



Industria y Comercio

SUPERINTENDENCIA

Delegatura de Propiedad Industrial

División de Nuevas Creaciones

PCT
SOLICITUD

PATENTE DE INVENCION

04-108186

21. EXPEDIENTE No.

54. TITULO

MATERIAL NO TEJIDO ENREDADO HIDRAULICAMENTE Y METODO

PARA ELABORARLO

51. CLASIFICACION INTERNACIONAL

71. SOLICITANTE

SCA HYGIENE PRODUCTS AB

DOMICILIO

Goteborg, Suecia.

74. APODERADO

EMILIO FERRERO

C.C. 438,019 de Usaquén.

22. BOGOTA, D.C.,

202044

**Industria y Comercio**

SUPERINTENDENCIA

PETITORIO

SUPERINDUSTRIA Y COMERCIO

Radicación : 04100106 00000000

Folios: 68

Fecha (MM): 2004-10-27 17:00:38

Trámite : 011 PCT-PRTEMT 379 FASE NACI 411 PRESENTAC

Dependencia: 2020 DIVISION DE NUEVAS CREACIONES

**FORMULARIO UNICO DE SOLICITUD DE PATENTE
PCT
ENTRADA EN FASE NACIONAL****SOLICITUD DE:****1**☒ Patente de Invención.☐ Patente de Modelo de Utilidad.☐ Capítulo I.☒ Capítulo II.**2****SOLICITANTE
(71)**Nombre: **SCA HYGIENE PRODUCTS AB**
sociedad constituida y existente bajo las
leyes de Suecia.Dirección: S-437 36 Göteborg,
Suecia.Domicilio Göteborg,
Suecia.**IDENTIFICACIÓN**C.C. ☐NIT ☐C.E. ☐Otro ☐

Cual _____

Número _____

3**REPRESENTANTE
O APODERADO**Nombre: **EMILIO FERRERO**
Dirección: **Carrera 4ª. No. 72-35**
Teléfono: **347 36 11**
Fax: **217 92 11**
E-mail: **clientes@camyo.com.**
Domicilio: **Bogotá, Colombia.****IDENTIFICACIÓN**C.C. ☒NIT ☐C.E. ☐Otro ☐

Cual _____

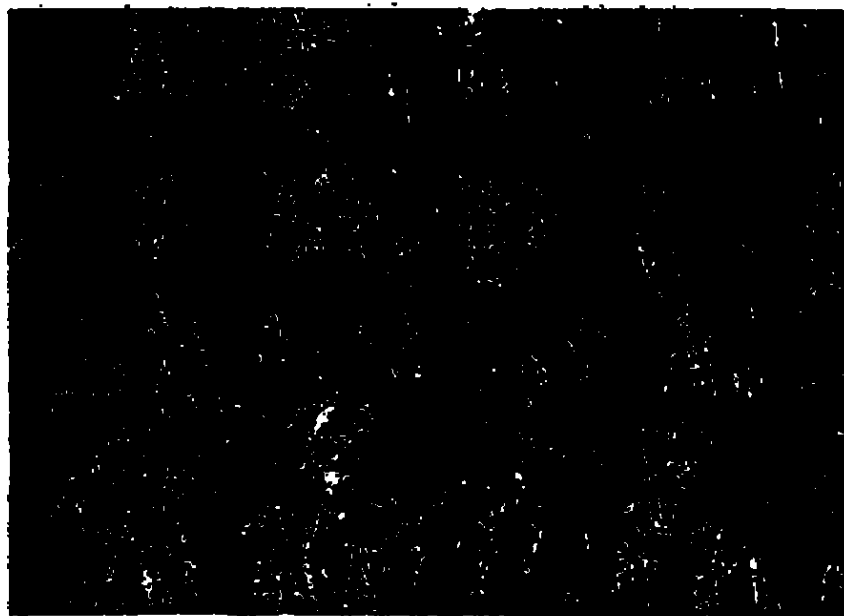
Número **438.019** T.P **31.929****4****INVENTOR (ES)
(72)**1. **Mikael STRANDQVIST**
Dålavägen 87,
S-437 36 Lindome,
Suecia.**5****PCT (86)**Solicitud Internacional No. **PCT/SE03/00486**Fecha: **25 de marzo de 2003**Publicación Internacional No. **WO 03/083197 A1**Fecha: **9 de octubre de 2003****6****Título (54)****MATERIAL NO TEJIDO ENREDADO HIDRÁULICAMENTE Y
MÉTODO PARA ELABORARLO****7****Clasificación Internacional (51) D04H 1/54****8****Prioridad****(33) País de Origen****(32) Fecha****(31) Número de Solicitud**SI ☒ NO ☐**SE.****28 de marzo de 2002****0200997-5****9****Comprobante de pago No.: 04 - 83.603****Fecha: 25 de octubre de 2004**

10

Anexos:

- ☒ Comprobante de pago de la tasa de presentación de la solicitud por \$ 422.000.00.
- ☐ Comprobante de pago por reivindicación de prioridad.
- ☒ Documento que acredita la existencia y representación legal cuando el solicitante sea persona jurídica.
- ☒ Poderes, si fuere el caso.
- ☒ Documento de cesión del inventor al solicitante o a su causante.
- ☐ Declaraciones.
- ☒ Copia de la solicitud internacional. (Resumen, descripción, reivindicaciones, dibujos)
- ☒ Traducción de la solicitud internacional al castellano. (Resumen, descripción, reivindicaciones, dibujos)
- ☒ Copia del examen preliminar efectuado por la IPEA.
- ☐ Traducción del examen preliminar efectuado por la IPEA.
- ☐ De ser el caso, copia del contrato de acceso.
- ☐ De ser el caso, documento que acredite la licencia o autorización de uso de conocimientos tradicionales de las comunidades indígenas.
- ☐ De ser el caso, certificado de depósito del material biológico.
- ☒ Arte final 12x12
- ☐ De ser el caso, información sobre otras solicitudes de patente o títulos obtenidos en el extranjero por el mismo titular o su causante, relacionadas parcial o totalmente con la invención de esta solicitud.
- ☐ Otros

11

FIGURA CARACTERÍSTICA

25

27

12

Solicito la concesión de la patente,

NOMBRE: EMILIO FERRERO

FIRMA : 
C.C. 438.019 de Usaquén T.P. 31.929

UR-

CAVELIER

BOGOTÁ, COLOMBIA

REPRESENTACION Y PODER

For patents, utility models, industrial designs, trademarks, commercial names, trade emblems, slogans.

Para patentes, modelos de utilidad, diseños industriales, marcas de fábrica, nombres comerciales, enseñas, lemas comerciales.

REPRESENTATION AND POWER OF ATTORNEY

33256
0031

I (we), the undersigned/Yo (nosotros), abajo firmado (s)

SCA HYGIENE PRODUCTS AB

of/domiciliado (s) en \$405 03 Goteborg,
SWEDEN

por el presente nombramos a EMILIO FERRERO, tpa. 31929; GONZALO PERDOMO, tpa. 831; LUZ CLEMENCIA DE PAEZ, tpa. 23555 y GERMAN CAVELIER, tpa. 832, domiciliados en la Carrera 4ª N° 72-35, Bogotá, Colombia, en obediencia a lo dispuesto en el parágrafo 1º del Artículo 543 del Código de Comercio, el primero como principal y los demás como suplentes, en su orden, como mis (nuestros) representantes en todos los asuntos de propiedad industrial con facultad para recibir notificaciones y nombrar apoderados judiciales o extrajudiciales. El primer representante suplente reemplazará al principal en caso de ausencia o impedimento temporal o definitivo de aquél. La misma regla se aplicará cuando el segundo representante suplente haya de reemplazar al primero, o el tercero al segundo. En tales casos, el representante principal, o el primero, o segundo suplente, en su caso, o ambos, declararán su intención de no ejercer la representación mediante declaración autenticada por Notario Público en Colombia, o por Notario u otro Funcionario Público, o Cónsul de Colombia, en el extranjero; y si se tratare de impedimento, con el certificado respectivo. Si alguno de los nombrados faltare definitivamente, el siguiente tomará su lugar. Cuando cesare la ausencia o impedimento del representante principal, o de su primero o segundo suplentes, en su caso, podrán ejercer la representación, en su orden, uno u otros según el caso, asumiéndola por el solo hecho de ejercerla, cesando en ese momento el ejercicio de la representación por el primero, segundo o tercer suplente en su caso.

