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Superindustria y Comercio
Radicación 00076961 2/000002 Folios 2
Fecha (AND) 2000-09-09 09:49:04
Trámite 000 PATENTES D. REGISTRO/ 538 PETICION
Dependencia 2020 DIVISION DE NUEVAS CREACIONES

**SEÑORES
SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
DIVISIÓN DE NUEVAS CREACIONES
MINISTERIO DE DESARROLLO ECONOMICO**

**REF EXPEDIENTE No 00076961 /
FECHA SOLICITUD Octubre 10, 2000
SOLICITANTE GRUPO P I MABE S A DE C V
TITULO PATENTE CAPA DE TRANSFERENCIA PARA
ARTICULOS ABSORBENTES
DESECHABLES Y PROCESO PARA SU
FABRICACION**

SOLICITUD DE ESTUDIO DE FONDO

DILIA RODRÍGUEZ D ALEMAN, en mi condición de apoderada de la Sociedad solicitante, por el presente escrito atentamente solicito a Usted que habiéndose surtido la publicación de la presente solicitud, en la Gaceta de la Propiedad Industrial N° 517 de fecha Junio 27 de 2002 se proceda con el estudio de Fondo

Para tal fin me permito anexar la tasa correspondiente

Agradezco continuar con el presente trámite

Señor Jefe,

**DILIA RODRIGUEZ D. ALEMAN
C C 41 654 882 de Bogotá
T P 20824 del C S J**

P-328

SUPERINTENDENCIA Y COMERCIO

Radicacion 0007594 00000002 Folios 2

Fecha (AMD) 2002-08-09 09:49:34

Tramite : 002 PATENTES P 1 REGISTRO/ 530 PETICION

Dependencia 2020 DIVISION DE NUEVAS CREACIONES

NIT 800176089-2

RECIBO OFICIAL DE CAJA 02 - 51 913
FECHA AGOSTO 8 DE 2002

***** CONSIGNACION *****

DEPOSITANTE	TIPO PAGO	BANCO	CUENTA	No PAGO	FECHA PGO	Vr PAGO
CLARKE MODET Y CO	COLOMBCONSIGNACION	BANCO POPULAR	050-00110-6	4112792	06/08/2002	1 351 200 00

***** CONCEPTO *****

CANT	RENTISTICO	CONCEPTO	TOTAL CONCEPTO
1	0005-01-01 SOLICITUDES	85 EXAMEN DE PATENTABILIDAD DE INVEN	318 000 00
		TOTAL :	\$ 318,000 00

SON TRESCIENTOS DIEZ Y OCHO MIL PESOS



RESPONSABLE _____

RECIBO DE CAJA APLICADO AL EXPEDIENTE No _____

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

2020

Bogotá, D C , 21 de Octubre de 2005

Doctora

DILIA RODRÍGUEZ D'ALEMAN

Representante **GRUPO P I MABE S.A.**

ASUNTO

Radicación	No	00-76961
Trámite		002
Evento		001
Actuación	430	9928
Oficio		
Folios		015

Como resultado del examen de fondo, realizado con fundamento en el artículo 45 de la Decisión 486 de la Comisión de la Comunidad Andina, se le comunica

1) Documentos estudiados

- a) Para el presente estudio se tendrán en cuenta el capítulo descriptivo, comprendido en los folios 4 a 24 y 111 de la solicitud en estudio
- b) Para el presente estudio se tendrán en cuenta los dibujos comprendidos en los folios 112 a 114 de la solicitud en estudio
- c) Para el presente estudio se tendrá en cuenta el capítulo reivindicatorio que comprende 27 reivindicaciones en los folios 107 a 110 de la solicitud en estudio
- d) Conforme lo establece los artículos 9, 10 y 11 de la decisión 486 de la Comisión de la Comunidad Andina, la presente solicitud en estudio fue presentada el 10 de octubre de 2000 y en el momento de la radicación si se reclamo prioridad de las primeras solicitudes presentadas en México MX9350 y MX999351

2) Objeto de la invención

- a) Las reivindicaciones 1 a 27 de la solicitud en estudio se refieren a
 - i) Una tela no tejida caracterizada porque está compuesta de una mezcla de al menos dos tipos de fibras sintéticas unidas por calor

- ii) Un artículo absorbente caracterizado porque lleva una capa de transferencia colocada entre la capa superior permeable y la matriz absorbente tal que la misma está compuesta por una mezcla de al menos dos tipos de fibras sintéticas unidas por calor
 - iii) Un artículo absorbente caracterizado porque lleva una capa de papel colocada sobre la matriz absorbente y una capa de transferencia colocada entre la capa superior permeable y la matriz absorbente tal que la misma está compuesta por una mezcla de al menos dos tipos de fibras sintéticas unidas por calor
 - iv) Un proceso para fabricar una capa de transferencia para artículos absorbentes desechables que consiste en premezclar fibras primera y segunda, abrirlas por medio de una abridora de balas, que además acaba de mezclarlas homogéneamente, alimentarlas a un compartimiento formador de napa caracterizado porque se obtienen velos de fibras peinadas y paralelizadas homogéneamente, donde las fibras se unen por medio de calor en una calandra con un rodillo superior grabado y un rodillo inferior liso, además porque las fibras que componen la napa y el velo son fibras sintéticas con diferentes puntos de sellado
- b) Los anteriores productos y procedimiento buscan una tela no tejida con propiedades ajustadas a un artículo absorbente desechable
 - c) Según la Clasificación Internacional de Patentes, la codificación para esta solicitud corresponde a A 61 F 13/15

3) Claridad de la Solicitud

- a) El artículo 28 de la Decisión 486 de la Comisión de la Comunidad Andina de Naciones establece

"La descripción deberá divulgar la invención de manera suficientemente clara y completa para su comprensión y para que una persona capacitada en la materia técnica correspondiente pueda ejecutarla"

La descripción no es clara toda vez que el solicitante afirma que las pruebas son universales cuando no lo son, exceptuando la prueba de penetración en películas. De acuerdo a lo anterior, el solicitante no puede considerar estas pruebas como elementos distintivos de su solicitud.

