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As 2581/P

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
DIVISIÓN DE NUEVAS CREACIONES
E S. D

Ref Expediente No 03061057
Solicitud de Patente a nombre de
Johnson & Johnson Indústrial Ltda

Yo, **JIMENA ESCOBAR URIBE**, identificada como aparece al pie de mi firma, domiciliada en Bogotá, en la Carrera 11 A No 94-76 Of 305, obrando como apoderada de la sociedad **Johnson & Johnson Indústrial Ltda.**, domiciliada en São José dos Campos, São Paulo, Brasil, solicitante de la patente de la referencia, pido a usted que se proceda a examinar si la invención, cuya patente se tramita en el expediente de la referencia, es patentable

Adjunto al presente memorial el recibo No 04 - 65,082 de agosto 18, 2004, por la suma de $353 000 oo, con lo cual queda cubierta la tasa oficial correspondiente a dicho estudio

Señor Superintendente,

JIMENA ESCOBAR URIBE
C C 39 779 452 de usaquén
T P 68 228
Cod 5376

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SUPERINDUSTRIA Y COMERCIO
Radicacion : 03061857 00000004 Folios: 2
Fecha (MM): 2004-09-02 16:23:52
Tramite 802 PATENTES D 1 REGISTRO/ 538 PETICION
Dependencia 2020 DIVISION DE NUEVAS CREACIONES

NIT : 800176089-2

RECIBO OFICIAL DE CAJA : 04 - 45 092
FECHA : AGOSTO 18 DE 2004

C O N S I G N A C I O N

DEPOSITANTE	TIPO PAGO	BANCO	CUENTA	No PAGO	FECHA PGO	Vr PAGO
ESCOBAR URIBE ASOCIADOS	CONSIGNACION	BANCO POPULAR	050-00110-6	23207647	18/08/2004	8,032 000

C O N C E P T O

CANT	REMITISTICO	CONCEPTO	TOTAL CONCEPTO
1	50005-01-01 SOLICITUDES	85 EXAMEN DE PATENTABILIDAD DE INVEN	333,000 00
		TOTAL : $	333 000 00

TRESCIENTOS CINCUENTA Y TRES MIL PESOS

RESPONSABLE : _____

RECIBO DE CAJA APLICADO AL EXPEDIENTE No _____

Industria y Comercio
SUPERINTENDENCIA

DIVISION DE NUEVAS CREACIONES

RADICACIÓN EXPEDIENTE No **03- 61057**

EL EXTRACTO DE LA PRESENTE SOLICITUD DE **PATENTE DE INVENCION** FUE PUBLICADO

EN LA GACETA DE PROPIEDAD INDUSTRIAL No **539**, DE FECHA **30** DE **ABRIL** DE **2004**, EL

TERMINO HABIL SEÑALADO POR LA LEY EXPIRA EL **02** DE **AGOSTO** DE **2004**

NOTA. Dentro del plazo de los seis (6) meses siguientes a partir de la fecha de publicación en la gaceta de Propiedad Industrial, deberá solicitar y cancelar el examen de patentabilidad so pena de que la solicitud caiga en abandono, de acuerdo con lo establecido en el Artículo 44 de la Decisión 486/2000

SE PRESENTARON OPOSICIONES POR PARTE DE TERCEROS

SI ___ _____ NO ___ **X** _____

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SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
DIVISION DE NUEVAS CREACIONES

2020
Bogotá, D C , 29 de marzo de 2006

Doctora
JIMENA ESCOBAR URIBE
Apoderada

Oficio No 3965

ASUNTO

Radicación	**03-61057**
Trámite	002
Evento	001
Actuación	430
Folios	011

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

- Para el presente estudio se tuvo en cuenta el capítulo descriptivo que se encuentra en los folios 5 a 19, los dibujos que se encuentran en los folios 99 a 102 y el capítulo reivindicatorio que se encuentra en los folios 20 y 21 que comprende ocho (8) reivindicaciones

- Se considerará la prioridad reivindicada sobre la solicitud de Brasil No PI0202912 – 0 del 19 de julio de 2002

2 Objeto de la invención

- La invención propuesta se refiere a un producto absorbente, particularmente para la absorción de exudados corporales, que presenta propiedades tales como velocidad de absorción de líquido, capacidad de absorción de impacto e integridad del núcleo absorbente, que están mejoradas significativamente con respecto a los productos existentes