Además, confiero (conferimos) poder a los abogados arriba nombrados, para obtener la protección de mi (nuestra) propiedad industrial y contra la competencia desleal, a cuyo efecto autorizo (amos) a los dichos apoderados para que me (nos) representen ante cualesquiera entidades o personas, ejerzan o no jurisdicción, especialmente ante las del orden administrativo, contencioso-administrativo y judicial, así como los tribunales de arbitramento, en todo lo concerniente a los siguientes asuntos: a) Obtención de patentes de invención, modelos de utilidad, y diseños industriales; el registro de marcas de fábrica, colectivas, defensivas, de servicio, lemas comerciales, nombres comerciales, enseñas, variedades vegetales y denominaciones de origen; su renovación, traspaso, cambio de nombre o domicilio, cancelación voluntaria; y el registro de licencias de uso de esos derechos; b) Las acciones de competencia desleal, protección del consumidor, oposiciones u observaciones, cancelación administrativa y judicial, nulidad, medidas cautelares, concesión de licencias, la tutela, la protección de secretos industriales, y en general los juicios civiles, penales, administrativos o contencioso-administrativos relacionados con estos derechos; acciones y procesos que promovamos o se nos promuevan. Y para que en todos los asuntos arriba determinados, puedan sustituir este mandato, transigir, conciliar, admitir los hechos del proceso, desistír, cancelar, recibir, renunciar, y ratificar los actos de agentes oficiosos.

In due compliance with the terms of paragraph 1st of article 543 of the Commercial Code, do hereby appoint EMILIO FERRERO, tpa. 31929; GONZALO PERDOMO, tpa. 831; LUZ CLEMENCIA DE PAEZ, tpa. 23555 and GERMAN CAVELIER, tpa. 832, domiciled at Carrera 4ª N° 72-35, Bogotá, Colombia, the first as principal and the others as alternates, in the order of their appointment, as our representatives for all industrial property matters with faculty to receive notifications and to appoint attorneys in and out of Court. The first alternate shall replace the principal in case of his absence or of temporal or definitive impediment. The same rule will apply when the second alternate representative is to replace the first one, or when the third is to replace the first or second alternates in their turn, or both of them, second. In such cases, the principal representative, or the first or second alternates in their turn, or both of them, shall state their intention not to act as representatives through a declaration given before a Notary Public in Colombia, or before a Notary or another Public Official or a Colombian Consul abroad; and in case of impediment, the appropriate certificate shall suffice. If any of the appointees were to be definitely absent, the following alternate shall take his place. When the absence or impediment of the principal representative, or of the first or second alternate in their turn ceases, the representation can be taken again in their sequence, by the principal, the first or second alternate depending on case, and the mere fact or its exercise will suffice. The exercise of the representation by the first, second or third alternates in their turn shall end at such time.

In addition, we grant a Power of Attorney in favor of the above-named attorneys-at-law so that they may obtain the protection of my (our) industrial property and against the unfair competition, for which purpose I (we) authorize the said attorneys to represent me (us) before any authorities or persons, with or without jurisdiction, specially those administrative, administrative contentious and judicial, as well as before Arbitration Court, in all matters concerning the following: a) Obtainment of patents, utility models and industrial designs; the registration of trademarks, collective, defensive and service marks, slogans, commercial names, trade emblems, vegetal varieties and denominations of origin; its renewal, assignment, change of name or domicile, voluntary cancellation; and the registration of licenses of use of the above rights; b) Actions of unfair competition, protection of the consumer, oppositions or observations, administrative and judicial cancellation, nullity, infringement, granting of licenses, the action for writ mandamus, the protection of trade secrets, and in general the civil, penal, and administrative suits relating to those rights; actions and suits instituted by me (us) or against me (us). And that in all the above matters they may substitute this Power of Attorney, compromise, conciliate, admit the facts of the case, desist, cancel, receive, renounce, and ratify acts done by representatives without power of attorney.

Given and signed this/Dado y firmado hoy

Gothenburg 19 February 1999

In/en

Bengt Forshult

Signature

Firma

Bengt Forshult

Head of Patent Department

SCA Hygiene Products AB

TRADUCCION No. 1707199

MARIA ELVIRA MARTELO

Traductora e interprete Oficial

Inglés - Español - Inglés

Res. No. 2879 Min. Justicia

G. CAVELIER ABOGADOS

INTERDETERMINADA (MINUTA 12.1.2.5)

ASUME
RAN DEL T
Si
TOMAR

LEGALIZACION

El Señor Cónsul de Colombia debe expedir un certificado consular sobre (1) la existencia legal de la compañía que otorga el poder, (2) que ésta ejerce su objeto social, y (3) que las personas que otorgan el poder están autorizadas para darlo. A este efecto las solicitamos que muestren al Señor Cónsul las pruebas que acrediten esos hechos (1), (2) y (3).

LEGALIZATION

The Colombia Consul must issue a consular certificate on (1) the legal existence of the company which grants the Power-of-Attorney, (2) that it is in actual exercise of its company purposes, and (3) that the persons who execute the Power of Attorney is authorized to do so. To this effect, please show the Consul the evidence to prove the above facts (1), (2) and (3).

TRADUCCION No. 1707/99
MARIA ELVIRA MARTELO
Traductora e Interprete Oficial
Inglés - Español - Inglés
Res. No. 2879 Min. Justicia

NO SE ASUME
RESPONSABILIDAD TEXTUAL
2000 FEB 14 A 11:50
DE LEGALIZACIONES
C O L O M B I A

MINISTERIO DE RELACIONES
EXTERIORES

[Signature]
1999-03-05

RECEIVED
26 OCT 2004

NO. 3066
The Ministry for Foreign Affairs in Stockholm, hereby certifies that
Mr. Rickard Ström
Notary Public of
Gothenburg
has issued and signed the foregoing attestation in his official capacity

Fee Stockholm this 2nd day of March
Kr 120/- PAID 1977

[Signature]
Inger Höglberg

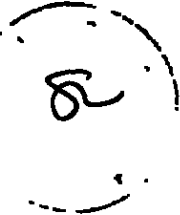
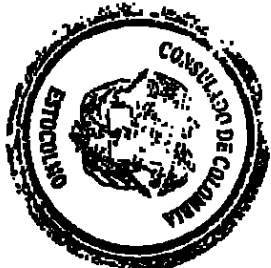
MARIA SMITH RUEDA
Encargada de las Funciones Consiliares

[Signature]
No. 022

Fecha 1999-03-05

que el señor Bengt Forshult
quien firma el documento y se antecede
a la presentación de la Sociedad SCP Hygiene Products Aktiebolag
que existe en virtud de las leyes de
según se me presentó en los documentos que
tuve a la vista

PAGADO
Impuesto de Timbre
de Sociedades
dólares US\$ 7
Monedas US\$ 100



NOTA PARA EL SEÑOR CONSUL DE COLOMBIA: Según los artículos 65 del C. de P.C. y 480 del C. de Co., si el poderdante es una sociedad, el Señor Cónsul debe certificar que tuvo a la vista las pruebas de su existencia, que ejerce su objeto social y que quien confiere el poder es su representante.