- b) El artículo 30 de la Decisión 486 de la Comisión de la Comunidad Andina establece que

"Las reivindicaciones definirán la materia que se desea proteger mediante la patente. Deben ser claras y concisas y estar enteramente sustentadas por la descripción. Las reivindicaciones podrán ser independientes o dependientes. Una reivindicación será independiente cuando defina la materia que se desea proteger sin referencia a otra reivindicación anterior. Una reivindicación será dependiente cuando defina la materia que se desea proteger refiriéndose a una reivindicación anterior. Una reivindicación será"

dependiente cuando defina la materia que se desea proteger refiriéndose a una reivindicación anterior - Una reivindicación que se refiera a dos o más reivindicaciones anteriores se considerará reivindicación dependiente múltiple "

El capítulo reivindicatorio no es claro toda vez que

- i) No se precisa la materia sobre la cual se solicita protección. Como se explicará en el punto 4), la presente solicitud no posee unidad de invención, por lo que no está definida la materia sobre la cual se solicita protección.
- ii) Como el solicitante no se basa en pruebas universales, la solicitud se torna confusa. Por ejemplo, cuando el solicitante menciona la tercera descarga, no es posible identificar plenamente la cantidad de la descarga o las demás propiedades de la descarga. El solicitante deberá eliminar las reivindicaciones que incorporen dichas características no universales.
- iii) Las reivindicaciones 3, 4, 6, 7, 10, 11, 12, 25, 26 y 27 quieren proteger resultados a alcanzar. Esto también se demuestra de lo contenido en la descripción. No es correcto solicitar protección sobre el resultado a alcanzar. Las reivindicaciones deben caracterizar un producto por la forma o constitución del mismo, las partes que lo componen y todo lo que permita establecer de cómo se llega a ese resultado. No se aceptan reivindicaciones que caractericen resultados. Deben eliminarse.
- iv) Términos como "ligeramente mayor" deben eliminarse porque son ambiguos.

De acuerdo a lo anterior, el capítulo reivindicatorio no cumple con el requisito de claridad de acuerdo a lo establecido en el Art 30 de la Decisión 486.

4) Evaluación de la Unidad de Invención

El artículo 25 de la Decisión 486 de la Comisión de la Comunidad Andina establece

"La solicitud de patente sólo podrá comprender una invención o un grupo de invenciones relacionadas entre sí, de manera que conformen un único concepto inventivo"

La presente solicitud carece de unidad de invención toda vez que configura DOS diferentes objetos. La primera reivindicación muestra una tela no tejida y la reivindicación número ocho un artículo absorbente que lo incorpora. Sin embargo, la reivindicación 9 muestra un artículo absorbente con características diferentes a las de la reivindicación 8. Esto permite afirmar que no se trata del mismo producto. Todo el problema radica en configurar varias reivindicaciones independientes con materia diferente. El solicitante debería establecer una sola reivindicación independiente dirigida al **producto absorbente** en la forma más simple de la solicitud de invención. Partiendo de allí establecer reivindicaciones dependientes que amplíen esa forma más simple hasta su forma más compleja.

De acuerdo a lo anterior, la presente solicitud no cumple con el requisito de unidad de invención de acuerdo al Art 25 de la Decisión 486

5) Determinación del Estado de la Técnica

El artículo 16 de la Decisión 486 de la Comisión establece

"El estado de la técnica comprenderá todo lo que haya sido accesible al público por una descripción escrita u oral, utilización, comercialización o cualquier otro medio antes de la fecha de presentación de la solicitud de patente o, en su caso, de la prioridad reconocida "

"Sólo para el efecto de la determinación de la novedad, también se considerará dentro del estado de la técnica, el contenido de una solicitud de patente en trámite ante la oficina nacional competente cuya fecha de presentación o de prioridad fuese anterior a la fecha de presentación o de prioridad de la solicitud de patente que se estuviese examinando, siempre que dicho contenido este incluido en la solicitud de fecha anterior cuando ella se publique o hubiese transcurrido el plazo previsto en el artículo 40 "

Consultadas las bases de datos y los archivos con que cuenta la entidad, especialmente bajo las clasificaciones A 61 F 13/15 y las más cercanas a ellas, se encontró que antes del 13 de octubre de 1999 (fecha para determinar el estado de la técnica) habían sido publicados los documentos que se enumeran en la siguiente tabla los cuales se relacionan con artículos absorbentes deseables que incorporan una capa de transferencia

De acuerdo con o establecido en el artículo 16 se determinó el estado de la técnica y se encontró el siguiente antecedente

Nº	Documento	Título	Fecha de Publicación
D1	US 4 480 000	Absorbent article	1984 12 30
D2	US 5 728 081	Absorbent composite article having fluid acquisition sub layer	1998 03 17

6) Evaluación de los requisitos de patentabilidad

El artículo 14 de la Decisión 486 de la Comisión de la Comunidad Andina establece

"Los Países Miembros otorgarán patentes para las invenciones, sean de producto o procedimiento, en todos los campos de la tecnología, siempre que sean nuevas tengan nivel inventivo y sean susceptibles de aplicación industrial"

En cumplimiento con este artículo, se procedió a evaluar los requisitos de novedad, nivel inventivo y aplicación Industrial con el fin de establecer la patentabilidad de la invención reivindicada en la solicitud en estudio

a) Evaluación de la novedad y el del Nivel Inventivo

El art 16 de la Decisión 486 de la Comisión de la Comunidad Andina establece

"Una invención se considerará nueva cuando no está comprendida en el estado de la técnica " "El estado de la técnica comprenderá todo lo que haya sido accesible al público por una descripción escrita u oral, utilización comercialización o cualquier otro medio antes de la fecha de presentación de la solicitud de patente o, en su caso, de la prioridad reconocida "

