

Señores
Superintendencia de Industria y Comercio
División de Nuevas Creaciones
E. S. D.

72
SUPERINDUSTRIA Y COMERCIO
Radicación : 02999031 00000004 Folios: 2
Fecha (VNO): 2004-07-14 15:41:15
Trámite : 002 PATENTES D 1 REGISTRO/ 538 PETICION
Dependencia: 2000 DIVISION DE NUEVAS CREACIONES

Ref: Expediente No 02-099.031

Solicitud de Patente de Invención denominada
"Proceso para fabricar un artículo absorbente
desechable con canales de distribución-contención"
Solicitante: Grupo P.I. Mabe, S.A. de C.V.

Darío Cárdenas Navas, identificado como aparece al pie de mi firma y obrando en mi condición de apoderado de la sociedad Grupo P.I. Mabe, S.A. de C.V., solicitante de la patente de invención mencionada en la referencia, solicito al Despacho se sirva proceder con el examen de patentabilidad de esta patente. Para tal fin adjunto el recibo oficial No 04-49,878 del 24 de Junio de 2004 por un valor de \$353.000.00.

En consecuencia solicito al despacho se sirva proceder con el mencionado examen de patentabilidad.

Atentamente,



Darío Cárdenas Navas
C.C 17.066.629 de Bogotá
T.P. 1.250 del Consejo Superior de la Judicatura
Fol No P-200

SUPERINDUSTRIA Y COMERCIO
Radicación : 82999031 00000004 Folios: 2
Fecha (AV): 2004-07-14 15:41:15
Tramite : 002 PATENTES D 1 REGISTRO/ 538 PETICION
Dependencia: 2020 DIVISION DE NUEVAS CREACIONES

NIT : 800176089-2

RECIBO OFICIAL DE CAJA : 04 - 49,978
FECHA : JUNIO 24 DE 2004

***** CONSIGNACION *****

DEPOSITANTE	TIPO PAGO	BANCO	CUENTA	No. PAGO	FECHA PAGO	Vr. PAGO
CARDENAS Y CARDENAS P.I.	CONSIGNACION	BANCO POPULAR	050-00110-6	28716312	24/06/2004	11,189,000.00

***** CONCEPTO *****

CANT.	RENTISTICO	CONCEPTO	TOTAL CONCEPTO
1	50005-01-01	SOLICITUDES	
		85 EXAMEN DE PATENTABILIDAD DE INVEN	353,000.00
		TOTAL :	\$ 353,000.00

SON: TRESCIENTOS CINCUENTA Y TRES MIL PESOS

RESPONSABLE : _____

RECIBO DE CAJA APLICADO AL EXPEDIENTE No. 02-099.03

CARDENAS Y CARDENAS
ABOGADOS

DIVISION DE NUEVAS CREACIONES

RADICACIÓN EXPEDIENTE No. 02- 99031

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

EN LA GACETA DE PROPIEDAD INDUSTRIAL No 540, DE FECHA 31 DE MAYO DE 2004, EL

TERMINO HABIL SEÑALADO POR LA LEY EXPIRA EL 30 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**

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

2020

Bogotá, D.C., 3 de febrero de 2006

Doctor
DARIO CARDENAS NAVAS
Apoderado

Oficio No. **2368**

ASUNTO	Radicación	02-09031
	Trámite	002
	Evento	001
	Actuación	430
	Folios	013

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 17, los dibujos que se encuentran en los folios 24 a 27 y el capítulo reivindicatorio que se encuentra en los folios 18 a 22 que comprende dieciocho (18) reivindicaciones.
- Se considerará la prioridad reivindicada sobre la solicitud de México No. PA/a/2001/011092 del 31 de octubre de 2001.

2. Objeto de la invención

- La invención propuesta se relaciona con un procedimiento para el grabado de canales sobre un artículo absorbente desechable.

En la reivindicación Independiente 1 se define un proceso para grabar canales de distribución-contención de fluidos en artículos absorbentes desechables que constan básicamente de una capa permeable a los fluidos, una matriz absorbente de fluidos y una capa impermeable a los fluidos, la matriz absorbente de fluidos estando colocada entre la capa permeable y la capa impermeable; caracterizado el proceso porque comprende los siguientes pasos:

Alimentar una matriz absorbente;

Suministrar una película que servirá como capa superior del artículo;

Aplicar un adhesivo por la parte interna de la capa superior permeable al fluido;

Unir la capa superior a la matriz absorbente por la cara superior o inferior de la misma;

Mantener uniforme unida la capa superior permeable al fluido a la matriz absorbente al menos en las zonas donde se grabarán los canales;

Grabar los canales de distribución-contención de fluidos sobre la capa superior y la matriz absorbente, de modo que los mismos queden grabados en la capa superior y la matriz absorbente y de preferencia hasta en alrededor del 90% del grosor de la matriz absorbente, mediante un dispositivo grabador que gira a la misma velocidad de avance que el producto;

Unir por la cara opuesta de la matriz absorbente la capa inferior impermeable a los fluidos del artículo absorbente desechable.