In/en

5

Bengt Forshult

Signature

Firma

Bengt Forshult
Head of Patent Department

SCA Hygiene Products AB

O. CAVALLER ABOGADOS

PODERE (MINUTA 121.125)

9:

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SE ASUME
en el T

JEFE
SCA

TRADUCCION No. 707199

MARIA ELVIRA MARTELO

Traductora e Interprete Oficial

Inglés - Español - Inglés

Res. No. 2879 Min. Justicia

MINISTERIO DE RELACIONES
EXTERIORES

202032
Miguel Smith Rueda
CUYA FIRMA APARECE EN EL
DOCUMENTO DESEMPENA
LAS FUNCIONES INDICADAS

MINISTERIO DE RELACIONES EXTERIORES
NO SE ASUME RESPONSABILIDAD DEL TEXTO
ANULADO
079530
CUYA FIRMA APARECE EN EL DOCUMENTO DESEMPENA LAS FUNCIONES INDICADAS

COMO NOTARIO SECTORIAL DEL CIRCULO DE BOGOTA, HAJO CONSTAR QUE LA FOTOCOPIA COINCIDE CON EL ORIGINAL QUE HE TENIDO A LA VISTA
26 OCT 2004
PAULO MENDEZ BARALAS
NOTARIO (S)

H. RUEDA
donde Consular

0: 022

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NOTA PARA EL SEÑOR CONSUL DE COLOMBIA: Según los artículos 65 del C. de P.C. y 480 del C. de Co., si el poderdante es una sociedad, el Señor Cónsul debe certificar que tuvo a la vista las pruebas de su existencia, que ejerce su objeto social y que quien confiere el poder es su representante:



EL CONSULADO DE COLOMBIA EN
ESTOCOLMO, SUECIA

Fecha.....1999-07-01..... No:.....001329

Previa la confrontación correspondiente DA
FE de que la firma que aparece en este docu-
mento es similar a la REGISTRADA aquí por

Ing. Högberg, M. Relaciones
Exteriores, Suecia

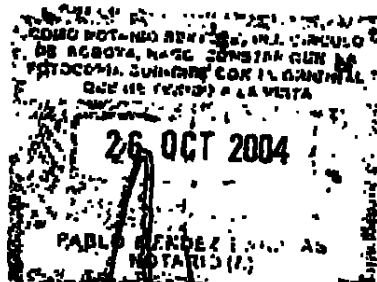
M. Smith
MARIA SMITH-RHENA

PAGADO	
Impuesto de Timbre	
<u>Diez</u>	dólares US\$ <u>7</u>
Derechos Consulares	
<u>Quince</u>	dólares US\$ <u>15</u>



RADUCCION No: 1709199

MARIA ELVIRA MARTELO
Traductora e Interprete Oficial
Inglés - Español - Inglés
Res. No. 2879 Min. Justicia



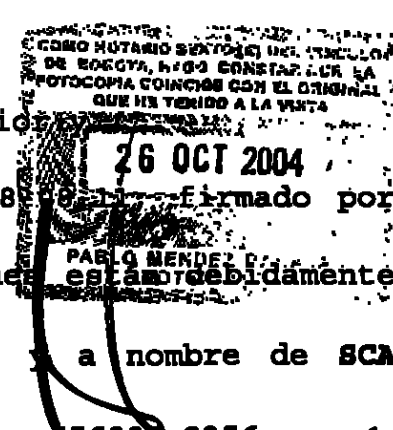
6

TRADUCCIÓN OFICIAL No. 17.07/99 preparada por María Elvira Martelo, Traductora Oficial aprobada por el Ministerio de Justicia por Resolución 2879 de 1995 y reconocida por el Ministerio de Relaciones Exteriores.

(A continuación se traducen los sellos y legalizaciones de un documento escrito en inglés y español, por el cual SCA HYGIENE PRODUCTS AB otorga poder a EMILIO FERRERO, GONZALO PERDOMO, LUZ CLEMENCIA DE PAEZ Y GERMAN CAVELIER). Dado y firmado el 19 de febrero de 1999 en Gothenburg. (Firma ilegible) Bengt Forshult, Jefe del Departamento de Patentes.

Yo, el abajo firmante RICKARD STRÖM, Notario Público de Gothenburg, Suecia, por el presente certifico,

que Bengt Forshult

ha firmado personalmente el documento anterior 
que de acuerdo con el poder de fecha 1998-07-20, firmado por GUNNAR ANDERSSON y SVEN-ERIK WINLÖF, quienes están debidamente autorizados para firmar conjuntamente por y a nombre de SCA HYGIENE PRODUCTS AKTIEBOLAG - Org. No. 156007-2356; según Certificado de Registro Sueco de fecha 1998-07-20, Bengt Forshult está debidamente autorizado para firmar dicho documento a nombre de la compañía. Gothenburg, 25 de febrero de 1999.

Ex oficio: (Firma ilegible), RICKARD STRÖM (Sello notarial).

Exp. No.: 79234

Derechos: SEK 350:--.

No. 3066

El Ministerio de Relaciones Exteriores en Estocolmo por el presente certifica que el Sr. Rickard Ström, Notario Público de Goteborg, ha expedido y firmado la declaración anterior en su capacidad oficial.

Derechos Estocolmo, 25 de marzo

Kr. 120 PAGADOS de 1999

(Firma ilegible) Inger Högberg. (Sello en tinta) Ministerio de Relaciones Exteriores.

(En español) Certificación de la capacidad legal de Bengt Forshult y de la existencia legal de SCA HYGIENE PRODUCTS AKTIEBOLAG expedida el 5 de marzo 1999 por el Consulado de Colombia en Estocolmo bajo el No. 022. (Firma) M. Smith. MARÍA SMITH RUEDA, Encargada de las Funciones Consulares. Sello consular en tinta. Pagados impuesto de timbre y derechos consulares.

(En español) Certificación de la firma de Inger Högberg, Ministerio de Relaciones Exteriores, Suecia, expedida el 01 de julio de 1999 por el Consulado de Colombia en Estocolmo bajo el No. 001329. (Firma) M. Smith. MARÍA SMITH RUEDA, Encargada de las Funciones Consulares. Sello consular en tinta. Pagados impuesto de timbre y derechos consulares.

(Al anverso) Legalización de la firma que antecede expedida por

el MINISTERIO DE RELACIONES EXTERI RES bajo el No. 119916 del 14 de febrero del 2000, firmado por el Jefe de Legalizaciones.

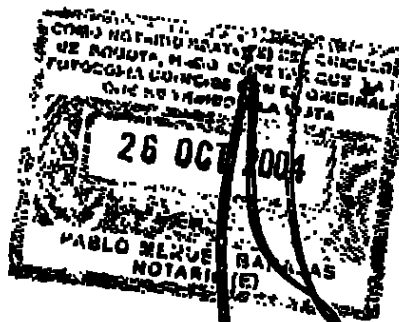
Es traducción fiel y completa de la cual se deja copia en esta oficina para su confrontación.

COLO 11256-801-014-7

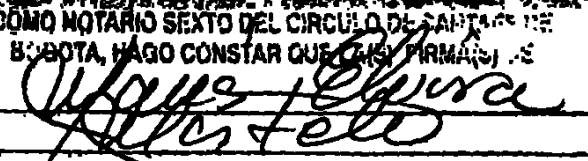
Id. 108

Feb. 15/00

Maria Elvira Martelo
TRADUCCION No. 1707/99
MARIA ELVIRA MARTELO
Traductora e interprete Oficial
Inglés - Español - Inglés
Res. No. 2879 Min. Justicia



MINISTERIO DE RELACIONES EXTERI RES
220552.
CIVILIA MARTELO
CUYA FIRMA ADECUA SE DEBE
DOCUMENTAR DESEMPENAR
LAS FUNCIONES INDICADAS
2000 FEB 15/00
Jefe de LEGALIZACIONES
SANTAFÉ DE BOGOTÁ

COMO NOTARIO SEXTO DEL CIRCULO DE SANTARE DE
 BOGOTA, HAGO CONSTAR QUE CADA FIRMA

 COINCIDE(N) CON LA FIRMA REGISTRADA POR
 EL (ELLOS) EN ESTA NOTARIA
 SANTARE DE BOGOTA
 15 FEB 2000



EXHIBICION

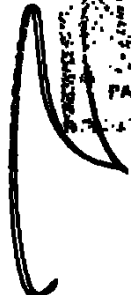
50225

EXHIBICION

2004 OCT 26

EXHIBICION

COMO NOTARIO SEXTO DEL CIRCULO DE SANTARE DE
 BOGOTA, HAGO CONSTAR QUE CADA FIRMA
 COINCIDE(N) CON LA REGISTRADA EN ESTA NOTARIA
 26 OCT 2004
 PABLO MENDEZ VILLALBA
 NOTARIO (F)



CAVELIER

356

OK 9

ABOGAD S
EDIFICIO SISKI
CARRERA 4a N° 72-35
BOGOTA, 8 - COLOMBIA

CESION

Yo, (nosotros) abajo firmado (s)

Mikael Strandqvist

domiciliado(s) en

Dalavagen 87, SE-437 36 LINDOME, Suecia

declaro(amos) bajo juramento ser único(s) y verdadero(s) inventor(es) de la invención:

materiales no tejidos entrelazados hidráulicamente
y método para fabricar el mismo

declaro(amos) así mismo que cedo(emos) y transfiero(emos), sin limitación, a favor de la sociedad

SCA HYGIENE PRODUCTS AB

constituida y existente de conformidad con las leyes de

SUECIA

domiciliada en

SE-405 03 GÖTEBORG, SUECIA

todos los derechos inherentes a dicha invención y que la citada Compañía queda facultada para solicitar en su nombre la patente de modelo de utilidad correspondiente en la República de Colombia.