"Sólo para el efecto de la determinación de la novedad, también se considerará dentro del estado de la técnica, el contenido de una solicitud de patente en trámite ante la oficina nacional competente, cuya fecha de presentación o de prioridad fuese anterior a la fecha de presentación o prioridad de la solicitud de patente que se estuviese examinando, siempre que dicho contenido esté incluido en la solicitud de fechas de prioridad cuando ella se publique o hubiese transcurrido el plazo previsto en el artículo 40 "

El art 18 de la Decisión 486 de la Comisión de la Comunidad Andina establece

"Se considerará que una invención tiene nivel inventivo, si para una persona del oficio normalmente versada en el arte en la materia técnica correspondiente, esa invención no hubiese resultado obvia ni se hubiese derivado de manera evidente del estado de la técnica"

Lo planteado en la reivindicación 1 es muy conocido en el estado de la técnica y así lo muestran dos documentos representativos D1 y D2 Ambos incorporan mezclas de al menos dos tipos de fibras de fibras sintéticas y ambas unidas por calor Es más, relacionan mezclas de poliolefinas y poliésteres que es lo mismo que lo que el solicitante para Colombia desea proteger Aunque existen ciertas diferencias en los artículos absorbentes, dichas diferencias son mínimas y para un técnico medio resulta evidente obtener lo que el solicitante desea proteger partiendo de D1 y D2 Lo mismo se puede considerar con respecto al proceso

Por lo anterior, la presente solicitud carecería de los requisitos para que se le conceda el privilegio solicitado

b) Resumen

En conclusión los requisitos de patentabilidad de la presente solicitud se podrían ver afectados así

Nº	Documento	Relvindicaciones afectadas	Requisito que afecta
D1	US 4 480 000	1 - 27	Novedad
			Nivel inventivo
D2	US 5 728 081	1 - 27	Novedad
			Nivel inventivo

7) Notificación

En cumplimiento del artículo 45 de la Decisión 486 de la Comisión de la Comunidad Andina, se le indica que dentro del término de sesenta días contados a partir de la fecha de la notificación de la presente comunicación debe responder a la notificación. En caso de no dar respuesta al presente requerimiento, o si a pesar de la respuesta subsistieran los impedimentos para la concesión, se denegará la patente.

Notifíquese el presente oficio conforme a lo dispuesto por el numeral 5.2, literal e) del capítulo quinto del título primero de la Circular Única N° 10 de 2001.


ALIX CARMENZA CÉSPEDES DE VERGEL
Jefe División de Nuevas Creaciones

El anterior requerimiento fue notificado por fijación en la lista, de fecha

27 OCT 2005

Concepto Técnico N°	EXAMINADOR TÉCNICO	EXAMINADOR JURÍDICO
1656	Código No 202003	Código No

126
118

United States Patent [19]
Watanabe et al.

[11] **Patent Number** 4,480,000
[45] **Date of Patent** Oct. 30, 1984

[54] **ABSORBENT ARTICLE**

[75] **Inventors:** Imao Watanabe; Toshinobu Kashiwada, both of Chiba, Hiroshi Suzuki, Sagami-hara, Junji Yoshii, Atsugi, all of Japan

[73] **Assignees:** Lion Corporation, Tokyo; Amee Company, Ltd., Kanagawa, both of Japan

[21] **Appl. No.** 388,632

[22] **Filed.** Jan. 15, 1982

[30] **Foreign Application Priority Data**

Jan. 18, 1981 [JP] Japan 56-94178

[51] **Int. Cl.³** A61F 13/00

[52] **U.S. Cl.** 428/284; 428/286; 428/287; 428/288; 428/298; 428/913; 604/370; 604/378; 604/385

[58] **Field of Search** 428/284, 286, 287, 298, 428/288, 913; 604/370-374, 378, 379, 385

[56] **References Cited**

U. S. PATENT DOCUMENTS

3,545,442 12/1970 Wicker et al. 604/370
4,069,821 1/1978 Fitzgerald et al. 604/379

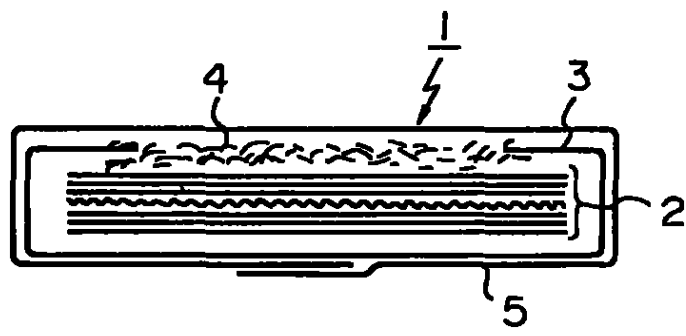
4,307,721 12/1981 Tsuchiya et al. 628/212 X
4,324,246 4/1982 Mullins et al. 604/370
4,324,247 4/1982 Ann 604/371

Primary Examiner—George F. Leames
Assistant Examiner—Nancy A. B. Swisher
Attorney, Agent, or Firm—Armstrong, Nikaido, Marmelstein & Kubovick

[57] **ABSTRACT**

Improved absorbent articles such as sanitary napkins and disposable diapers are provided. The absorbent articles have (1) an absorbent core layer, (2) a barrier covering the lateral faces and underneath face of the absorbent core layer (3) a web placed on the top of the absorbent core layer and (4) a nonwoven fabric wrapped around the above-mentioned (1), (2) and (3). The nonwoven fabric is comprised of 10-70 wt. % of a regenerated cellulose fiber 5-60 wt. % of a polyester fiber and 25-75 wt. % of a heat-bondable composite polyolefin fiber and the web is predominantly comprised of a polyester fiber. The absorbent articles absorb a body fluid at an enhanced rate and have a feeling of dryness even after such absorption.