- Se afirma que en los procesos convencionales de grabar canales se presenta el problema de que al grabar los canales de distribución-contención es necesario aplicar una presión suficiente, además de calor, para lograr un buen grabado, y que los citados canales se marquen adecuadamente en la capa superior y en la matriz absorbente. De esta forma se corre un alto riesgo de debilitar o dañar la capa inferior impermeable, de modo que se produzcan pequeñas perforaciones, ya sea durante el uso o desde el momento del grabado.
- El objeto de la invención definido se catalogó como B32B 5/00, según la Clasificación Internacional de Patentes (IPC).

3. Claridad de la solicitud

El artículo 28 de la Decisión 486 de la Comisión de la Comunidad Andina 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".

- El capítulo descriptivo contiene cantidades precedidas por la expresión "alrededor" la cual no confiere claridad ni precisión. Por lo tanto, se recomienda eliminar dicha expresión del capítulo descriptivo.
- En conclusión, el capítulo descriptivo no cumpliría con el requisito de claridad de acuerdo con el artículo 28 de la Decisión 486.

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 que se refiera a dos o más reivindicaciones anteriores se considerará una reivindicación dependiente múltiple".

- Las reivindicaciones 1 y 9 incluyen una cantidad precedida por la expresión "alrededor" lo cual no le confiere precisión y por lo cual se recomienda eliminar dicha expresión de dicha reivindicación para que la cantidad no tenga interpretaciones subjetivas.
- En conclusión, las reivindicaciones 1 y 9 no cumplirían con el requisito de claridad de acuerdo con el artículo 30 de la Decisión 486.

4. 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 **31 de Octubre de 2001** 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	US3881490	"THIN, FLEXIBLE ABSORBENT PADS"	6 de mayo de 1975
2	EP1013252	"ABSORBENT ARTICLE WITH SUPERABSORBENT PARTICLES AND WITH DENSIFIED REGION AND MANUFACTURING METHOD"	28 de junio de 2000

5. 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 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:

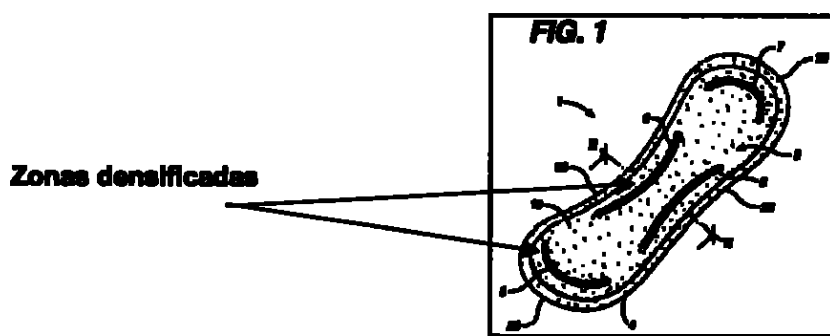
- En el Documento **US3881490** (llamado D1 de aquí en adelante) se divulga una almohadilla absorbente flexible y delgada que posee una matriz absorbente, una hoja de cubierta permeable a los líquidos y un capa inferior impermeable a los líquidos, donde la hoja de cubierta y la matriz presentan líneas onduladas formadas por aplicación de presión las cuales cumplen la función de dirigir los fluidos capturados hacia ellas e impedir que se desplacen produciendo fugas.

En D1 se enseña que la hoja de cubierta no tejida puede ser de cualquier tipo conocido y el más común puede ser fibras de rayón cardado. Se menciona que en una modificación de la invención, toda la superficie inferior de la hoja de cubierta está asegurada a la parte superior de la matriz absorbente por una delgada capa de adhesivo. Preferiblemente, el adhesivo es aplicado a las fibras de la superficie de la matriz en la forma de un adhesivo acuoso atomizado previo a colocar la hoja de cubierta sobre dicha matriz.

La hoja de cubierta es entonces colocada sobre la matriz atomizada con adhesivo y las fibras son unidas a la hoja de cubierta por la aplicación de calor y presión. Mientras la presión moderada es aplicada a la unión de la hoja de cubierta a la matriz, una consideración crítica es unir las fibras en áreas seleccionadas por uso de suficiente presión para proveer enlaces de hidrógeno en áreas definidas por un patrón de líneas extendidas.

Después de que la matriz y la hoja de cubierta superior están integradas por calor y presión, y que se forman las líneas antes mencionadas, la estructura es asegurada a una película plástica posterior (externa) para completar dicha estructura.