  En la **reivindicación independiente 1** se define un producto absorbente, particularmente para la absorción de exudados corporales, que comprende una hoja interna (2) para ser colocada junto al cuerpo del usuario, una hoja externa (4) para ser colocada junto a la ropa interior del usuario, y un nucleo absorbente (3) colocado entre dicha cara externa y dicha cara interna (2, 4), el núcleo absorbente estando comprendido por una capa de transferencia (5) hecha de un material absorbente, **caracterizado porque** la capa de transferencia (5) comprende un material polimérico y presenta un gramaje sustancialmente entre 8 y 20 g/m^2, y comprende, adicionalmente, por lo menos un elemento tensioactivo permanente

- Con la finalidad de mejorar la velocidad de incorporación de fluido hacia los núcleos absorbentes, la capa de transferencia ha sido incorporada crecientemente en las estructuras absorbentes entre la capa interna permeable a líquido y el núcleo absorbente Para mejorar el rendimiento del producto absorbente con respecto a los productos que contienen papel de seda, se han usado redes hechas de fibras sintéticas de alto Denier, tales como polipropileno, poliéster y similares, que son aglutinadas y termoformadas a fin de producir una capa de gramaje alto, densidad baja y porosidad alta, que permite una rápida penetración de líquido Esta solución por lo general da buenos resultados, sin embargo, debido al alto costo de los materiales usados y a modificaciones en el proceso de fabricación para esta aplicación, el problema no está resuelto a un costo compatible con los productos de precio bajo y penetración de mercado alta, particularmente en los países en donde la mayor parte de la población tiene ingresos salariales bajos

- El objeto de la invención definido se catalogó como **A61F 13/15**, según la Clasificación Internacional de Patentes (IPC)

3 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 esté incluido en la solicitud de fecha anterior cuando ella se publique o hubiese transcurrido el plazo previsto en el artículo 40 "

- Se consultaron las bases de datos con que cuenta y tiene acceso la entidad y se consideró el **19 de julio de 2002** como fecha para investigar el estado de la técnica

- De acuerdo con lo establecido en el artículo 16 se determinó el estado de la técnica y se encontraron los siguientes antecedentes

No	Documento No	Título	Fecha de Publicación
1	US5458592	"THERMOPLASTIC FIBROUS NONWOVEN WEBS FOR USE AS CORE WRAPS IN ABSORBENT ARTICLES"	17 de octubre de 1995
2	US5300054	"ABSORBENT ARTICLE HAVING RAPID ACQUIRING, WRAPPED MULTIPLE LAYER ABSORBENT BODY"	5 de abril de 1994

4. 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 de 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

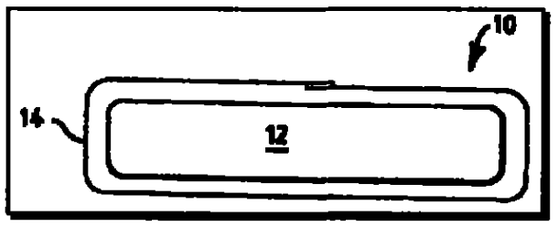
Evaluación de la Novedad

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 publico 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 esté incluido en la solicitud de fecha anterior cuando ella se publique o hubiese transcurrido el plazo previsto en el artículo 40 "

Respecto al estado de la técnica

- En el documento **US5458592** (llamado D1 de aquí en adelante) se divulga la existencia de un artículo absorbente con un cuerpo absorbente que está envuelto en un tisu elaborado de una tela no tejida fibrosa termoplástica como se observa en la siguiente figura



En D1 se enseña que la envoltura puede ser de una tela no tejida fibrosa de polipropileno cuyo peso base puede ser de 8 g/m^2, 11 g/m^2, 9 8 g/m^2, 12 2 g/m^2, 14 2 g/m^2 o 15 g/m^2 como se muestra en los ejemplos Además de esta característica se menciona que la envoltura es tratada con un surfactante no iónico tal como octilo fenoxi polietoxi etanol

Respecto a la solicitud en estudio

- De acuerdo con la reivindicación independiente 1, el producto absorbente para la absorción de exudados corporales está caracterizado por las particularidades propias de la capa de transferencia

La parte caracterizante de la reivindicación citada menciona que la capa de transferencia comprende un material polimérico y presenta un gramaje sustancialmente entre 8 y 20 g/m^2, y comprende, adicionalmente, por lo menos un tensioactivo permanente No obstante, D1 divulga una envoltura para un cuerpo absorbente, que también es de un material polimérico como lo es el polipropileno revelado en los ejemplos de la invención de dicha anterioridad, también el gramaje se encuentra en el intervalo propuesto por la solicitud, ya que en D1 se mencionan valores tales como 8 g/m^2, 11 g/m^2, 9 8 g/m^2, 12 2 g/m^2, 14 2 g/m^2 o 15 g/m^2 y finalmente, también se divulga en D1 la adición de un tensioactivo como lo es un surfactante