6 Claims, 2 Drawing Figures



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Fig 1

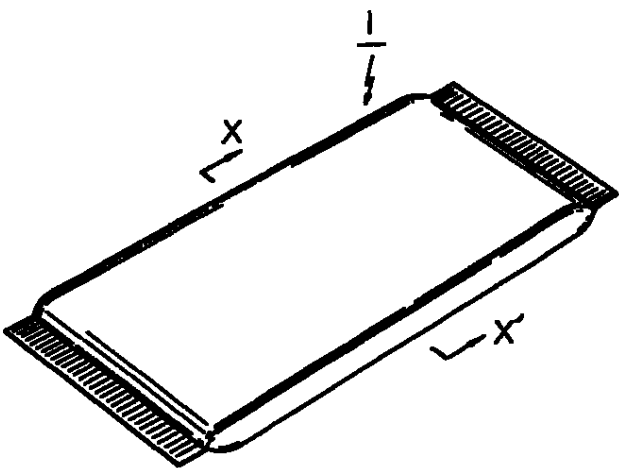
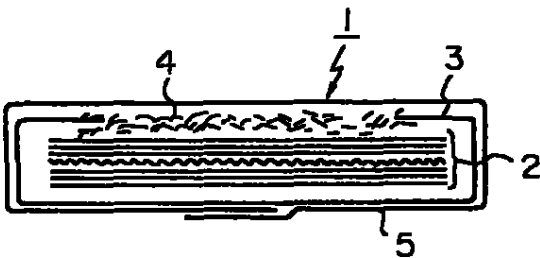


Fig. 2



ABSORBENT ARTICLE

BACKGROUND OF THE INVENTION

(1) Field of the Invention

This invention relates to an improvement in absorbent articles which are used, for example, as sanitary napkins and disposable diapers and are characterized by absorbing menstrual fluid, urine, and other body fluids at an extremely enhanced rate and having, after the absorption of a body fluid, a feeling of dryness.

(2) Description of the Prior Art

It is known that conventional absorbent articles such as sanitary napkins have as a top cover a nonwoven fabric made of a blend of a heat-bondable composite polyolefin fiber and another fiber. It is recognized that if such a top cover is made of a well-balanced blend of a hydrophobic fiber and a hydrophilic fiber, the top cover absorbs a body fluid at an enhanced absorption rate, the absorbed body fluid does not seep out of the absorbent article, and, thus, the absorbent article maintains a feeling of dryness. It is naturally desirable that the absorption rate be as high as possible and that the absorbent feel as dry as possible after the absorption of a body fluid in order to mitigate the physiological and physical discomfort and the unpleasant feeling accompanying menses. Thus, enhancement of the absorption rate and the feeling of dryness has heretofore been and is still greatly desired.

SUMMARY OF THE INVENTION

It is, therefore, a primary object of the present invention to provide absorbent articles exhibiting an enhanced absorption rate and having, after the absorption of a body fluid, an enhanced feeling of dryness.

Other objects and advantages of the present invention will be apparent from the following description.

In accordance with the present invention there is provided an absorbent article comprising (1) an absorbent layer (2) a barrier covering the lateral faces and underneath face of the absorbent layer (3) a web placed on the top of the absorbent layer and (4) a nonwoven fabric wrapped around the absorbent layer the barrier and the web, wherein said nonwoven fabric comprises, based on the weight of the nonwoven fabric, 10 to 70% by weight of a regenerated cellulose fiber 5 to 60% by weight of a polyester fiber, and 25 to 75% by weight of a heat-bondable composite polyolefin fiber and said web is predominantly comprised of a polyester fiber.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a perspective view of an absorbent article of the present invention; and

FIG. 2 is an enlarged sectional view taken along the line X-X' in FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to FIGS. 1 and 2 wherein a sanitary napkin is illustrated as an example of the absorbent article of the present invention, the sanitary napkin 1 is comprised of an absorbent layer 2 located in the core portion, a barrier 3 covering the lateral faces and underneath face of the absorbent layer 2, a web 4 placed on the top of the absorbent layer 2, and a nonwoven fabric 5 wrapped around the absorbent layer 2, the barrier 3, and the web 4.

By the term "web" used herein is meant a mass of fibers in the form of a sheet which is made up of non-interlaced and non-bonded fibers.

One main feature of the present invention resides in the nonwoven fabric used as a top cover of the absorbent article. The nonwoven fabric is made of a blend of a regenerated cellulose fiber, a polyester fiber and a heat-bondable polyolefin composite fiber. It is preferable that the regenerated cellulose fiber have a fineness of 1 to 6 deniers, more preferably 1.5 to 3 deniers, and a length of 1.5 to 7 cm, more preferably 3 to 5 cm. As the regenerated cellulose fiber there can be mentioned a viscose rayon.

It is preferable that the polyester fiber have a fineness of 1 to 7 deniers, more preferably 1.5 to 4 deniers, and a length of 1.5 to 7 cm, more preferably 3 to 5 cm. As the polyester fiber there can be mentioned a polyethylene terephthalate fiber and other commercially available polyester fibers for apparel use.