- En el Documento EP1013252 (llamado D2 de aquí en adelante) se divulga un artículo absorbente desechable, específicamente un artículo de higiene femenino que tienen partículas superabsorbentes y por lo menos una región densificada tal como se ilustra en la siguiente figura representativa:



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 atienda a planes de mejoramiento continuo normalmente formulados por las empresas.
- El estudio de nivel inventivo desarrollado a continuación se basó en el análisis de documentos muy cercanos a la propuesta de la solicitud. Se quiere aclarar que el análisis de D1 y D2 no se realizó de manera independiente sino que se basó en la combinación de los documentos, mirando las equivalencias con un documento y si las diferencias resultan evidente u obvias para un técnico de nivel medio versado en la materia.
- De acuerdo con las reivindicaciones de la solicitud, se entiende que el principio técnico sobre el cual se fundamenta la propuesta consiste en un proceso de grabado de canales de distribución – contención de fluidos en artículos absorbentes desechables cuya secuencia de etapas es tal que implica que se dañe la capa impermeable. Esta secuencia de etapas consiste en alimentar una matriz absorbente, suministrar película que servirá de capa superior, aplicar adhesivo a la superficie interna de la capa superior, mantener uniformemente unida la capa superior a la matriz absorbente, grabar los canales y finalmente, unir por la cara opuesta de la matriz absorbente la capa inferior impermeable a los fluidos del artículo absorbente desechable.

Al estudiar la solicitud se entiende que lo que resuelve el problema técnico relacionado con la capa inferior impermeable es colocar esta capa solamente después que se hayan elaborado los canales de distribución – contención sobre la matriz y la capa superior. De esta manera, la capa inferior impermeable conserva sus propiedades y no sufre deterioros. En otras palabras, se comprende que la secuencia del proceso es muy importante para resolver el problema.

A pesar de lo anterior, al analizar D1 se puede observar que existe un proceso de etapas y secuencia de etapas equivalente al de la solicitud y que particularmente, la capa inferior impermeable también es colocada en la matriz absorbente una vez se ha realizado todo el proceso de formación de canales entre la capa superior y la matriz absorbente. Esto mismo hace pensar que la capa inferior impermeable se mantiene intacta y no sufre riesgos de daños.

La diferencia que existe entre la invención de la solicitud y D1 es que la primera no explicita el porcentaje del grosor de la matriz absorbente que ocupan los canales grabados y no define la misma configuración de los canales de distribución – contención sobre la matriz absorbente porque la configuración de líneas en D1 es ondulada y longitudinal en toda el área superior del artículo. Sin embargo, es importante anotar que un técnico de nivel medio versado en la materia tiene conocimientos básicos sobre el porcentaje de grosor de canales y tendería a incluir el mayor posible dado que esto mejora el funcionamiento de dichos canales. Por otro lado D2 es un documento que contiene un artículo absorbente desechable con una sugerencia de configuración de las zonas densificadas equivalente al de la propuesta en estudio, de tal manera que un técnico de nivel medio versado en la materia con conocimientos básicos podría basarse en las enseñanzas de proceso incluidas en D1 donde la incorporación de la película impermeable solo se realiza después de la formación de los canales y no antes, para impedir daños en ella, y emplear la sugerencia de configuración de D2 para lograr un producto equivalente al de la solicitud.

Dado lo anterior, la invención propuesta no parece generar un efecto sorprendente que evidencie un salto tecnológico sobre el arte previo. Por el contrario, la invención parece ser una propuesta que se encuentra dentro de la línea normal de avance de la tecnología.

- Por lo anteriormente expuesto, la invención definida por las reivindicaciones 1 a 18 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.
- En conclusión, los requisitos de patentabilidad de la presente solicitud se encontrarían afectados así:

No.	Documento	Reivindicaciones Afectadas	Requisito que afecta
1.	US3881490	1 – 18	Nivel Inventivo
2.	EP1013252		

Se anexan los apartes principales de las autoridades 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.

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 09 MAR. 2006

CONCEPTO TECNICO No. 329	EXAMINADOR TECNICO Código No. 202042
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08-06-06

[54] THIN, FLEXIBLE ABSORBENT PADS

[75] Inventors: Howard A. Whithead, Appleton;
Ralph V. Braun, Neenah, both of
Wis.