- En la reivindicación dependiente 4 se especifica que la capa está elaborada en polipropileno, detalle que también se revela en los ejemplos de D1

- En la reivindicación dependiente 5 se especifica que la capa está hecha de material absorbente que presenta un gramaje sustancialmente entre 8 y 12 g/m^2, pero en D1 también se reportan gramajes que caen dentro del mismo intervalo

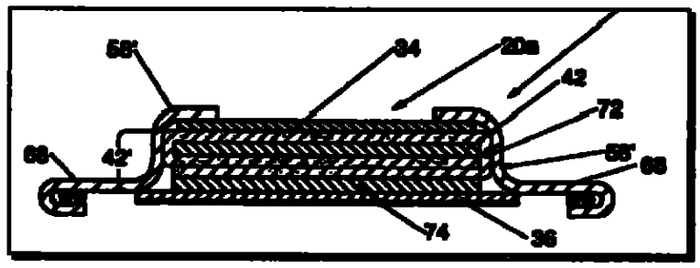
- En conclusión, la invención definida en las reivindicaciones 1, 4 y 5, se encontraría afectada en el requisito de novedad de acuerdo con el art 16 de la Decisión 486

Evaluación del Nivel Inventivo

El artículo 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 la materia técnica correspondiente, esa invención no hubiese resultado obvia ni se hubiese derivado de manera evidente del estado de la técnica "

Respecto al estado de la técnica

- En el Documento **US5300054** (llamado de aquí en adelante D2) se divulga un artículo absorbente que tiene una rápida adquisición de fluidos Este artículo absorbente presenta un cuerpo absorbente multicapas envuelto en una película tal como se muestra en la siguiente figura



Respecto a la solicitud en estudio

- El técnico de nivel medio versado en la materia encargado de resolver el problema técnico puede ser un ingeniero químico que labore en la industria de artículos absorbentes y que atiende a planes de mejoramiento continuo normalmente formulados por las empresas

- En las reivindicaciones dependientes 2 y 3 de la solicitud en estudio se realiza una especificación de la disposición de la capa de transferencia y se menciona que presenta una primera región de traslape sobre la cual está provista una segunda región de traslape, particularmente que el traslape de la primera y segunda región de traslape configura una doble capa de material absorbente No obstante, D1 o D2 presentan enseñanzas sobre dicha especificación, de lo cual se puede concluir que tal característica de traslapar los bordes de la capa de envoltura en un área definida, es algo convencional De hecho dicha característica podría ser una modificación de la invención de D1

- En las reivindicaciones dependientes 6 a 8 se especifica la cantidad de tensioactivo añadido No obstante, un técnico de nivel medio versado en la materia que conoce la posibilidad de incluirlos en las capas de envoltura como se demuestra con D1, tiene los suficientes conocimientos básicos como para realizar ensayos de rutina y así determinar la cantidad más adecuada para favorecer la transferencia al interior del cuerpo absorbente

- Dado lo anterior, las especificaciones de disposición de la capa de transferencia que envuelve el cuerpo absorbente y la cantidad de tensioactivo son características convencionales y que pueden ser derivadas del arte previo por parte de un técnico de nivel medio versado en la materia

- Así las cosas, proponer un producto absorbente que incluya una capa de transferencia que envuelve un cuerpo absorbente de la forma como se expresa en las reivindicaciones de la solicitud no parece generar un efecto sorprendente que evidencie un salto tecnológico sobre lo conocido en el estado de la técnica

- Por lo anteriormente expuesto, la invención especificada por las reivindicaciones 2, 3, 6 a 8 de la solicitud, podría verse afectado en su nivel inventivo ya que se deriva de manera evidente del estado de la técnica y puede ser obvia para un técnico de nivel medio versado en la materia Por tanto, no cumpliría con las disposiciones del artículo 18 de la Decisión 486 de la Comisión de la Comunidad Andina

- Los requisitos de patentabilidad de la presente solicitud se encuentran afectados así

No	Documento	Reivindicaciones Afectadas	Requisito que afecta
1	US5458592	1, 4 y 5 6 – 8	Novedad Nivel Inventivo
2	US5300054	2, 3	Nivel Inventivo

Se anexan los apartes principales de las anterioridades en el documento adjunto

En cumplimiento del artículo 45 de la Decisión 486 de la Comisión de la Comunidad Andina, se le indica que debe dar respuesta dentro del término de sesenta días contados a partir de la fecha de notificación de la presente comunicación 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

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Notifíquese el presente oficio conforme a lo dispuesto en el numeral 5 2, literal e), del capítulo quinto del título primero de la circular única No 10 de 2001

ALIX CARMENZA CESPEDES DE VERGEL
Jefe de División de Nuevas Creaciones

El anterior requerimiento fue notificado por fijación en lista, de fecha 06 ABR. 2006

CONCEPTO TECNICO No 485	EXAMINADOR TECNICO Código No 202042

US005458592A

United States Patent [19]

Abuto et al.