The heat-bondable composite polyolefin fiber preferably possess either a sheath-core structure comprising a high-melting polyolefin core ingredient surrounded by a low-melting polyolefin sheath ingredient or a side-by-side structure comprising a high-melting polyolefin ingredient and a low-melting polyolefin ingredient. A preferable heat-bondable composite polyolefin fiber is composed of polypropylene as the high-melting polyolefin ingredient and polyethylene as the low-melting polyolefin ingredient and is commercially available, for example, under the tradename of "ES fiber" (manufactured by Chisso K.K.). It is preferable that the heat-bondable composite polyolefin fiber have a fineness of 1 to 20 deniers, more preferably 1.5 to 7 deniers, and a length of 1 to 10 cm, more preferably 4 to 7 cm. The proportion of the three fibers in the nonwoven fabric should be based on the weight of the nonwoven fabric, as follows: the regenerated cellulose fiber 10 to 70% preferably 30 to 60% by weight; the polyester fiber, 5 to 60% preferably 5 to 40%, by weight, and the heat-bondable composite polyolefin fiber, 25 to 75% preferably 30 to 65%, by weight.

The nonwoven fabric used as a top cover of the absorbent article of the present invention may be prepared by a process wherein the above-mentioned three fibers are uniformly blended and made into a sheet form, and the sheet is heated at a temperature of 120° to 150°, whereby the composite polyolefin fibers are bonded with each other at their intersecting points. The nonwoven fabric, so prepared, has a basis weight of 10 to 35 g/m² preferably 13 to 18 g/m², and a density of 0.01 to 0.1 g/cm³, preferably 0.05 to 0.07 g/cm³.

Another main feature of the present invention resides in the web, which is predominantly made up of a polyester and is interposed between the above-mentioned nonwoven fabric and the absorbent layer. If no web is interposed between the nonwoven fabric and the absorbent layer or if a conventional web made of a rayon staple fiber is interposed, between the nonwoven fabric and the absorbent layer the intended enhanced absorption rate and feeling of dryness cannot be attained. It has not clearly been elucidated yet but it is presumed that the intended enhanced absorption rate and feeling of dryness are due to the fact that a polyester fiber is contained in both the nonwoven fabric and the web.

The polyester web should be bulky and preferably possess a basis weight of 10 to 50 g/m² more preferably 15 to 30 g/m² and a density of 0.001 to 0.04 g/cm³ more preferably 0.003 to 0.02 g/cm³. As the polyester

126
120

fiber, a polyethylene terephthalate fiber and other commercially available polyester fibers for apparel use can be used. The polyester fiber may be either tow or staple. If a polyester fiber in the form of two is used, it is preferable that the fiber be crimped so that it has a high bulkiness and good workability. If a polyester fiber in the form of staple is used, it is preferable that the fiber have a length of 1 to 6 cm, more preferably 1 to 3 cm.

The absorbent layer and the barrier in the absorbent article of the present invention may be conventional. Namely, the absorbent layer may be made of, for example, cellulose pulp, absorbing paper, a high polymeric absorbent material, or a combination of these materials. The barrier may be made of, for example, polyethylene film, polyethylene-laminated paper, polyvinyl alcohol film, or water-repellent paper.

The absorbent article of the present invention, which is characterized by having the specified polyester web on the top of the absorbent core layer and further by having the specified nonwoven fabric wrapped around the entire body of the absorbent article, is superior to other absorbent articles which have the same absorbent core layer but a different web and/or nonwoven fabric as follows. Namely, the absorbent article of the present invention absorbs menstrual fluid, urine, and other body fluids at an extremely enhanced rate, and the absorbed body fluid does not readily seep out of the absorbent article. Thus, the absorbent article has a feeling of dryness even after the absorption of a body fluid, and the absorbent article does not become stuffy. Furthermore, the nonwoven fabric used as the top cover is soft and does not give a feeling of physical discomfort. Therefore, when the absorbent article is used as a sanitary napkin or a disposable diaper, it has a good feel and is comfortable for the wearer.

The invention will be further illustrated by the following examples.

EXAMPLES

Sanitary napkins having a laminated structure similar to that shown in FIGS. 1 and 2 were prepared. The napkins consisted of (1) an absorbent layer comprised of fleece-like pulp and three sheets of absorbent paper, (2) a polyethylene-laminated paper (barrier), (3) a web, and (4) a nonwoven fabric wrapped around the absorbent layer, the barrier and the web. The respective nonwoven fabrics and webs were made of the fibers shown in Table I below.

The rate of absorption of menstrual fluid, the amount of menstrual fluid which seeped out of the napkin and the feeling of dryness were determined as follows.

ADSORPTION RATE

An iron plate having a perforation in the center thereof and having a cylinder attached to the perforated portion was placed on each horizontally laid sanitary napkin specimen. A pressure of 8 g/cm² was applied to the specimen, and 10 ml of a simulated menstrual fluid containing 0.89% by weight of an electrolyte and having a surface tension of 42 dyne/sec was forced in one stroke through the cylinder into the specimen. The amount of time in which the simulated menstrual fluid was absorbed on the surface of the specimen was determined. The absorption rate was expressed in terms of such an amount of time (sec.).

AMOUNT OF MENSTRUAL FLUID SEEPED OUT

Two minutes after the determination of the absorption rate, a pile of 20 sheets of filter paper was superposed on the absorbed specimen and then a pressure of 50 g/cm² was uniformly applied thereto. The pressed specimen was maintained under this pressure for two minutes and then the amount of fluid which seeped out of the specimen onto the filter papers was measured.

FEELING OF DRYNESS

The feeling of dryness after the absorption of menstrual fluid was panel tested by twenty women from 18 to 24 years old, was evaluated according to the following five ratings, and was expressed by the average rating.

- 5 Very dry
- 4 Slightly dry
- 3 Moderate
- 2 Slightly wet
- 1 Very wet

The nonwoven fabrics used were made in a conventional manner from a viscose rayon staple fiber having a fineness of 2 deniers and a length of 5 cm, a polyethylene terephthalate staple fiber having a fineness of 2 deniers and a length of 5 cm, and a heat-bondable polypropylene/polyethylene composite staple fiber ("Polypro-ES fiber" supplied by Chisso K.K.) having a fineness of 3 deniers and a length of 6.4 cm. The nonwoven fabrics had a basis weight of 14 to 15 g/m² and a density of 0.06 g/cm³.