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

[22] Filed: Dec. 20, 1973

[21] Appl. No.: 426,521

[52] U.S. CL..... 128/287; 128/290 R; 161/DIG. 3

[51] Int. Cl. A61F 13/16

[58] Field of Search 128/287, 284, 290 R, 290 P,
128/156; 161/66, 67, 79, DIG. 3

[56] References Cited
UNITED STATES PATENTS

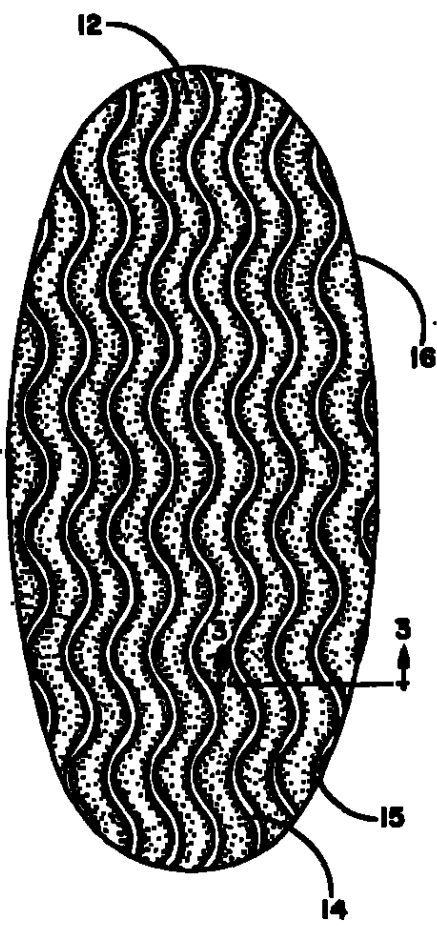
2,782,003	4/1957	Morin	128/284
3,563,243	2/1971	Lindquist	128/287
3,995,237	7/1971	Sargent et al.	128/290 R
3,670,731	6/1972	Harmon	128/284
3,693,622	9/1972	Jones, Jr.	128/284 X

Primary Examiner—Richard A. Gaudet
Assistant Examiner—J. Yanko
Attorney, Agent, or Firm—Daniel J. Hanson, Jr.;
William D. Herrick; Raymond J. Miller

[57] ABSTRACT

Thin, absorbent pads with soft, flexible edges. The pad structure comprises a fluid pervious non-woven cover sheet, a central absorbent batt of comminuted wood pulp fibers, and a fluid-impervious backing element. Each element is coextensive with the others. The integrity of the central absorbent batt is maintained in the x and y directions by adhering the cover sheet and fluid impervious backing element to the respective top and bottom surfaces of the central batt by light applications of flexible adhesive, and in the z direction by hydrogen bonding of the wood pulp fibers in selected areas. The selected areas of hydrogen bonding comprise a spaced pattern of embossment lines which extend generally longitudinally of the pad and intersect the edges and ends of the pad at spaced intervals. The pad may be adapted for secure placement on a suitable support such as a snug-fitting undergarment by the use of pressure sensitive adhesive on the backing element or by increasing the frictional properties of the bottom side by the use of flexible foam or other friction increasing materials.

9 Claims, 5 Drawing Figures



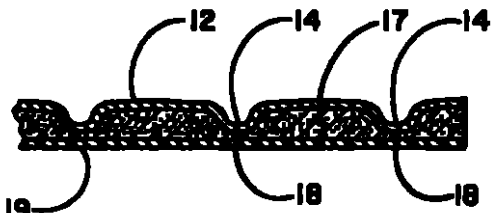


FIG. 3

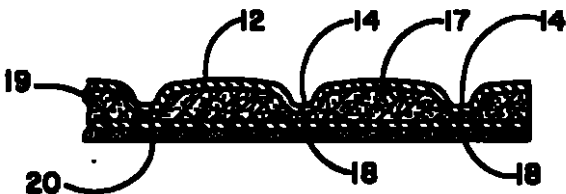


FIG. 4

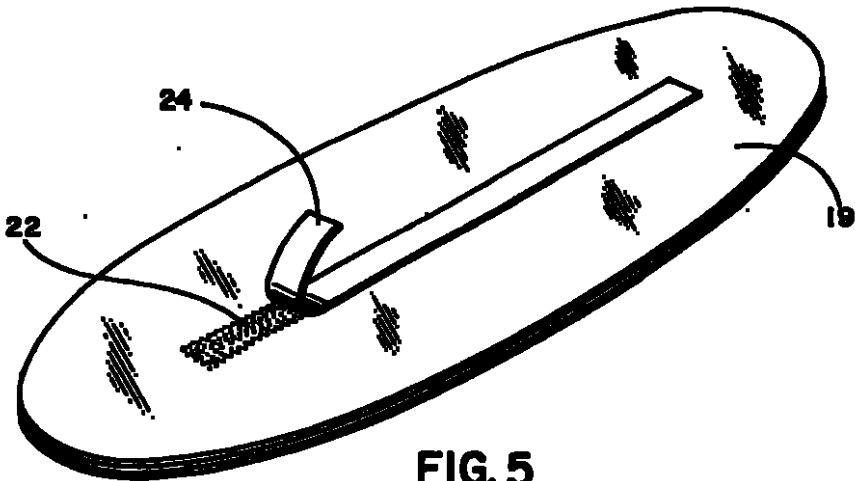


FIG. 5

THIN, FLEXIBLE ABSORBENT PADS BACKGROUND OF THE INVENTION

This invention relates to improvements in the structure of very thin absorbent pads primarily for feminine hygiene which may be used for undergarment protection between menstrual periods as well as for absorbing light flow between and during periods.