ASSIGNMENT

I (we), the undersigned

Mikael Strandqvist

of Dalavägen 87, SE-437 36 LINDOME, Sweden

state(s) under oath to be sole and true inventor(s) of the invention:

Hydraulically entangled nonwoven material and method for making it

state as well, that assign, without reservations or limitations in favour of

SCA HYGIENE PRODUCTS AB

a corporation constituted and existing in conformity with the laws of

Sweden

domiciled in

SE-405 03 GÖTEBORG, Sweden

all rights inherent to said invention and that the above mentioned company hereby is enabled to apply, in its name, for the corresponding utility patent application, in the Republic of Colombia

Dado y firmado hoy/ Given and signed this 01/09

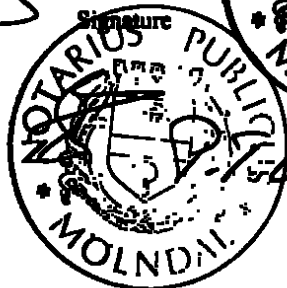
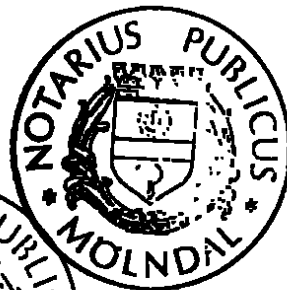
1st day of September 2004

en/in

Firma

Mikael Strandqvist

Signature



AUTENTICACION NOTARIAL (INDIVIDUO)

A los 0 días del mes de septiembre de 2004 ante mí, Notario Público de Mölnadal, Suecia compareció(ron) personalmente Mikael STRANDQVIST

a quien(as) doy fe de conocer y me consta que es(son) la(s) persona(s) firmante(s) del documento que precede, y quien(es) tiene(n) capacidad legal para otorgarlo.

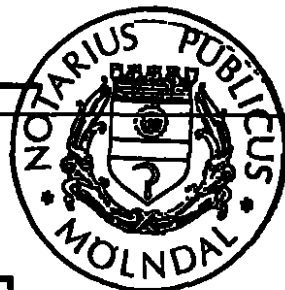
Notario Público/Notary Public

NOTARIAL AUTHENTICATION (INDIVIDUAL)

On this 0th day of September 2004 before me, a Notary Public of Mölnadal, Sweden personally appeared

Mikael Strandqvist

to me known, and known to me to be the person(s) who executed that foregoing document, and who has (have) legal capacity to execute it.



Value p. f.!

APOSTILLE

(Convention de La Haye du 5 octobre 1961)

1. Country: SWEDEN
- This public document
2. has been signed by BENGT LION
3. acting in the capacity of NOTARY PUBLIC
4. bears the seal/stamp of

Certified

5. at
6. the
7. by
8. No.
9. Seal/stamp
10. Signature

APOSTILLA
(Convention de La Haye du 5 octobre 1961)

1. Pais: Suecia

El presente documento oficial

2. ha sido firmado por Bengt Lion

3. en su calidad de Notario Público en Mölndal

4. y lleva el timbre/sello de Notario Público en Mölndal

Atestado

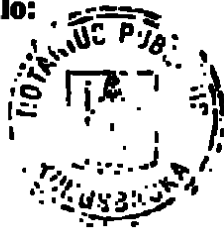
5. en Kungsbacka

6. el 8 de septiembre de 2004

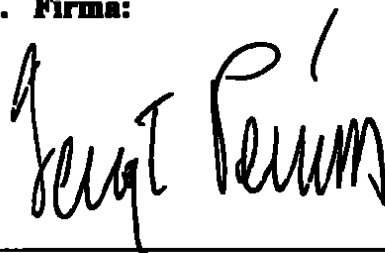
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(54) Title: HYDRAULICALLY ENTANGLED NONWOVEN MATERIAL AND METHOD FOR MAKING IT



25 27

(57) Abstract: The invention refers to a wetlaid or foam formed hydraulically entangled nonwoven material containing at least 30 %, by weight, pulp fibres and at least 20 %, by weight, manmade fibres or filaments. The material has a basis weight variation in a non-random pattern in that it comprises a plurality of higher basis weight cushions (25) protruding from one major surface of said material, said cushions as a main component comprises pulp fibres (26) and are surrounded by a lower basis weight network (27) which as a main component comprises said manmade fibres (28) or filaments. The invention further refers to a method for making the material.

WO 03/083197 A1

Hydraulically entangled nonwoven material and method for making it**TECHNICAL BACKGROUND**

5

The present invention refers to a wetlaid or foam formed hydraulically entangled nonwoven material containing at least 30%, by weight, pulp fibres and at least 20%, by weight, manmade fibres. It further refers to a method of making such a material.

- 10 Hydroentangling or spunlacing is a technique introduced during the 1970'ies, see e g CA patent no. 841 938. The method involves forming a fibre web, which is either drylaid or wetlaid, after which the fibres are entangled by means of very fine water jets under high pressure. Several rows of water jets are directed against the fibre, web which is supported by a movable wire. The entangled fibre web is then dried. The fibres that are used in the
- 15 material can be natural fibres, especially cellulosic pulp fibres, manmade staple fibres, which may be synthetic, e g polyester, polyamide, polyethylene, polypropylene, or regenerated staple fibres, eg viscose, rayon, lyocell or the like, and mixtures of pulp fibres and staple fibres. Spunlace materials can be produced in high quality to a reasonable cost and they possess a high absorption capacity. They can e g be used as wiping material for
- 20 household or industrial use, as disposable materials in medical care and in hygiene purposes etc.

- Through e g EP-B-0 333 211 and EP-B-0 333 228 it is known to hydroentangle a fibrous mixture in which one of the fibre components is continuous filaments in the form of
- 25 meltblown fibres.

In WO 96/02701 there is disclosed hydroentangling of a foam formed fibrous web. The fibres included in the fibrous web can be pulp fibres and other natural fibres and manmade fibres.

30

- During the hydroentanglement the fibre web is supported either by a wire or a perforated, cylindrical metal drum. An example of a hydroentanglement unit of this kind is disclosed in for example EP-A-0 223 614. However, supporting members in the form of wires of the type utilised in connection with paper production is the most frequently occurring type as
- 35 for example is shown in EP-A-0 483 816. One disadvantage with using wires of this type is that the fibre web, during the hydroentanglement, is exerted to a strong action by the water jets and will penetrate into and get caught between the wire threads. It may then be difficult to separate the final product from the wire.

- 40 WO 01/88261 discloses the use of a moulded, close-meshed screen of thermoplastic material as supporting member during hydroentanglement of a fibrous web. The removal of the final product from such screen is simplified as compared to a wire.

When making a nonwoven material, especially a material that is intended to be used as a wiping material, there are many properties that are important, such as absorptive capacity, absorption speed, wet strength, softness, drapability, low linting, high cleaning ability etc. It is however difficult to combine all these properties in one and the same material. It is for example possible to make cloth like, soft, strong and low linting hydroentangled nonwoven material by using 100% synthetic fibres. However the absorption properties of such a material will be low. Materials containing a high amount of pulp fibres have a high absorptive capacity, but a poor wet strength and high linting. The wet strength and linting properties can be improved by the addition of chemicals, such as wet strength agents and binders.

SUMMARY OF THE INVENTION

The object of the present invention is to provide a hydroentangled nonwoven material that combines properties like wet strength, absorptive capacity, softness and drapability. This has been achieved by a wetlaid or foam formed hydraulically entangled nonwoven material containing at least 30%, by weight, pulp fibres and at least 20%, by weight, manmade fibres or filaments, said nonwoven material having a basis weight variation in a non-random pattern in that it comprises a plurality of higher basis weight cushions protruding from one major surface of said material, said cushions as a main component comprises pulp fibres and are surrounded by a lower basis weight network which contains a relatively higher amount of manmade fibres or filaments as compared to the cushions.