The webs used were made from a polyethylene terephthalate staple fiber and a viscose rayon staple fiber both of which had a fineness of 1.5 deniers and a length of 1.5 cm. The webs had a basis weight of 25 g/m² and a density of 0.004 g/cm³.

The test results are shown in Table I below.

129
121

180
122

TABLE I

No.	Composition of nonwoven fabric			Web	Absorption rate (mm.)	Amount of fluid that soaked out (g)	Feeling of dryness
	Cellulose fiber (%)	Polyester fiber (%)	Polyolefin fiber (%)				
Example 1	10	25	65	Polyester	2.9	3.1	1.7
Example 2	10	40	50	"	3.3	3.1	1.7
Example 3	10	60	30	"	3.0	3.1	1.7
Example 4	35	5	60	"	3.2	3.2	3.9
Example 5	35	25	40	"	2.8	3.2	4.1
Example 6	35	40	25	"	2.9	3.1	3.6
Example 7	35	5	40	"	3.7	3.0	3.9
Example 8	35	20	25	"	3.1	3.0	3.6
Example 9	70	5	25	"	3.5	3.0	3.7
Comparative Example 1	10	—	90	"	4.7	3.8	3.1
Comparative Example 2	50	—	50	"	4.9	3.9	3.2
Comparative Example 3	75	—	25	"	4.3	3.9	2.8
Comparative Example 4	—	30	70	"	5.6	3.4	3.0
Comparative Example 5	80	10	10	"	4.0	3.7	2.1
Comparative Example 6	30	40	30	"	4.2	3.6	2.5
Comparative Example 7	10	80	10	"	5.1	3.3	2.6
Comparative Example 8	35	25	40	No web used	4.8	7.3	1.7
Comparative Example 9	35	25	40	Viscose rayon	5.5	6.1	2.8

We claim

1 An absorbent article comprising (1) an absorbent layer, (2) a barrier covering the lateral faces and underneath face of the absorbent layer (3) a web placed on the top of the absorbent layer and (4) a nonwoven fabric wrapped around the absorbent layer the barrier and the web, characterized in that said nonwoven fabric comprises, based on the weight of the nonwoven fabric, 10 to 70% by weight of a regenerated cellulose fiber 5 to 60% by weight of a polyester fiber and 25 to 75% by weight of a heat-bondable composite polyolefin fiber and said web is predominantly comprised of a polyester fiber

2. An absorbent article according to claim 1 wherein said web is made of polyester fibers and has a basis weight of 10 to 30 g/m²

3. An absorbent article according to claim 1 wherein said web has a density of 0.001 to 0.04 g/cm³

4. An absorbent article according to claim 1 wherein said nonwoven fabric comprises, based on the weight of the nonwoven fabric, 30 to 60% by weight of a regenerated cellulose fiber, 5 to 40% by weight of a polyester fiber and 30 to 65% by weight of a heat-bondable polyolefin composite fiber

5 An absorbent article according to claim 1 or 4 wherein said nonwoven fabric has a basis weight of 10 to 35 g/m²

6. An absorbent article according to claim 1 or 4 wherein said nonwoven fabric has a density of 0.01 to 0.1 g/cm³

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60

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US005728081A

United States Patent [19]

[11] Patent Number 5,728,081

Baer et al.

[45] Date of Patent. Mar. 17, 1998

[54] ABSORBENT COMPOSITE ARTICLE
HAVING FLUID ACQUISITION SUB-LAYER

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[57] ABSTRACT

[21] Appl. No. 680,995

An absorbent article has an absorbent core and a liquid permeable top sheet made of polyolefin material. An acquisition layer is provided between the top sheet and the core. The acquisition layer is a nonwoven fabric made from polyolefin fibers bonded by a cured resin. The acquisition layer has a larger pore size than the top sheet and is treated with a surface active agent to render it hydrophilic.

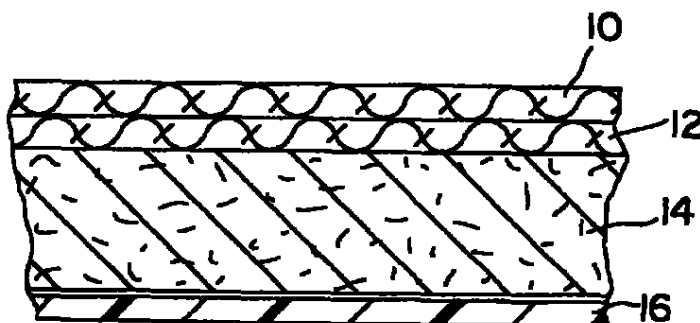
[22] Filed Jul. 16, 1996

[51] Int. Cl.⁶ A61F 13/15, A61F 13/20

[52] U.S. Cl. 604/370; 604/378, 604/367

[58] Field of Search 604/378, 385.1,
604/365 366, 367 368, 370, 375 381
384

14 Claims, 1 Drawing Sheet



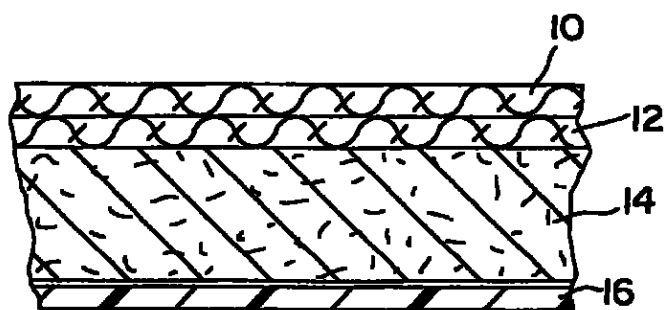


FIG. 1

1

ABSORBENT COMPOSITE ARTICLE HAVING FLUID ACQUISITION SUB-LAYER

BACKGROUND OF THE INVENTION

This invention relates to absorbent composites and more particularly to composites capable of rapidly absorbing liquids, such as disposable diapers or other disposable sanitary products, such as adult incontinence briefs and sanitary pads.