There are a number of prior art patents relating to thin absorbent pads for the above purposes. The pad structure defined in these patents broadly fall into two categories. One in which the main absorbent medium comprises multiple piles of creped absorbent tissue commonly called cellulose wadding, and the other in which the main absorbent medium is an airformed batt of comminuted wood pulp fibers commonly known as fluff.

This invention relates to improvements in the latter type of pad in which the main absorbent medium is fluff.

In prior art pads where fluff is the main absorbent component, it has always been considered necessary to confine or bind the short wood pulp fluff fibers in some way to prevent undesirable dusting of the short fibers which would otherwise occur. One common way of accomplishing this is to enclose the fluff batt in a tissue or nonwoven wrap as is taught for example in U.S. Pat. No. 2,826,200 issued Mar. 11, 1958. Another way to prevent dusting is to cover the tops, sides and ends of the pad with a nonwoven wrapper as shown in U.S. Pat. No. 3,575,175 issued Apr. 20, 1971. Still another way is to cover or adhesively bind the surface fibers and then seal all the pad edges by highly compressing the pad around its entire periphery as taught in British Pat. No. 1,071,191 published Jun. 7, 1967. Adhesive binder to secure all or part of the fluff fibers to each other has also been used in combination with some of the above structures.

While the above structures do accomplish the job of fiber confinement in various ways and do minimize or prevent dusting out of the fibers, some disadvantages in comfort and disposability remain when such structures are used for absorbent pads which contact the body as in feminine hygiene uses. In addition the cost of the confining elements special adhesive combination and multiple operations necessary to assemble the prior art pads add undesirably to the final cost of the product.

An encircling outerwrap of nonwoven material with an all fluff central batt and a thin film baffle for example, is relatively quite an expensive component when very thin pads are involved. In addition because of the inherent flexibility of thin pads, such wrappers tend to wrinkle excessively at the fold lines along the pad edges when the pad is arcuately bent into the usual shape which results when worn for catamenial uses.

When, as taught in the prior art, the entire periphery of the pad is compacted or compressed sufficiently to seal the edges with or without supplementary adhesive, relatively harsh and sharp edges are formed which, because of the resulting cardboard-like structure, tend to wrinkle and form undesirable abrasive edges during use. Continuous peripheral embossing also limits the thickness of the absorbent element which can be satisfactorily used and still remain sealed at the edges.

In the structure disclosed herein it has been found that a suitable pad can be provided, in which the short fibered fluff comprising the absorbent material in the

central pad terminates at the peripheral edges without employing an enclosing wrapper or continuous peripheral sealing. The pad described herein can also be produced at low cost. While the resulting pad may dust moderately at the unbonded edge areas this slight disadvantage is overshadowed by the more important advantage of providing comfortable soft edges for the user. In emergencies, the pad may also be disposed of in a toilet since the main fluff element will delaminate and break apart as water destroys the hydrogen bonding in the embossed line areas hereinafter described thus permitting dispersion of the major portion of the fibers when the pad is agitated in water during the flushing action.

SUMMARY OF THE INVENTION

The pad of this invention comprises a thin elongate air felted absorbent batt of intermingled wood fluff fibers, a fluid pervious nonwoven cover sheet and a fluid impervious film backing sheet. The absorbent batt, cover sheet and backing film are all coextensive with each other.

The nonwoven cover sheet may be any of the many known types of pervious non-woven materials in common use as wrappers for sanitary napkins, the most common of which comprises carded rayon fibers of staple length bonded by a flexible adhesive.

In the preferred embodiment, the entire under-surface of the cover sheet is secured to the top of the fluff batt by a very thin adhesive layer. Preferably, the adhesive is applied to the top surface fibers of the fluff batt in the form of an atomized spray of aqueous based adhesive prior to placing the cover sheet material onto the batt.

The cover sheet is then placed on top of the sprayed batt and the fibers in the fluff batt are caused to bond to the cover sheet by the simultaneous application of heat and pressure. While moderate overall pressure is applied to bond the cover sheet to the batt, a critical consideration is to bond the fibers in selected areas by using heavy pressure sufficient to provide hydrogen bonding in areas defined by a pattern of narrow spaced lines of compression. Many suitable patterns may be used. A particularly preferred pattern comprises spaced longitudinally extending lines arranged in a sinuous pattern with the lines terminating at points spaced from each other around the pad periphery. The spacing between the lines of compression and the width of the lines is preferably such that the non-woven cover area between lines is not highly stressed in order that the batt areas between lines remains substantially uncompressed and thus provide soft, resilient, cushioned areas. Another important consideration is that the primary direction of the impressed lines be in the longitudinal direction of the pad and that the major portion of the edge area of the pad remain unbonded to retain its softness and resiliency.