It is believed that this specific structure provides:

- a cloth like appearance of the material;
- high strength due to the network of the manmade fibres;
- high absorptive capacity provided by the high pulp content cushions and the three-dimensional structure formed by these;
- high softness and drapability due to the plurality of bending indications provided by the network pattern.

The opposite major surface of the material is preferably substantially smooth. This will improve the capability of the material to wipe a surface dry from any remaining liquid.

The material preferably contains 40%, and more preferably at least 50%, by weight, pulp fibres. Preferably it contains at least 30%, and more preferably at least 40%, by weight, manmade fibres or filaments. The manmade fibres are in one embodiment staple fibres of a length between 6 mm and 25 mm.

It is preferred that the material has an absorptive capacity of at least 5 g/g water.

It is further preferred that the material has an absorption speed, WAT, in MD of no more than 1,5 s/m, preferably no more than 1 s/m, and in CD of no more than 2,5 s/m, preferably no more than 2 s/m.

In a preferred embodiment the cushions have a length and width between 0,2 and 4 mm, preferably between 0,5 and 2 mm. It is further preferred that the distance between the adjacent cushions is between 0,2 and 4 mm, preferably between 0,5 and 2 mm.

- 5 The present invention also refers to a method of producing a nonwoven material as stated above, said method comprises wetlaying or foamforming a fibre dispersion to form a fibrous web containing at least 30%, by weight, pulp fibres and at least 20%, by weight, manmade fibres or filaments, calculated on the total weight of the fibres in said fibrous web, and hydroentangling the fibrous web followed by subsequent dewatering and drying,
- 10 wherein
- at least part of the hydroentangling step is performed on a foraminous support member in the form of a moulded, close-meshed screen of a thermoplastic material, said screen having apertures of the cross-dimensional size 0.2 - 4 mm the and the distance between the apertures being between 0.2 - 4 mm.
- 15 Preferably the apertures in said screen are of the size 0.5 - 2 mm and the distance between the apertures is between 0.5 - 2 mm.

- In one embodiment the fibrous web is formed on a formation wire and is subjected to a
- 20 first hydroentangling while supported on said formation wire, and is then transferred to said moulded, close-meshed screen where it is subjected to a further hydroentangling.

- Preferably said further hydroentangling is performed from the opposite side of the fibrous web as compared to the first hydroentangling.

- 25 In a preferred embodiment the web is after dewatering subjected to non-compacting drying, such as through-air-drying, IR drying or the like. In order to maintain bulk and absorbency of the material preferably no pressing of the fibrous web takes place during dewatering and drying.

30

DESCRIPTION OF THE DRAWINGS

- The invention will below be described with reference to some embodiments described in
- 35 the accompanying drawings.

Fig. 1 is a schematic view of a device for hydroentangling a fibrous web.

Fig. 2 shows a schematic perspective view, on an enlarged scale, of a screen used for supporting the fibrous web during the hydroentangling.

- Fig. 3 is a picture taken of a nonwoven material according to the invention on a
- 40 magnification of about 30 times.

Fig. 4 and 5 are electron microscope (SEM) pictures of a nonwoven material according to the invention.

DESCRIPTION OF EMBODIMENTS

The device, which schematically is shown in Fig. 1, for manufacturing a so-called hydroentangled or spunlaced material, comprises a vessel 10, e.g. a pulper, in which a wet or foamed fibre dispersion is prepared, which via a headbox 11 is distributed on a foraminous support member 12. This foraminous support member 12 is preferably a wire of any conventional kind used in papermaking industry and which is suited for formation and for a first hydroentangling step to intertwine at least the manmade fibres present in the web. The formed fibrous web 13 is then subjected to hydroentanglement from several rows of nozzles 14, from which water jets at a very high pressure are directed towards a fibrous web, while this is supported by the foraminous support member 12. The fibrous web is drained over suction boxes 15. Thereby, the water jets accomplish an entanglement of the fibrous web, i.e. an intertwining of the fibres. Appropriate pressures in the entanglement nozzles are adapted to the fibrous material, grammage of the fibrous web, etc. The water from the entanglement nozzles 14 is removed via the suction boxes 15 and is pumped to a water purification plant, and is then re-circulated to the entangling stations.

For a further description of the hydroentanglement or, as it is also called, spunlacing technology, reference is made e.g. to the above-mentioned CA patent No. 841 938.

The fibrous web 13 is either wet-laid or foam-formed. In a wet-laid process the fibres are dispersed in a liquid, normally water, in a similar way as in a papermaking process and the dilute fibre dispersion is deposited on the foraminous support member where it is dewatered to form a continuous web-like material. The fibre dispersion may be diluted to any consistency that is typically used in conventional papermaking process. A foam forming process is a variant of a wet-laying process and a surfactant is added to the fibre dispersion, which is foamed, and the foamed fibre dispersion is deposited on the foraminous support. A very even fibre distribution is achieved in a foam forming process and it is also possible to use longer fibres than in a conventional wet-laying process.

The fibres used to form the fibre dispersion is a mixture of cellulosic pulp fibres and manmade staple fibres or manmade filaments. The pulp fibres can be selected from any type of pulp and blends thereof. Preferably the pulp is characterized by being entirely natural cellulosic fibres and can include cotton as well as wood fibres. Preferred pulp fibres are softwood papermaking pulp, although hardwood pulp and non-wood pulp, such as hemp and sisal may be used. The length of pulp fibres may vary from less than 1 mm for hardwood pulp and recycled pulp, to up to 6 mm for certain types of softwood pulp. The fibre dispersion should contain at least 30% by weight, calculated on the total fibre weight, pulp fibres.

The manmade fibres may be any suitable synthetic fibres or regenerated cellulosic fibres. Examples of commonly used synthetic fibres are polyester, polyethylene, polypropylene, polyamide, polylactides and/or copolymers thereof. Examples of regenerated fibres are

rayon, viscose, lyocell. The manmade fibres may be in the form of staple length fibres. A preferred length of staple fibres used in a wetlaying or foam forming process is between 6 mm and 25 mm. The fineness of the fibres can vary between 0,3 dtex and 6 dtex. The fibre dispersion should contain at least 20% by weight, calculated on the total fibre weight, 5 manmade fibres.

The manmade filaments are preferably spunlaid or meltblown filaments of suitable thermoplastic polymers, such as polyethylene, polypropylene, polyamides, polyesters and polylactides. Copolymers of these polymers may of course also be used, as well as natural 10 polymers with thermoplastic properties.

The web 13 is turned 180° and transferred to a second foraminous support member 16, which in a preferred embodiment is constituted of a moulded, close-meshed plastic screen, as disclosed in WO 01/88261. The plastic screen according to the invention can consist of 15 one layer, as shown in Fig. 2, or of two or several layers applied on top of each other. Possibly, the screen can be reinforced with reinforcement wires 17 which extend in the intended machine direction of the plastic screen/entanglement wire 16. Reinforcement wires can be arranged also in the transverse direction of the screen, or both in the longitudinal and the transverse direction. The production of the plastic screen can take 20 place e.g. in the way described in US 4,740,409. The plastic screen is provided with a plurality of apertures 18, which will be described in greater detail below.

The web is hydroentangled a second time from several rows of nozzles 19 while supported on the plastic screen member 16. The second hydroentanglement takes place from the 25 opposite side of the fibrous web 13 as compared to the first hydroentanglement. The fibrous web is drained over suction boxes 20.

Further dewatering of the fibrous web may take place over suction boxes 21, while the web 13 has been transferred to a dewatering wire 22. This further dewatering may 30 optionally take place while the fibrous web is still supported by the plastic screen member 16.

The entangled material is then brought to a drying station 23 for drying before the finished material is reeled up and converted. Drying can be performed by blowing hot air through 35 the fibrous web, by IR dryers or other non-compacting drying technique. Preferably no pressing of the fibrous web takes place during dewatering and drying thereof. The material may before conversion be exerted to different kind of treatments, such as corona or plasma treatment 24, treatment with chemicals of any desired kind etc. Corona or plasma treatment is preferably made after drying while chemicals may be added either to the fibre 40 dispersion or after dewatering of the web by spraying printing or the like.