Originally disposable diapers and related absorbent products were made from a top or cover layer of porous fabric, a central layer of liquid absorbing pulp, and an outer layer of impervious film. More recently attempts have been made to reduce the bulk of the core, in order to reduce product thickness, for several reasons, such as reduced shipping cost, reduced storage space, and better conformability of the absorbent article or garment to the body of the user.

A reduced thickness of the core has been accomplished primarily by increasing the density of the cellulose pulp and by adding up to about 40% of a superabsorbing polymer to the core. These changes, however inevitably have led to a reduction in the rate of absorption of liquid into the core, resulting in possible runoff and leakage of liquids.

In more recent times, proposals have been made to insert an additional layer of nonwoven fabric between the absorbent core and the porous top sheet, in order to act as a so-called surge or acquisition layer. The purpose of such layer is to allow rapid absorption and distribution of possibly repeated inputs of liquid and to allow sufficient time for the core to permanently absorb the liquid.

Commercial products such as diapers have employed various types of fabrics as an acquisition layer. Spunbonded fabrics have been employed, but these typically have a relatively small void volume and cannot accept sufficient quantities of liquid to prevent rewetting of the top sheet or leakage. Bulky acquisition layers are employed, which comprise through-air thermally bonded bicomponent fibers, but such a layer adds undesirable bulk to the final product.

Another fabric used as an acquisition layer is a web made from adhesively bonded polyester staple fibers. Although such webs are employed with success, there still remain disadvantages. For example, the typically top sheet is composed of polypropylene fibers and cannot be thermally or sonically bonded to the polyester acquisition layer which has a much higher melting point. Rather, the fabrics must be joined with adhesive, which may possibly decrease liquid transfer rate and add to the cost of manufacture. Also, if dissimilar materials are used in the two layers, used products are difficult to recycle.

SUMMARY OF THE INVENTION

In accordance with the present invention, a nonwoven fabric is prepared from polyolefin staple fibers by application of a suitable curable adhesive, preferably in the form of an aqueous suspension or emulsion. The web is then consolidated by heating the fabric to cure the adhesive and cause point bonding between intersecting fibers. If the web is to be employed as an acquisition layer a surface active agent is either mixed with the adhesive or is subsequently applied to the consolidated fabric in order to render the fabric more hydrophilic.

The present invention also contemplates an absorbent article comprising, in order, a porous top sheet of nonwoven polyolefin material, an acquisition layer made from the above-described web, and an absorbent core. The acquisition

layer has a pore size greater than the top sheet. Also, the top sheet and acquisition layer are thermally compatible and can be, or are, thermally bonded together. For example, the top sheet and acquisition layer may be made from the same type of polyolefin fibers such as polypropylene. The polyolefin fibers in the top sheet have an average diameter of from about seven to twelve microns, with the fabric having a basis weight of from about ten to about forty grams per square meter (gsm). The fibers in the acquisition layer have an average diameter of from about ten to about twenty-four microns and the fabric has a basis weight of from about ten to about one hundred gsm.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic cross sectional view of the liquid absorbing composite of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

As shown in FIG. 1 the basic components of the present invention comprise a porous top sheet 10 of nonwoven polyolefin fibers, an acquisition layer 12 comprising a web of adhesively bonded polyolefin fibers, and a liquid absorbing core 14. In most cases, the article will include an outer liquid impermeable layer 16 such as a film.

The core 14 may comprise fibers capable of absorbing relatively large quantities of liquid, such as cellulose fibers or wood pulp. The core may also comprise polymers capable of absorption of many times by its weight of liquid. These well known superabsorbent polymers may be employed in powdered or fiber form and are well known in the art of absorbent products.

The top sheet 10 and acquisition layer 12 comprise polyolefin fibers which are thermally compatible and which may be heat or ultrasonically bonded together. Suitable polyolefins include polypropylene, polyethylene, polybutylene, copolymers of such polymers and blends thereof. Polypropylene is preferred. Although less preferred, the fabric layers may comprise bi-component or multi-component fibers having an exposed polyolefin component, such as sheath-core or side-by-side bicomponent fibers. As one example, bicomponent fibers having a polyester core and a polypropylene sheath may be employed.

The top sheet 10 may be made by any suitable conventional method for making nonwoven fabrics. One particularly suitable method starts with the carding of polyolefin fibers into a uniform, random web, and then consolidating the fibers. The preferred method of consolidation is by thermal bonding, such as by passing the web through heated calendar rolls one of which is engraved, whereby the fibers are thermally point bonded in a repeating pattern. Other suitable methods include entanglement of the fibers such as by hydroentanglement and through air bonding in which heated air is passed through the unconsolidated web.

The diameter of the fibers and the basis weight of the fabric of top sheet 10 relative to the acquisition layer 12 is very important in order to provide an acceptable rate of transfer of liquid towards and into the core 14. The fibers in the top sheet should have an average diameter of from about seven to about twelve microns, with the fabric having a basis weight of from about ten to about forty gsm. The fibers in the acquisition layer 12 should have an average diameter of from about ten to about twenty-four microns and the fabric should have a basis weight of from about ten to about one hundred gsm.

In addition, the average pore size of the acquisition layer, measured at 0.5 psi is substantially greater than the average

pore size of the top sheet 10. For example, the pore size of the top sheet 10 will typically average in the range of about 20 to 50 microns, whereas the pore size of the acquisition layer will be in excess of 50 microns preferably in the order of about 60 to about 180 microns.