After the batt and overlying cover sheet are integrated by heat and pressure, and the fluff fibers are hydrogen bonded by line embossing, the embossed pad structure is secured to a plastic film backing to complete the pad structure. Preferably such securement is obtained by an intermittent pattern of adhesive applied to the surface of the underlying film, with the spacing between adhesive areas being sufficient to permit easy flexing of the completed pad structure.

The completed pad may be used in combination with a tight fitting undergarment without supplementary attachment means if desired. Preferably, however, pressure sensitive adhesive is disposed on a portion of the bottom surface of the plastic film and covered with a removable protective strip which may be peeled off by the user for more positive attachment purposes. The bottom surface may alternatively be provided with a thin, flexible, high friction material such as synthetic sponge of polyurethane or the like which will help retain it in position on an undergarment by frictional engagement therewith.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. 1 is a plan view of one embodiment of the pad of the invention.

FIG. 2 is a plan view of a modified pad shape.

FIG. 3 is an enlarged section taken along line 3—3 of FIG. 1.

FIG. 4 is a section similar to FIG. 3 showing a modification thereof.

FIG. 5 is a perspective view of the bottom of another embodiment of the pad.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

In the plan view of FIG. 1 there is shown a substantially elliptical pad having a top cover sheet 12 of non-woven material with a pattern of spaced longitudinally extending line embossments 14 impressed therein. Undulating line embossments 14 extend the full length of the pad and intersect the ends and edges of the pad at intervals indicated at 15, leaving major portions 16 of the periphery unembossed and therefore unbonded in the z-direction.

FIG. 2 illustrates an oblong tapered pad with undulating line embossments 14 of a similar nature.

The internal structure of the pad is shown in FIG. 3 which is an enlarged section taken along line 3—3 of FIG. 1. As shown therein, fiber batt 17 of absorbent wood pulp fibers is heavily compressed along line embossments 14 and by being so heavily compressed provide hydrogen bonding of the wood pulp fibers in areas 18. It is this hydrogen bonding which provides the fluff batt 17 with sufficient integrity to prevent delamination in the z-direction. Cover sheet 12 is puffed up in rounded cushion-like contours between the line embossments 14 where uncompressed and unbonded portions of fiber batt 17 press upwardly against cover sheet 12 between embossments.

Backing element 19 is a thin film, such as polyethylene, which is adhesively attached to batt 17 and which film retains its substantially planar configuration.

Cover sheet 12 is bonded to batt 17 over its entire common interface with batt 17 by a light layer of adhesive applied as hereinafter described, while film backing element 19 is intermittently bonded to the bottom surface of batt 17 by a spaced pattern of adhesive printed on the upper surface of the film 19 before assembling the pad into its final form.

Referring again to FIG. 1, unbonded edge portions 16 also retain a plumped up cushion-like configuration similar to that shown between embossments in FIG. 3 and thereby provide the pad with the desired soft edges.

The FIG. 4 pad structure is the same as that of the FIG. 3 pad except that a layer of lightweight synthetic sponge 20 such as polyurethane foam is additionally laminated to the backing element 19. The foam 20 provides a high friction surface which assists in maintaining the pad in place when the pad is worn with a tight-fitting undergarment.

In FIG. 5 a perspective view of the underside of a completed pad is shown wherein another means for attaching the pad to an undergarment is illustrated. As shown in FIG. 5 the backing element 19 has applied thereto a narrow band of pressure sensitive adhesive 22 which is covered by a peelable strip of protective release paper 24 or the like.

When the FIG. 5 pad is worn in combination with an undergarment, protective strip 24 is first peeled off and the exposed pressure sensitive adhesive 22 is then utilized to adhere the pad to the crotch area of the undergarment. Generally, the use of pressure sensitive attachment means for absorbent pads is well known in the art and is disclosed herein merely as a preferred embodiment.

While only two pad shapes are illustrated in the drawings, it is understood that various other elongate configurations may be used including a variety of geometric forms such as rectangular, oblate, diamond, hexagonal and the like.

Additionally while the line embossments are shown as uniformly spaced and substantially parallel undulating lines, other longitudinally extending patterns may be used. Important considerations are: that the lines be spaced sufficiently apart to prevent undue compression of the batt between lines; that the compressed bonded areas be of narrow width for the same reason; that they extend substantially longitudinally of the pad; and that where they intercept the edges they be spaced from one another to minimize edge compression or bonding. Typical dimensions for the line embossments comprise a width of about 1/32 inch and a spacing of about 1/4 inch to 3/8 inch. An objective of the line embossing arrangement, in addition to providing the hydrogen bonding which is the primary means for providing z direction integrity in the pads, is to provide the entire surface of the pad including the edges with a soft, cushion-like structure.