In the embodiments shown in Fig. 2, the apertures 15 in the screen 16 exhibit a rectangular shape, but it is evident that this shape can be varied to any geometrical shape. The meshes in the screen suitably exhibit an aperture size within the interval 0.2 -

- 4 mm, preferably 0.5 - 2 mm. The aperture size is herein defined as the size between opposite side edges or corners. The apertures are either of substantially the same size or of different sizes, and are either uniformly distributed across the screen or arranged to form patterns with alternating groups of apertures of different sizes. Also the cross-sectional shape of the apertures in the z-direction can be varied, and can be e.g. substantially rectangular, alternatively convex or concave. The distance between the apertures may vary between 0.2 - 4 mm, preferably between 0.5 and 2 mm. The distance between the apertures is defined as the shortest distance between adjacent apertures.
- 10 In case the screen consists of two or several layers arranged on top of each other, the different layers can exhibit different aperture sizes among themselves, e.g. with larger apertures in an upper layer and smaller apertures in a lower layer. This is shown in WO 01/88261. In this way, fibres can penetrate down into the larger apertures in the upper layer but be retained by the lower layer during the entanglement.
- 15 The surface, which is intended to support the fibrous web, can be substantially smooth, or exhibit a three-dimensional structure in order to impart a corresponding three-dimensional structure to the hydroentangled material.
- 20 Other foraminous supports such as wires and other types of screens may also be used, which have apertures of the size stated above.
- When hydroentangling the fibre dispersion through the apertured screen 16 the shorter pulp fibres, which are more easily mobile, will to a higher extent follow the water that is drained through the apertures 18 and be accumulated in said apertures, while the longer manmade fibres which are less mobile and more easily intertwined by the water jets, will to a higher extent stay in place on the screen 16 and build up a strong fibrous network.
- This will result in a nonwoven material having a plurality of cushions 25 protruding from one major surface of the material, said cushions as a main component comprise pulp fibres 26 that during drainage have accumulated in the apertures 18 of the screen 16. The term "main component" in this respect means that more than 50% by weight, preferably more than 60% by weight and more preferably more than 70% by weight of the fibres present in said cushions are pulp fibres 26. A minor proportion of the fibres in the cushions 16 will of course be manmade fibres.
- The pulp fibre cushions 25 are surrounded by a network 27, which contains a relatively higher amount of manmade fibres 28 as compared to the cushions 25. In a preferred embodiment more than 50% by weight, preferably more than 60% by weight and more preferably more than 70% by weight of the fibres present in said network are manmade fibres 28. The longer manmade fibres 28 are more easily entangled and will intertwine with each other to form a strong continuous network 27 which will impart high strength to the material. The pulp fibre cushions contribute to the absorbency of the material. This is shown in Figs. 4 and 5 showing SEM-pictures of a material according to the invention, and in which the accumulation of pulp fibres 26 to form the cushions 25 can be seen. It is

further seen how these cushions 25 are surrounded by a network. This is also seen from the light microscope picture in Fig. 3.

In order to provide a pronounced cushion effect at least 30% by weight and preferably at least 40% of the fibres in the material should be pulp fibres and in order to provide a strong network of manmade intertwined fibres at least 20% by weight and preferably at least 30% by weight of the fibres in the material should be manmade fibres.

The length and width dimensions of the cushions 25 will correspond to the size of the apertures 18 of the screen 16 and the width of the network strands 27 between the cushions 25 will correspond to the distance between adjacent apertures 18 of the screen 16.

The opposite major surface of the material is preferably substantially smooth as compared to the first surface having a pronounced three-dimensional structure provided by the plurality of protruding cushions. This gives the material a two-sidedness with one side that is more "rough" and adapted to remove and capture liquids, viscous fluids and solid particles from a surface. The opposite smooth surface is adapted to wipe a surface dry from liquid.

20

Tests have been performed on materials produced as described below.

A foamformed fiber dispersion was made from water, surfactant and a mixture of pulp fibres and manmade staple length fibres. A surfactant was added to the water in an amount of 0.03% by weight. The foamed fibre dispersion was laid on a wire and the formation was made at an air content in the foam of 30-50% by volume. The fibrous web was hydroentangled on the same wire used for formation. The web was then transferred to a moulded, close-meshed plastic screen as disclosed above, having holes of the size 0,89x0,84 mm and a distance between the holes of 0,46 mm. The web was then hydroentangled from the opposite side. The main part of the hydroentangling was made on the first wire in order to give maximum strength to the material. The total energy supply at the hydroentangling was about 200 kWh/ton material.

The fibrous web was then dewatered by vacuum suction boxes and dried by so called through-air-drying (TAD).

35

The fibres used for forming the fibrous web had the following composition:

Ex. 1: 25wt% polyester (PET) from KoSa, 1,7dtex/19mm;
17 wt% polypropylene (PP) from Fibervisions, 1,7dtex/18mm;
58 wt% bleached sulphate pulp fibres from Korsnäs, Vigor Fluff.

40

Ex. 2: 40wt% polypropylene (PP) from Fibervisions, 1,7dtex/18mm;

50wt% bleached sulphate pulp fibres from Korsnäs, Vigor Fluff.

As reference material was used a nonwoven wiping material produced by SCA Hygiene Products AB under the trade mark E-Tork Strong™ . It is made by wet forming a fibre mixture and hydroentangling thereof. However there is not used any moulded, close-meshed plastic screen, but the hydroentangling process is performed on a conventional papermaking wire. The material does not have the patterned three-dimensional structure as claimed by the present invention, but a more uniform fibre distribution. The fibre composition in the reference material was as follows:

- 10 Ref.: 25wt% polyester (PET) from KoSa, 1,7dtex/19mm;
17 wt% polypropylene (PP) from Steen, 1,7dtex/18mm;
58 wt% bleached sulphate pulp fibres from Korsnäs, Vigor Fluff.

Thus the fibre composition is the same as for Ex. 1 except that the PP fibres are from another manufacturer.

Evaluations concerning strength properties both in dry and wet conditions, absorbency, wicking rate were performed and gave the results presented in Table 1 below:

20 Table 1

		Ex. 1	Ex. 2	Ref.
Grammage	g/m ²	76,4	88,0	83,0
Thickness	µm	623	641	357
Bulk 2kPa	cm ³ /g	8,2	7,3	4,3
Tensile stiffness MD	N/m	30230	38385	57518
Tensile stiffness CD	N/m	2096	6488	6689
Tensile stiffness index	Nm/g	104	179	236
Tensile strength MD, dry	N/m	3126	3061	1499
Tensile strength CD, dry	N/m	672	745	630
Tensile index, dry	Nm/g	19	17	12
Stretch MD	%	28	33	13
Stretch CD	%	71	45	44
Stretch sq root(MDCD)	%	45	39	24
Work to rupture MD	J/m ²	647	714	251
Work to rupture CD	J/m ²	347	238	261
Work to rupture index	J/g	6	5	3
Tensile strength MD, water	N/m	2066	3028	568
Tensile strength CD, water	N/m	330	619	185
Tensile index, water	Nm/g	10,8	15,6	3,9
Relative strength, water	%	57	91	33
Tensile str. MD, surfactant	N/m	1536	3002	407
Tensile str. CD, surfactant	N/m	330	647	122
Tensile index, surfactant	Nm/g	9,3	18,2	2,5
Rel. strength, surfactant	%	49	96	15
Absorption DIN, water	g/g	6,0	5,1	3,9
Absorption speed WAT, x-dir. (CD)	s/m	0,4	0,7	1,7

Absorption speed WAT, y-dir. (MD) s/m	0,8	1,3	2,7
Wet linting part./m ²	397	228	259

The tensile stiffness, tensile strength, work to rupture and stretch were measured according to the test method SCAN-P44:81.

- 5 The absorption DIN was measured according to the test method DIN 54 540, part 4, with the modification that the sample was suspended vertically during soaking and not in horizontal position as in the standard method.

The absorption speed WAT was measured according to the test method SCAN-P 62:88.

- 10 However the following modification of the sample was made: Instead of aiming for a total grammage of between 100 and 150 g/m² of the sample sheaf, we have aimed for a total thickness of 1 mm. No measurements of the absorption speed in z-direction were made.

- These results show superior strength properties both in dry and wet conditions for the
15 nonwoven materials according to the invention. This is believed to be due to the strong network that is created by the manmade fibres present in the material, said network being more or less continuous. The choice of manmade fibres also plays an important role for the strength of the material, and it is seen from the test results that Ex. 2 which contains 40% by weight polypropylene fibres (1,7dtex/18mm), has improved strength properties as
20 compared to Ex. 1 containing a mixture of polyester and polypropylene, 25% polyester (1,7dtex/19mm) and 17% polypropylene fibres (1,7dtex/18mm). However both materials have considerably higher strengths, i. e. tensile strength (dry, water, surfactant), stretch and work to rupture, as compared to the reference material.