While both the top sheet 10 and acquisition layer 12 may comprise a mixture of fibers including polyolefin fibers at least a majority of the fibers and preferably in excess of 50 to 65% of the fibers will be thermally compatible, so as to be heat sealable.

The acquisition layer 12 is a web comprising adhesively bonded polyolefin fibers, with the web being treated with a surface active agent to render it more hydrophilic, and typically but not necessarily more hydrophilic than the top sheet 10. The web is formed by carding crimped fibers onto a moving support, treating the fibers with a heat curable adhesive, and then heating the web to cure the adhesive. It is important that the adhesive cure at a temperature below the melting temperature of the fibers.

In the preferred embodiment, the adhesive is applied in the form of an aqueous emulsion. The emulsion may be applied by dipping or by other coating methods such as spraying, printing or other techniques. The mount of curable resin applied should be in the order of from about ten to about thirty percent by weight solids based on the weight of the fiber.

Depending on the type of adhesive employed, the resin is cured by application of heat to the adhesively treated web. Resins which are curable or cross linked by radiation may also be employed. Either the web may be passed through an oven, or in the case of the polypropylene web, may be passed over steam cans to cure the resin. As the web is dried, the adhesive tends to accumulate at the points of fiber intersection as it is being cured. Suitable resins or adhesives include, for example, styrene-butadiene, ethylene vinyl acetate, ethylene acrylic acid, polyvinyl acetate, styrene acrylic acid, polyurethane, polyvinyl alcohol and chemically modified starch, as well as terpolymers of the polymers or copolymers, such as styrene-butadiene-acrylic terpolymers.

The curing temperature of the adhesive resin is preferably above 105° C. Also, the curing temperature is preferably at least 5° C below the melting temperature of the fibers in order to prevent any possible thermal deformation of the fibers and fibers sticking to the steam cans. The term "curable or cured" as used herein means that the adhesive is capable of a water resistant bond upon being dried.

The fabric is treated with a surface active agent such as a surfactant to render the web more hydrophilic. The surface agent is applied at a rate of from about 0.1 to about 5 percent by weight of the fibers. Although nonionic surfactants may be employed, anionic surfactants are preferred. The surfactant may be mixed with the aqueous adhesive emulsion prior to application to the web, and in such case, the surfactant must be compatible with the emulsion of latex. Also, at least part of the agent may be applied to the dry web of fibers in the form of an aqueous solution in order to pre-wet the fibers. Another suitable method for application of the surface active agent is application after drying, such as by spraying on an aqueous solution followed by drying.

In order for the acquisition layer to function properly the surface tension of the surfactant should be less than 31 dyne/cm at 25° C. and more preferably less than 28 dyne/cm. The preferred surfactant is a sulfosuccinate and derivatives thereof. Other suitable types include ethoxylated alkylphenols and sorbitan derivatives.

As discussed hereinbefore, the top sheet 10 and the acquisition layer 12 preferably comprise fibers made of the same polymer. For example, if the top sheet 10 is made from a web of thermally bonded polypropylene fibers, the acquisition layer is made from resin bonded polypropylene fibers. This allows the top sheet 10 to be thermally bonded to the acquisition layer by heat or sonic bonding, for example, at spaced locations between the two layers. This feature eliminates the need to apply a separate adhesive between the layers during fabrication of the absorbent article.

The acquisition layer has several advantages over other types which have been proposed or are presently in use. Especially if polypropylene fibers are used in the fabrics of the top sheet and acquisition layer the cost of manufacture is kept as low as possible, since polypropylene has a lower density than many other polymers such as polyester. The two layers being of the same polymer, can be more easily recycled. Also, the acquisition layer of the present invention has a low bulk and can be effectively incorporated into present day ultra thin absorbent products.

What is claimed is

1. An absorbent article comprising a porous top sheet comprising a nonwoven polyolefin fabric, said top sheet having a basis weight of from about 10 to about 40 grams per square meter, an absorbent core, and a porous acquisition layer disposed between said top sheet and said core, said acquisition layer comprising a nonwoven fabric of polyolefin fibers an adhesive bonding said polyolefin fibers together, said acquisition layer having a basis weight of about 10 to about 100 grams per square meter, said acquisition layer having a pore size larger than the pore size of said top sheet and being treated with a surface active agent to render said acquisition layer hydrophilic, said top sheet and said acquisition layer being thermally bonded.

2. The absorbent article of claim 1 wherein the top sheet and the acquisition layer comprise the same polyolefin.

3. The absorbent article of claim 2 wherein said polyolefin is polypropylene.

4. The absorbent article of claim 1 wherein said top sheet is a nonwoven fabric of thermally bonded polyolefin fibers.

5. The absorbent article of claim 1 wherein said top sheet and acquisition layers are thermally bonded in spaced locations.

6. The absorbent article of claim 1 wherein said polyolefin fibers of said acquisition layer comprise bicomponent fibers.

7. The absorbent article of claim 1 wherein said polyolefin fibers of said top sheet comprise bicomponent fibers.

8. The absorbent article of claim 1 wherein said top sheet comprises fibers having a diameter of from about 7 to about 12 microns, and said acquisition layer comprises fibers having a diameter of from about 10 to about 24 microns.

9. The absorbent article of claim 1 wherein said adhesive is present in the mount of from about 10 to about 30% based on the weight of the fibers.

10. The absorbent article of claim 9 wherein said adhesive comprises a styrene butadiene acrylic latex.

11. The absorbent article of claim 9 wherein said adhesive comprises ethylene vinyl acetate.

12. The absorbent article of claim 9 wherein said adhesive comprises ethylene acrylic acid.

13. The absorbent article of claim 1 wherein said surface active agent is a surfactant having a surface tension of less than 31 dyne/cm.

14. The absorbent article of claim 13 wherein said surfactant comprises sulfosuccinates and derivatives thereof.

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