Another objective of the line embossments is to direct the migration of the absorbed flow in the longitudinal direction especially since the edges of the pad are unsealed and it is therefore desirable to keep any of the absorbed fluid away from these edges as long as possible. The longitudinally extending embossments serve this purpose well as conduits which due to their compressed condition provide small pores in the batt which enhance capillary action pressures.

Undulating or wavy lines are also preferred for the line embossments because when the pad is bent into its arcuate shape during use, the wavy or undulating lines were found to flex much more readily than straight lines do and thus produce only small scale wrinkles which do not appear to interfere with tactile comfort as large scale wrinkles have been found to do.

As indicated throughout this specification, the primary purpose of the line embossing is to bind the short wood pulp fibers together by means of hydrogen bonding. As is well known in the papermaking art, hydrogen bonding of wood pulp fibers are bonds which develop when the hydroxyl groups of adjacent fibrillae in the

cellulosic fibers form hydrogen bonds when a paper web is dried. In this instance the bonds are formed during the embossing process. Such bonding is also the sole means for maintaining the strength and integrity of the batt in the z direction in the pads disclosed herein. Sufficient strength and integrity in the x and y directions are of course provided by the adhesive attachment of the cover sheet and backing element to the batt as previously described. The x, y, and z designations are used herein in the customary manner, i.e., x and y are the transverse and longitudinal directions respectively, while the z direction is perpendicular thereto.

A suitable method for fabricating the pads will now be described. In manufacturing the pads a thin uniform continuous batt of intermingled wood pulp fibers is first formed by suitable airlaying methods. Many methods for airlaying wood fibers are known, so there is no need to describe such methods here. It is also well known that airlaid batts have little self integrity because even though the fibers in the batt are intermingled, no chemical bonding is developed in dry forming and since the fibers are so short little tensile strength is derived from mere mechanical entanglement. Airlaid batts are therefore very weak and easily destroyed when tensile forces are applied. To obtain batts with structural integrity some supplementary bonding means is therefore required. This is particularly true when the batt is thin, i.e., in the range of 1/16 inch to 1/4 thick as used herein.

Because of the inherent structural weakness of unbonded airlaid batts it is therefore necessary during subsequent converting operations for the formed batt to be carried on suitable supporting means such as the wire mesh fabric on which it is formed during the airlaying process. Alternatively, the batt could be formed on woven or non-woven scrim which could then be retained with the batt and become an integral part of the finished pad, if desired. However, the latter modifications adds to the final cost, and since these pads are intended to be disposable low cost pads, the inclusion of scrim may not be desirable from a cost standpoint.

After the batt is formed it is sprayed with a light application of an atomized spray of an aqueous-based flexible adhesive. Amounts in the range of 5 to 15 grams per square yard are appropriate. In general, acrylic latexes are preferred for use as the adhesive. It is desirable to use latexes or other aqueous-based adhesives because it is necessary to moisturize the wood pulp fibers at some stage in the process in order to obtain the previously mentioned hydrogen bonding, and aqueous-based adhesives facilitate this.

After the adhesive is sprayed onto the batt, a cover sheet of fluid-pervious non-woven material is then applied to the surface of the batt on which the adhesive has been sprayed. This laminate is lightly pressed between two rolls to lightly adhere the cover sheet and batt and is next passed under a bank of infrared lamps or other heating means to partially set the adhesive and to help condition the batt to a point where the moisture is uniformly distributed through the batt in the amount of about 10 to 20 percent by weight. Further moisture conditioning of the laminate may be done before embossing by spraying the laminate with water at this point in the process. The laminate is then passed through a high pressure nip comprised of a top embossing roll having the desired pattern and a lower heated roll. As the conditioned laminate is passed through the nip, the high pressure exerted on the moisture-

conditioned batt by the raised land areas of the embossing roll develops the hydrogen bonding of the fibers in only the compressed area of the batt. Nip pressures in the range of about 70-85 psi and temperatures of about 300° to 350°F are suitable for this purpose. Heat is utilized to help drive off residual moisture and to further set the adhesive. The preferred density of the batt in the compressed and hydrogen bonded areas is in the range of about 0.40 grams per cubic centimeter to about 1.0 grams per cubic centimeter. In the uncompressed areas preferred densities are approximately 0.03 grams per cubic centimeter to about 0.15 grams per cubic centimeter.

The laminated batt and cover sheet are then passed through another light pressure nip where a film backing element having a patterned adhesive on the surface is applied to the bottom of the batt to complete the laminated structure.

The continuous laminate then goes through further processing machinery where pads of the desired shape and dimension are cut out, and where pressure sensitive adhesive or friction increasing means may also be applied to the bottom surface.

