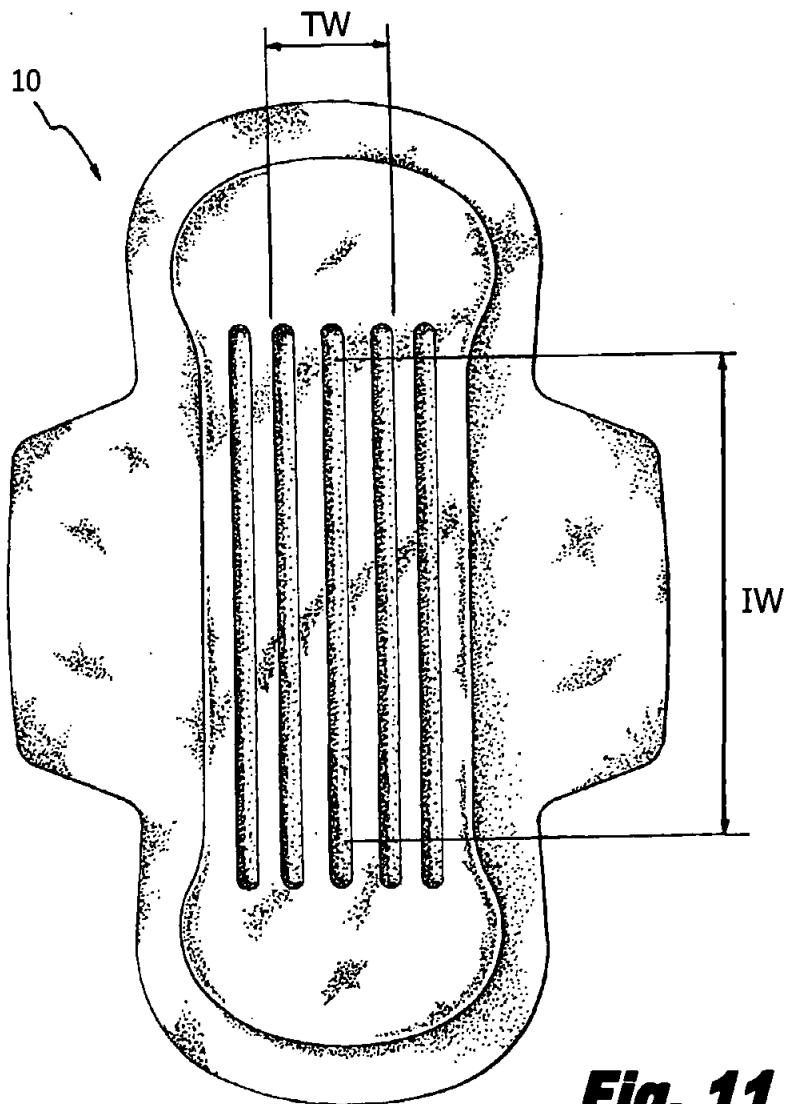


**Fig. 11**



No. 08-116270- -00000-0000

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 Act. 411 PRESENTACION Folios: 56

**Industria y Comercio**  
 SUPERINTENDENCIA

### REQUISITOS MINIMOS PARA ADMISION A TRAMITE PCT

PATENTE DE INVENCION

☒MODELO DE UTILIDAD ☐

- ◆ Indicación de que se solicita la concesión de una patente ☒
- ◆ Datos de identificación del solicitante o de la persona que presenta la solicitud ☒
- ◆ Descripción de la invención ☒
- ◆ Dibujos de ser estos pertinentes ☒
- ◆ Comprobante de pago de las tasas establecidas ☒

COMPLETA ☐INCOMPLETA ☐DISEÑO INDUSTRIAL ☐

- ◆ Indicación de que se solicita el registro de Diseño Industrial ☐
- ◆ Datos de identificación del solicitante o de la persona que presenta la solicitud ☐
- ◆ Representación gráfica y fotográfica del Diseño Industrial o muestra del material que incorpora el diseño ☐
- ◆ Comprobante de pago de las tasas establecidas ☐

COMPLETA ☐INCOMPLETA ☐ESQUEMA DE TRAZADO ☐

- ◆ Indicación de que se solicita el registro de un Esquema de Trazado ☐
- ◆ Datos de identificación del solicitante o de la persona que presenta la solicitud ☐
- ◆ Representación gráfica del esquema trazado ☐
- ◆ Comprobante de pago de las tasas establecidas ☐

COMPLETA ☐INCOMPLETA ☐

Sandra Rodríguez  
 Firma Responsable

Fecha OCT. 30. 08

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REPUBLICA DE COLOMBIA  
SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

Bogotá,  
2020

Doctor(a)  
ESCOBAR URIBE JIMENA  
Apoderado(a) y/o Representante de  
MC NEIL - P P C, INC.

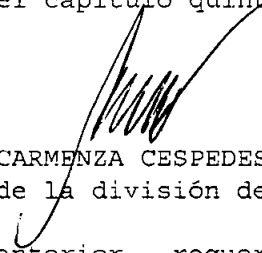
|            |                                |
|------------|--------------------------------|
| REFERENCIA | Radicación No. 8 116270        |
|            | Trámite 2                      |
|            | Evento 1                       |
|            | Actuación 430                  |
|            | Oficio No. <b>Nº 1 5 2 8 9</b> |

Como resultado del examen de forma, realizado con fundamento en el artículo 38 de la Decisión 486 de la Comisión de la Comunidad Andina, se le comunica que:

1. La solicitud no contiene la copia del documento en que consta la cesión del derecho a la patente del inventor al solicitante o a su causante, conforme a lo establecido por el artículo 26 literal k) de la Decisión 486 de la Comisión de la Comunidad Andina. Cuando se trate de documentos otorgados en el extranjero, estos deberán legalizarse de conformidad con lo dispuesto por los artículos 259 y 260 del Código de Procedimiento Civil. Cuando se trate de las declaraciones a que hace referencia la Regla 4.17 ii) del Tratado de Cooperación en Materia de Patentes PCT., el alcance de las tales declaraciones se determinará según indiquen claramente una cesión de derechos del inventor al solicitante o su causante, de conformidad con lo dispuesto en el numeral 5.2.15 del Capítulo Quinto, Título X de la Circular Única de Superintendencia de Industria y Comercio.

En cumplimiento del artículo 39 de la Decisión 486, se le requiere para que dentro del término de dos (2) meses siguientes a la fecha de notificación del presente oficio, complete los requisitos anteriormente enunciados. En caso de no dar cumplimiento al presente requerimiento, la solicitud se considerará abandonada y perderá su prelación.

Notifíquese el presente oficio conforme a lo dispuesto en el numeral 5.2, literal e), del capítulo quinto del título primero de la Circular Unica No.10 de 2001.

  
ALIX CARMENZA CESPEDES DE VERGEL  
Jefe de la división de Nuevas Creaciones

El anterior requerimiento fue notificado por fijación en lista de  
fecha **04 DIC. 2008**  
jfernand