[11] Patent Number: 5,458,592

[45] Date of Patent: Oct. 17, 1995

[54] **THERMOPLASTIC FIBROUS NONWOVEN WEBS FOR USE AS CORE WRAPS IN ABSORBENT ARTICLES**

[75] Inventors: Frank P Abuto, Alpharetta; Richard J Schmidt, Roswell, Patrick E. O'Brien, Woodstock, all of Ga. Michael W Veith, Oshkosh, Anthony J Wisneski, Kimberly, both of Wis.

[73] Assignee: Kimberly-Clark Corporation, Neenah, Wis.

[21] Appl. No.: 269,261

[22] Filed: Jun. 30, 1994

[51] Int. Cl.[6] A61F 13/15

[52] U.S. Cl. 604/378; 604/367 604/385.1, 156/167

[58] Field of Search 604/365, 367 604/366, 378 385 1 156/167

[56] References Cited

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2151272B	7/1985	United Kingdom

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NRL Report 4364, "Manufacture of Super-Fine Organic Fibers" by V A. Wendt, E. L. Boone and C. D. Fluharty, May 25, 1954 pp. 1–15.

NRL Report 5265, "An Improved Device For The Formation of Super-Fine Thermoplastic Fibers" by K. D. Lawrence, R. T Lukas and J A. Young, Feb. 11 1959 pp. 1–8.

ASTM D 5035–90—Standard Test Method For Breaking Force and Elongation of Textile Fabrics, Annual Book of ASTM Standards, vol 7.01 pp. 726–731 Jan. 26, 1989

ASTM F 316–86—Standard Test Method For Pore Size Characteristics of Membrane Filters by Bubble Point and Mean Flow Pore Test, Annual Book of ASTM Standards, vols. 11.01 and 14.02, Apr. 1986, pp. 818–823

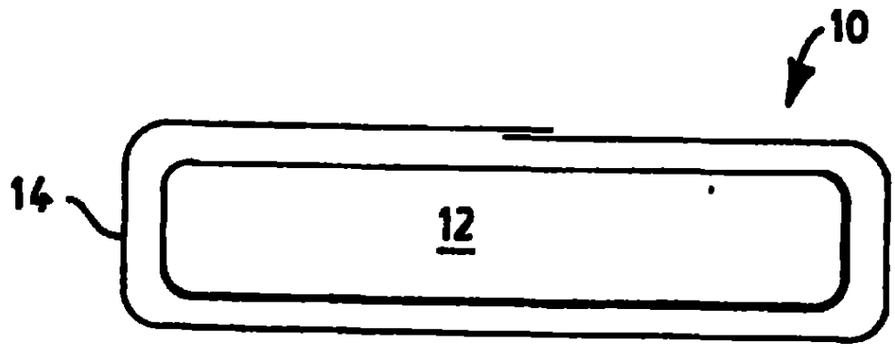
Federal Test Method Std. No. 191A–Method 5450—Permeability To Air; Cloth. Calibrated Orifice Method, Jul. 20, 1978.

Primary Examiner—Randall L. Green
Assistant Examiner—Dennis Ruhl
Attorney, Agent, or Firm—Patrick C. Wilson

[57] **ABSTRACT**

The present invention is directed to an absorbent article with a tissue-wrapped absorbent core wherein the tissue is made from a specifically designed thermoplastic fibrous nonwoven web which is particularly well-suited to trapping and retaining particulate material such as superabsorbent particles. The invention has particular application in conjunction with personal care products such as diapers, training pants, incontinence garments, sanitary napkins, bandages and the like.

16 Claims, 5 Drawing Sheets



THERMOPLASTIC FIBROUS NONWOVEN WEBS FOR USE AS CORE WRAPS IN ABSORBENT ARTICLES

FIELD OF THE INVENTION

The present invention is directed to an absorbent article with a tissue-wrapped absorbent core for use in personal care absorbent products and the process for making such meltblown tissue wrapped absorbent cores. The tissue wrap is made from thermoplastic fibers.

BACKGROUND OF THE INVENTION

The designs of personal care absorbent products have gone through extensive changes in recent times. Personal care absorbent products include such items as diapers, training pants, incontinence garments, sanitary napkins, bandages and the like. A major thrust in the design of these products, especially with diapers, training pants, incontinence garments and sanitary napkins, has been a reduction in the size of the products while increasing their absorptive capacity. Greater and greater usage of superabsorbents has made this possible.