The hydrogen bonding along the embossed lines, which is provided during fabrication, has been found to be of sufficient strength to retain the integrity of the batt, and thus the entire structure, during normal use. In the event the pad is disposed of in a toilet, or inadvertently dropped therein, these hydrogen bonds are swiftly destroyed as the water penetrates the batt. The batt will then delaminate and permit the major portion of the wood pulp fibers to disperse during normal flushing action. The cover sheet and backing element, of course, will not disperse but they are considered sufficiently flexible to pass through a normally functioning toilet system without difficulty.

While acrylic latexes are preferred for use as the bonding material between the cover sheet and the batt and also to secure the batt to the backing element, other flexible adhesives of similar nature may be used. Suitable adhesives, among the acrylics for example, included ethyl and methyl acrylates and their copolymers, and copolymers of ethyl acrylates, acrylamides and acrylic acid. Other suitable adhesives include vinyl resins such as vinyl acetates and vinyl chlorides and combinations thereof, other synthetic latexes such as butadiene, acrylonitrile and styrene and copolymers thereof, natural gums, starches and the like. Aqueous based adhesives are preferred of course for reasons mentioned earlier. That is, in order for the hydrogen bonding to occur, the batt must be properly conditioned with moisture, and the light spray application of an aqueous-based adhesive assists in achieving this purpose. A surfactant may be added to the latex in amounts of 4 to 5 percent by weight based on latex solids in order to maintain absorbency. Any suitable surfactants may be employed for this purpose. Particularly suitable are sulfated or sulfonated organic compounds representative of which are the sodium diamyl to sodium dioctyl sulfosuccinates, sodium lauryl sulfates, sodium sulfoethyl methyl oleyl amides, and sodium sulfonates of alkylated phenols or benzenes. When any of these are employed they should be non-toxic in nature, of course.

While the pad may be used in its basic form, it is preferred that it be provided with some garment attachment means. A preferred means is a strip of pressure-

sensitive adhesive as described with respect to FIG. 5. A thin, flexible foam layer such as polyurethane may also be used. Patches of friction increasing hot melts or the like may also be used.

The cover sheet may also be comprised of various materials and still function. A preferred material is a non-woven web of stable length rayon fibers. Other fibers including absorbent and non-absorbent synthetics may be used. Spunbonded webs of continuous filaments such as polyethylene, polypropylene, polyesters, nylon and the like may also be used. When the latter hydrophobic webs are used the pad retains a much drier surface when in use and such webs are sometimes preferred for that reason.

What is claimed is:

1. An elongate thin absorbent pad with soft flexible edges, said pad comprising a fluid pervious cover sheet of non-woven fibers, a central absorbent batt of comminuted wood pulp fibers, and a fluid impervious backing element; said cover sheet, absorbent batt, and backing element being coextensive; the entire undersurface of said cover sheet being secured to said batt by a light overall layer of flexible adhesive which does not penetrate into the batt; said cover sheet and said batt having a spaced pattern of line embossments impressed therein; said line embossments extending primarily in the longitudinal direction of said pad and intersecting the edges and ends of said pad at spaced intervals; said line embossments defining areas of said batt in which the fibers have been moisture conditioned and sufficiently compacted in the z direction to form hydrogen bonds between those fibers disposed in said line embossment areas; said backing element being secured to the bottom of said batt by discrete adhesive segments disposed in a spaced pattern; the adhesive between said cover sheet and said backing element respectively serv-

ing to attach only the respective surface fibers of the batt to said cover sheet and backing element in the adhesive areas; the integrity of said batt in the z direction between cover sheet and backing sheet being provided solely by said hydrogen bonding; and the fibers in the ends and edges of said batt being free of z-direction bonding except where intersected by said line embossments.

2. The absorbent pad of claim 1 wherein said batt has a thickness in the range of about 1/16 inch to about 1/4 inch.

3. The absorbent pad of claim 1 wherein said line embossments have an undulating configuration.

4. The absorbent pad of claim 1 wherein the density of said batt in the area of said line embossments is in the range of about 0.4 grams per cubic centimeter to about 1.0 grams per cubic centimeter.

5. The absorbent pad of claim 4 wherein the density of said batt in the area between said line embossments is in the range of about 0.03 grams per cubic centimeter to about 0.15 grams per cubic centimeter.

6. The absorbent pad of claim 1 wherein said fluid impervious backing element is a thin plastic film.

7. The absorbent pad of claim 1 wherein said backing element has an area of pressure sensitive adhesive applied to the lower surface thereof and wherein said area of adhesive is covered with a removable protective sheet.

8. The absorbent pad of claim 1 wherein said backing element has applied to its lower surface a friction-increasing material.

9. The absorbent pad of claim 8 wherein said friction increasing material is a thin layer of flexible plastic foam.

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(54) Absorbent article with superabsorbent particles and with densified region and manufacturing method

(57) The invention relates to a novel absorbent article (1), specifically a feminine hygiene article, having emulsion polymerized superabsorbent particles and at least one highly densified region (5, 6, 7, 8).

FIG. 1