- 25 The materials according to the invention are less stiff than the reference material.

- The materials according to the invention further have improved absorption properties, both total absorbency and absorption or wicking speed (WAT), as compared to the reference material. This is believed to be due to a combination of the high concentration of pulp
30 fibres present in the plurality of cushions protruding from one side of the material, said cushions of pulp fibres being capable of absorbing and holding liquid, and the network of predominantly manmade fibres, said network being adapted to distribute the liquid in the material.

CLAIMS

1. A wetlaid or foam formed hydraulically entangled nonwoven material containing at least
5 30%, by weight, pulp fibres and at least 20%, by weight, manmade fibres or filaments,
characterized in,
that said nonwoven material has a basis weight variation in a non-random pattern in that
it comprises a plurality of higher basis weight cushions (25) protruding from one major
surface of said material, said cushions as a main component comprises pulp fibres (26)
10 and are surrounded by a lower basis weight network (27) which contains a relatively
higher amount of manmade fibres or filaments (28) as compared to the cushions (25).
2. A nonwoven material as claimed in claim 1,
characterized in,
15 that the opposite major surface of the material is substantially smooth.
3. A nonwoven material as claimed in claim 1 or 2,
characterized in,
that it contains at least 40%, preferably at least 50%, by weight, pulp fibres.
20
4. A nonwoven material as claimed in any of claims 1-3,
characterized in,
that it contains at least 30%, preferably at least 40%, by weight, manmade fibres or
filaments.
25
5. A nonwoven material as claimed in any of the preceding claims,
characterized in,
that said manmade fibres are staple fibres of a length between 6 mm and 25 mm.
- 30 6. A nonwoven material as claimed in any of the preceding claims,
characterized in,
that it has an absorptive capacity of at least 5 g/g water.
7. A nonwoven material as claimed in any of the preceding claims,
35 characterized in,
that it has an absorption speed, WAT, in MD of no more than 1,5 s/m and in CD of no
more than 2,5 s/m.
8. A nonwoven material as claimed in claim 7,
40 characterized in,
that it has an absorption speed, WAT, in MD of no more than 1 s/m and in CD of no more
than 2 s/m.

9. A nonwoven material as claimed in any of the preceding claims,
characterized in,
that said cushions (25) have a length and width between 0,2 and 4 mm, preferably
5 between 0,5 and 2 mm.

10. A nonwoven material as claimed in any of the preceding claims,
characterized in,
that the width of the network strands (27) between adjacent cushions (25) is between 0.2
10 and 4 mm, preferably between 0.5 and 2 mm.

11. A method of producing a nonwoven material as claimed in claim 1, comprising
wetlaying or foamforming a fiber dispersion to form a fibrous web containing at least 30%,
by weight, pulp fibres and at least 20%, by weight, manmade fibres or filaments;
15 calculated on the total weight of the fibres in said fibrous web, and hydroentangling the
fibrous web followed by subsequent dewatering and drying,
characterized in
that at least part of the hydroentangling step is performed on a foraminous support
member in the form of a moulded, close-meshed screen (16) of a thermoplastic material,
20 said screen having apertures (18) of the cross-dimensional size 0.2 - 4 mm the and the
distance between the apertures being between 0.2 - 4 mm.

12. The method as claimed in claim 11,
characterized in
25 that the apertures (18) in said screen (16) are of the size 0.5 - 2 mm and the distance
between the apertures is between 0.2 - 5 mm.

13. The method as claimed in claim 11 or 12,
characterized in
30 that the fibrous web (13) is formed on a formation wire (12) and is subjected to a first
hydroentangling while supported on said formation wire, and is then transferred to said
moulded, close-meshed screen (16) where it is subjected to a further hydroentangling.

14. The method as claimed in claim 13,
35 characterized in
that said further hydroentangling is performed from the opposite side of the fibrous web
(13) as compared to the first hydroentangling.

15. The method as claimed in any of claims 11-14,
40 characterized in
that the web after dewatering is subjected to non-compacting drying, such as through-air-
drying, IR drying or the like.

**16. The method as claimed in claim 15,
characterized in
that no pressing of the fibrous web takes place during dewatering and drying.**