Using diapers as an example, originally diapers were very thick in design due to the high volumes of fluff or wood pulp used to form the absorbent core of the diaper. As a result, the diapers were very bulky and they tended to leak because, as the absorbent fluff was wetted with urine, the fluff tended to collapse. Typically the fluff used in such personal care absorbent products had a liquid gram per gram capacities of 4 to 20 grams of aqueous liquid absorbed per gram of fluff. In addition, this capacity was dependent upon the amount of pressure being applied to the wet fluff. For example, at a pressure of 0.5 pounds per square inch (psi) the fluff would only hold approximately 7 grams per gram. At 0.1 psi the capacity would increase to approximately 12 grams per gram and at zero psi the capacity would be approximately 20 grams of liquid per gram of fluff.

With the advent of superabsorbents and their incorporation into absorbent cores, the size of the absorbent cores have been reduced. Initial superabsorbents had gram per gram capacities in the range of 50 grams per gram but the particles became very mushy when wet and would often cause gel blocking. Today, superabsorbents have higher absorbency while under load but to do this, many of the superabsorbents have had their capacities reduced to around 35 grams per gram. The first commercial diapers using superabsorbents incorporated from about 10 to 20 percent by weight superabsorbent, based upon the total weight of the absorbent core. The superabsorbent particles, which typically had 20 to 1,000 micron diameters, were contained within the absorbent cores through mechanical entanglement with the wood pulp fibers. In addition, paper tissue was sometimes wrapped around the superabsorbent-containing batts and sometimes the tissue was glued to itself and/or the fluff to further encapsulate and retain the fluff and superabsorbent.

Today personal care absorbent products such as diapers have greatly reduced their thickness by removing large quantities of the fluff and replacing it with higher and higher percentages of superabsorbent particles. Some of the diapers today have absorbent cores with over 40 percent superabsorbent. Oftentimes the absorbent cores are compressed to further reduce their thickness after adding the tissue wrap. As a result, while old fluff cores tended to collapse when

wetted, the new absorbent cores with superabsorbent tend to swell as they are wetted. This swelling coupled with the twisting and flexing the absorbent core experiences during use, can cause the paper tissue wrap to rip and tear, especially when wetted. When this happens, there is a greater chance that the superabsorbent will escape from the diaper. While this is not dangerous, it is not desirable from an overall product performance standpoint.

In the dry state, there is also greater potential for loss of the superabsorbent from the absorbent core as the percentages of superabsorbent are increased. With less fluff in the core, there is less mechanical entrapment of the fibers. Thus, if there is a rip in the paper tissue wrap or a portion of the glued seam becomes separated, there is a higher likelihood that some of the superabsorbent particles will escape. An even bigger problem is that the pores in many paper tissue wraps are too big and therefore allow the superabsorbent to escape. Consequently there is a need for a more effective way of encapsulating the absorbent core.

From a processing standpoint there are also problems. Gluing a paper tissue wrap is messy and adds cost. Shake out of the superabsorbent particles can also cause equipment and housekeeping problems and higher production costs due to wasted material. As a result, there is a need for an improved absorbent core/wrap for uses such as in personal care absorbent products.

SUMMARY OF THE INVENTION

The present invention is directed to an absorbent article with a tissue-wrapped absorbent core made from thermoplastic fibers for use in personal care absorbent products such as diapers, training pants, incontinence garments, sanitary napkins, bandages and the like. The core wrap is made from a fibrous nonwoven web comprising a plurality of thermoplastic fibers. The core wrap has a plurality of pores with a mean flow pore size less than about 30 microns and wherein no more than 5 percent of the plurality of pores have a pore size greater than 50 microns. The core wrap has a wet to dry tensile strength ratio at peak load in the machine direction or the cross-machine direction of 0.5 or greater. In addition, the core wrap has a Frazier air permeability of at least 200 cubic feet per square foot per minute, a machine direction elongation at peak load of 30 percent or less, and a cross-machine direction elongation at peak load of 40 percent or less. The fibrous nonwoven core wrap is used to envelope an absorbent core including particulate superabsorbent. Due to the nature of the construction of the core wrap, less than 60 milligrams of shake up of particulate superabsorbent will occur. In addition, if so desired, the absorbent core may contain a plurality of fibers which are thermally bondable to the fibrous nonwoven web core wrap. To insure the proper retention of the particulate superabsorbent, it is desirable that at least 85 percent of the plurality of fibers forming the core wrap have fiber diameters of 8 microns or less and more desirably where at least 95 percent of such fibers have fiber diameters of 7 microns or less. Where particularly fine superabsorbent particles are being used, it is desirable that the plurality of pores in the fibrous nonwoven web core wrap with pore sizes greater than 50 microns be restricted to one percent or less.

The absorbent article including the fibrous nonwoven web core wrap and an absorbent core including particulate superabsorbent may be used by itself as a finished product or it may be incorporated into a personal care product. Such personal care products typically include a top sheet and a

Packet Shake-Out Test

A second method of testing was also used to determine particle shake-out from the absorbent core wraps. This test was used with respect to Examples 1 through 4 and 9. To perform the test an 8 inch by 4 inch sample of the core wrap was cut. Next 0.5 grams of Dow 534 particulate superabsorbent from the Dow Chemical Company was placed on top of the sample and the sample was folded over onto itself to cover the superabsorbent and form a 4 inch by 4 inch packet. The superabsorbent particles ranged in size from 88 to 149 microns. All four sides of the packet were then taped to a piece of plastic film. The tape overlapped approximately 0.25 inch the packet periphery. The sample and film were then inverted (packet side down) and the combination was attached to a Model RX-24 Shaker from the Tyler Company. Below the sample there was placed a tared pan of sufficient size to collect any superabsorbent shake-out. The shaker was turned on and operated for a period of five minutes. The shaker operated at approximately 520 cycles per minute with a 0.5 inch stroke. After five minutes the shaker was turned off and the pan was reweighed. The difference between the collected weight and the tared weight represented the amount of shake-out.

EXAMPLES

Example 1

A polypropylene meltblown fibrous nonwoven web core wrap was made using Himont PF-015 polypropylene polymer from Himont, USA of Wilmington, Del. The meltblown core wrap was made in accordance with meltblowing teachings described above utilizing a two bank meltblown apparatus. The polypropylene was extruded through the two bank meltblown die assembly at a throughput of 2.5 pounds per inch per hour (PIH). The extruded streams of molten polymer were attenuated with primary attenuation air delivered at a rate of between about 1700 and 2000 cubic feet per minute at a temperature of 530° F. The resultant meltblown core wrap had a basis weight of 8.0 grams per square meter (gsm) and was treated with Triton X-102 surfactant octylophenoxypolyethoxyethanol nonionic surfactant from Union Carbide Chemicals and Plastics Company, Inc. Industrial Chemicals Division of Danbury, Conn.

The core wrap had dry machine direction (MD) and cross-machine direction (CD) tensile strengths measured at peak loads of 1010 grams and 514 grams respectively and machine direction and cross-machine direction elongations at peak load of 16 and 33 percent respectively. The wet machine direction and cross machine direction tensile strengths at peak load were 998 grams and 554 grams respectively. The wet to dry tensile strength ratios in both the machine and cross machine directions were respectively 0.99 and 1.08. Ratios were determined by dividing wet and dry values for respective MD and CD directions. The mean flow pore size for the sample was 25 microns and the maximum flow pore size was 47 microns with 0.5 percent of the overall pores having a pore size greater than 50 microns. The core wrap had a Frazier air permeability of 361 cubic feet per square foot per minute. A sample of the meltblown core wrap was subsequently made into a packet and filled with 0.5 grams of Dow 534 type superabsorbent from the Dow Chemical Company of Midland, Mich. with particle sizes ranging between 88 and 150 microns in diameter. The packet was subjected to the packet shake test procedure as outlined above and the fallout was measured to be 2.7 milligrams as compared to 395 milligrams of fall-out for the same superabsorbent when placed within a packet made from standard paper tissue core wrap material.

Example 2

In Example 2 a polypropylene meltblown fibrous nonwoven web core wrap was made using the same polymer and surfactant treatments as listed above with respect to Example 1. The meltblown web was made using three banks of meltblown dies delivering polymer at a rate of 3.5 pounds per inch per hour (PIH) with the primary attenuation airflow remaining the same as that in Example 1. The resultant web had a basis weight of 11.0 grams per square meter. The core wrap had a dry machine direction tensile strength at peak load of 1391 grams. The mean flow pore size was 23 microns and the maximum flow pore size was 40 microns with zero percent of the pores being greater than 50 microns. Frazier air permeability was measured to be 250 cubic feet per square foot per minute. The meltblown core wrap was subsequently made into a packet and filled with 0.5 grams of the same Dow 534 type superabsorbent as mentioned in Example 1. The packet was then subjected to the shake test and fall out was measured to be 5.0 milligrams.

Example 3

In Example 3 an 8.0 gram per square meter basis weight polypropylene meltblown absorbent core wrap was made using the same polymer as in the previous examples. The core wrap had a dry MD tensile strength at peak load of 914 grams, a mean pore flow size of 24 microns and the maximum flow pore size was 40 microns with zero percent of the pores being greater than 50 microns. The Frazier air permeability was 327 cubic feet per square foot per minute and the core wrap had 1.1 milligrams of shake-out using the packet shake-out test.

Example 4

In Example 4 the same Himont polypropylene polymer was used to make a meltblown absorbent core wrap with a basis weight of 8.8 grams per square meter. The core wrap had an average fiber diameter of 2.4 microns, dry MD and CD tensile strengths at peak load of 844 and 382 grams, respectively and MD and CD elongations of 15 percent and 11 percent, respectively. Mean flow pore size was 22 microns and the maximum flow pore size was 34 microns. The Frazier air permeability was 484 cubic feet per square foot per minute and the packet shake-out test yielded 0.4 milligrams of superabsorbent.

Example 5

In Example 5 a meltblown absorbent core wrap was made with the same Himont polypropylene polymer. Processing conditions included a throughput of 1.5 pounds per inch per hour with the use of attenuating air flowing at a rate of 580 cubic feet per minute at a temperature of 490° F. The forming distance between the meltblown die tip and the forming surface was 9.5 inches and the forming wire onto which the web was deposited was traveling at a rate of 204 feet per minute. The sample had a basis weight of 7.2 grams per square meter with an average fiber diameter of 2.6 microns with 97 percent of the fibers having fiber diameters below 7 microns. The wet and dry MD peak load tensile strengths were 556 grams and 584 grams respectively and the wet and dry CD peak load tensile strengths were 251 grams and 231 grams respectively. As a result, the wet to dry

strength ratios in both the MD and CD directions were 0.95 and 1.09 respectively. The absorbent core wrap had dry elongation at peak load percentages in the MD and CD directions of 6 and 10 percent respectively. Frazier air permeability was measured to be 492 cubic feet per square foot per minute. Using the above described Coulter porometer pore size test, the mean flow pore size of the meltblown core wrap was 26 microns. Less than 5 percent of these pores were larger than 50 microns. Using the shake box shake-out test described above, the sample was found to have a shake out of 2.0 milligrams of superabsorbent. A comparative diaper tissue sample used by Kimberly-Clark Corporation will generally have MD and CD wet and dry peak load tensile strength ratios much less than 0.5 in either direction. The Frazier air permeability of such a paper tissue wrap was measured to be 473 cubic feet per square foot per minute and it had an average superabsorbent shake out of 264 milligrams.

Example 6

In Example 6 a meltblown absorbent core wrap was made in the same fashion as that of Example 5 except that the basis weight was increased to 9.8 grams per square meter. The sample had an average fiber diameter of 3.7 microns with 95 percent of the fibers having fiber diameters below 7 microns. The sample had wet MD and CD peak load tensile strengths of 884 grams and 407 grams respectively. The dry MD and CD peak load tensile strengths were 871 grams and 407 grams respectively and the wet to dry strength ratio in the MD and CD directions were 1.01 and 1.0 respectively. The sample had elongations at peak load of 7 percent in the machine direction and 13 percent in the CD direction. The Frazier air permeability was 397 cubic feet per square foot per minute and the Coulter porometer mean flow pore size was 27 microns. Less than 5 percent of the pores were larger than 50 microns. Using the same shake out test as that for Example 5, the material in Example 6 had no measurable superabsorbent shake out.

Example 7

In Example 7 the meltblown absorbent core wrap was also produced with the same polymer and in the same manner as the previous two examples except that the basis weight was further increased to 12.2 grams per square meter. The average fiber diameter was 4.3 microns with 89 percent of the fibers having fiber diameters less than 7 microns. The sample material had wet MD and CD peak load tensile strengths of 1092 grams and 542 grams respectively. The dry values were 1065 grams in the MD direction and 519 grams in the CD direction. The wet to dry strength ratio in the MD direction was 1.03 and 1.04 in the CD direction. The MD and CD elongation values at peak load were 5 percent and 12 percent respectively and the Frazier air permeability was measured to be 317 cubic feet per square foot per minute. The Coulter porometer mean flow pore size was 28 microns and less than 5 percent of the pores were larger than 50 microns. Shake out using the same test as with respect to Examples 5 and 6 was less than 0.1 milligrams of superabsorbent.

Example 8

In Example 8, the basis weight of the polypropylene meltblown absorbent core wrap was increased to 14.2 grams per square meter with the average fiber diameter being 4.0 microns. The dry MD and CD peak load tensile strengths were 1221 grams and 517 grams respectively and the wet MD and CD peak load tensile strengths were 1238 grams and 530 grams respectively. The ratio of wet to dry strength peak load tensile strengths in the MD and CD directions were 1.01 and 1.03 respectively. The elongation of the sample in the machine direction at peak load was 4 percent and in the cross-machine direction was 6 percent. The Frazier air permeability of the sample was 265 cubic feet per square foot per minute and the Coulter porometer mean flow pore size was 29 microns. Less than 5 percent of these pores were larger than 50 microns. The sample exhibited a shake out of 1.8 milligrams of superabsorbent using the same test procedure as was used for Examples 5 through 7.

Example 9

In Example 9 the same type of meltblown nonwoven web was formed as with the previous examples using the same polymer type. The resultant core wrap had a basis weight of 15.0 grams per square meter and the average fiber diameter was 2.8 microns. The dry MD and CD tensile strengths at peak load were 1512 grams and 701 grams respectively and the MD and CD elongations were 20 and 35 percent. Mean flow pore size was 20 microns and the maximum flow pore size was 31 microns. The Frazier air permeability was 214 cubic feet per square foot per minute and the packet shake-out superabsorbent weight was 6.8 milligrams.

The same material was also used to wrap an absorbent core of 10 grams of the Dow 534 superabsorbent and 10 grams of Kimberly-Clark CR-54 fluff to form an absorbent article. This absorbent article was in turn incorporated into a diaper construction in between a liquid pervious top sheet/body side liner and a bottom sheet or outer cover.

Examples 1 through 9 illustrate several important features of the present invention. The core wrap must provide adequate superabsorbent particle containment yet the same core wrap must provide sufficient air permeability to allow formation of the absorbent core. The examples demonstrate that excellent superabsorbent containment can be achieved with core wrap materials with basis weights of 15 grams per square meter and lower. Generally, this was found to be more achievable if the fiber diameter of the fibers was maintained below 8 microns and the mean flow pore size was maintained below 30 microns. Higher basis weight materials can also be used but this adds additional cost to the overall structure. In addition, higher basis weights can tend to reduce the Frazier air permeability of the material. Frazier air permeability values below 200 cubic feet per square foot per minute make it difficult to form the absorbent core onto the core wrap material.

Having thus described the invention in detail, it should be apparent that various modifications and changes can be made to the present invention without departing from the spirit and scope of the following claims.

We claim:

1. An absorbent article comprising:

an absorbent core including particulate superabsorbent and

a fibrous nonwoven web core wrap for containing said particulate, said core wrap comprising a plurality of thermoplastic fibers, said core wrap having a plurality of pores with a mean flow pore size less than about 30 microns and wherein no more than five percent of said plurality of pores have a pore size greater than 50 microns, said core wrap having a wet to dry strength ratio in the machine direction or the cross-machine

US005300054A

United States Patent [19]

Feist et al.

[11] Patent Number: 5,300,054

[45] Date of Patent: Apr. 5, 1994

[54] ABSORBENT ARTICLE HAVING RAPID ACQUIRING, WRAPPED MULTIPLE LAYER ABSORBENT BODY

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[21] Appl. No.: 911

[22] Filed: Jan. 6, 1993

Related U.S. Application Data

[63] Continuation of Ser. No. 926,183, Aug. 7, 1992, abandoned, which is a continuation of Ser. No. 637,571, Jan. 3, 1991 abandoned.

[51] Int. Cl.[5] A61F 13/15; A61F 13/20

[52] U.S. Cl. 604/378; 604/358; 604/368; 604/385.1

[58] Field of Search 604/358, 366-370, 604/374, 378-384, 385.1

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[57] ABSTRACT

An absorbent article, such as a disposable diaper, adult incontinent article, sanitary napkin, and the like, is disclosed which has a rapid acquiring, wrapped multiple layer absorbent body in an absorbent core. The absorbent article of the present invention comprises a liquid pervious topsheet, a liquid impervious backsheet, and an absorbent core positioned between the topsheet and the backsheet. The absorbent core comprises a multiple layer absorbent body comprising at least one rapid acquiring acquisition/distribution layer and at least one storage layer positioned subjacent each acquisition layer. The storage layers at least partially comprise a "high-speed" absorbent gelling material. A fluid transporting wrapping at least partially surrounds the multiple layer absorbent body to form a wrapped multiple layer absorbent body. Another storage layer is subjacent the wrapped multiple layer absorbent body. A multiple layer absorbent core for an absorbent article is also disclosed.

16 Claims, 4 Drawing Sheets