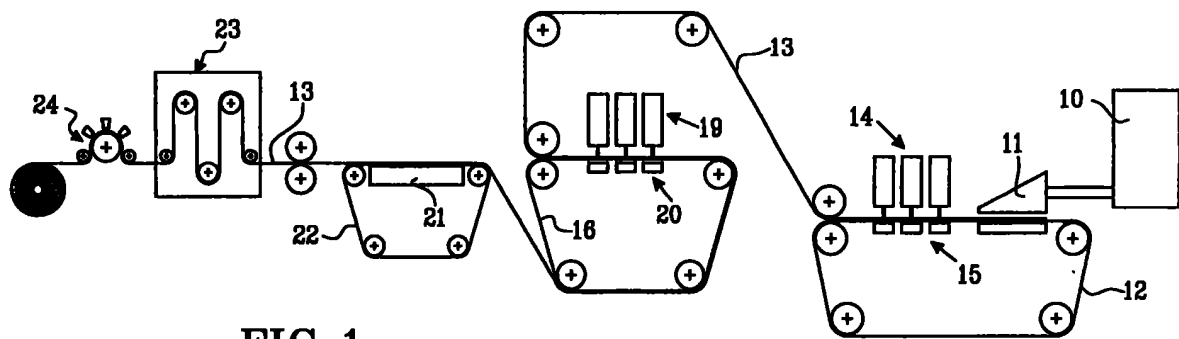


FIG. 1

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2/4

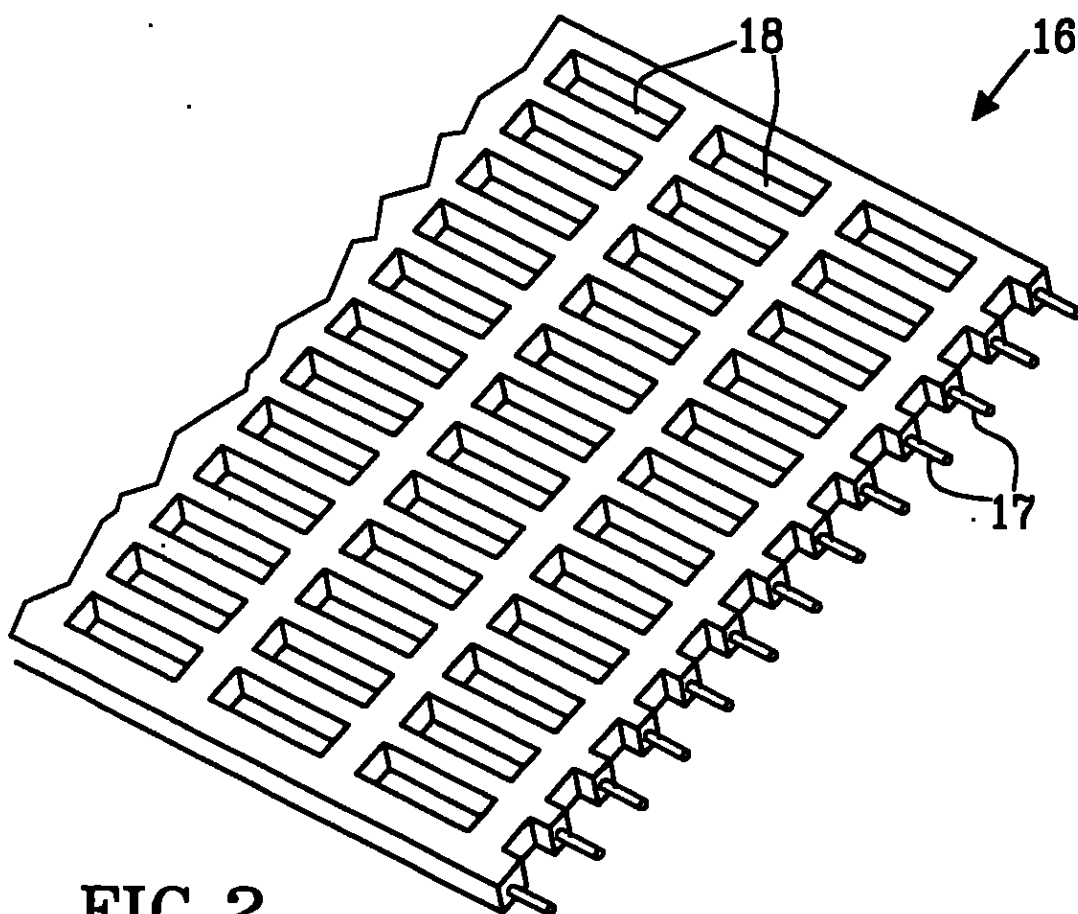
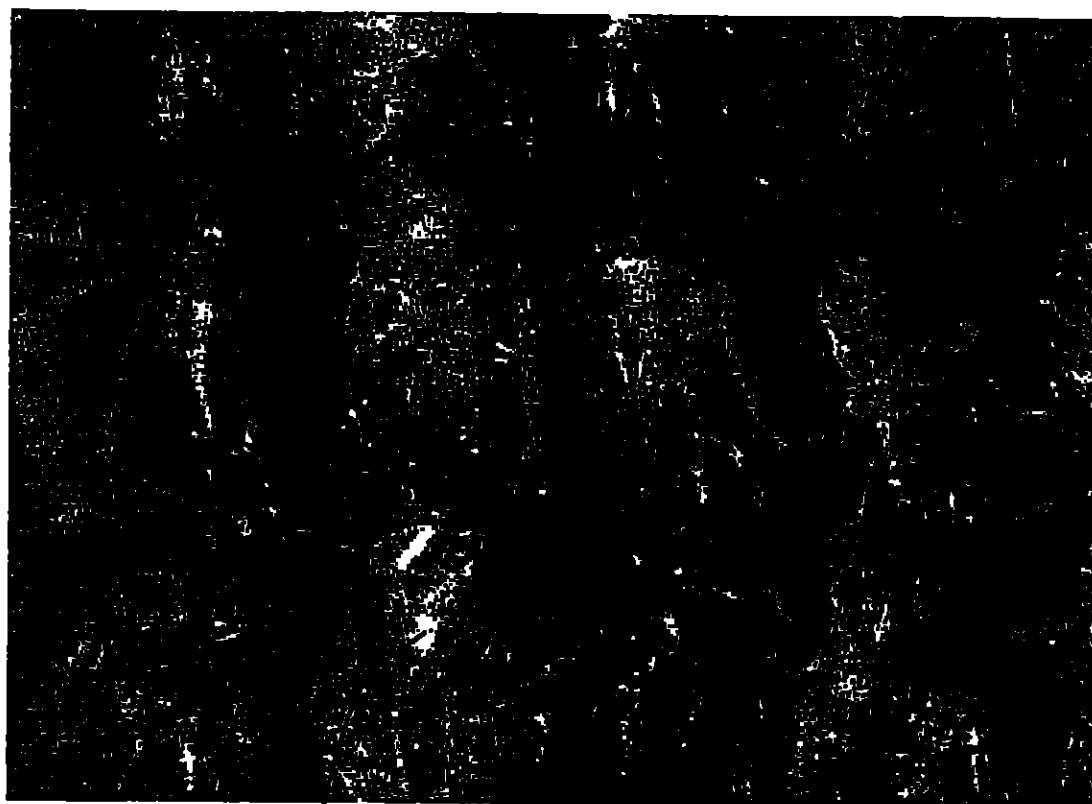


FIG. 2

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FIG.3

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FIG.4

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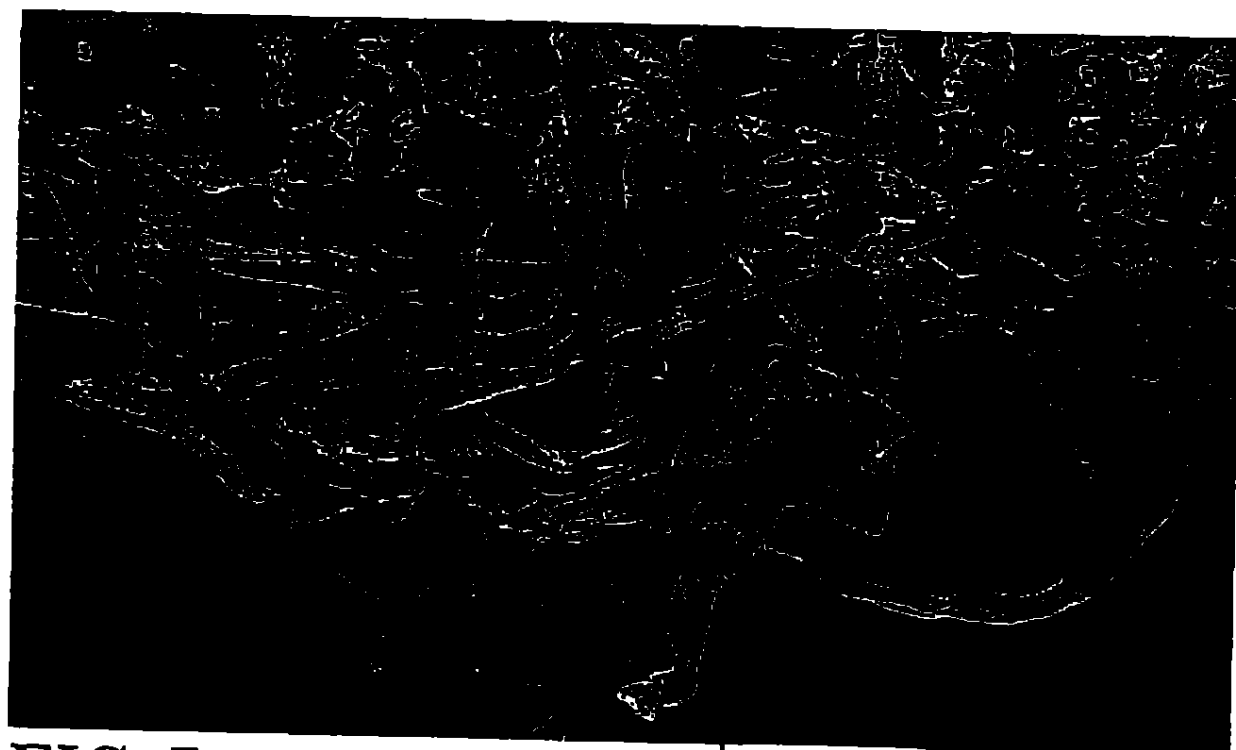


FIG.5

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 03/00486

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: D04H 1/54, D04H 1/56

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: D04H

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

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI, PAJ, FULLTEXT, INSPEC, EPOQUE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6163943 A (BERNT JOHANSSON ET AL), 26 December 2000 (26.12.00), column 6, line 14 - column 8, line 64, figures 1-5,10 --	1-16
Y	EP 0333211 A2 (KIMBERLY-CLARK CORPORATION), 20 Sept 1989 (20.09.89), column 11, line 40 - column 13, line 13, figures 1-4b --	1-16
A	EP 0333228 A2 (KIMBERLY-CLARK CORPORATION), 20 Sept 1989 (20.09.89), figures 1-4, abstract --	1-16

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"A" document member of the same patent family

Date of the actual completion of the international search

2 June 2003

Date of mailing of the international search report

11-06-2003

Name and mailing address of the ISA/
Swedish Patent Office
Box 5055, S-102 42 STOCKHOLM
Facsimile No. +46 8 666 02 86

Authorized officer

Beata Slusarczyk/Els
Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 03/00486

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 0188261 A1 (SCA HYGIENE PRODUCTS AB), 22 November 2001 (22.11.01), figures 1-4, abstract -- -----	1-6

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 03/00486

Patent document cited in search report			Publication date	Patent family member(s)		Publication date
US	6163943	A	26/12/00	AT	211193 T	15/01/02
				AU	734656 B	21/06/01
				AU	9770598 A	17/05/99
				BR	9813271 A	22/08/00
				CA	2308784 A	06/05/99
				CN	1277644 T	20/12/00
				DE	69803035 D,T	29/08/02
				EP	0938601 A,B	01/09/99
				SE	0938601 T3	
				ES	2170531 T	01/08/02
				HU	0004252 A	28/04/01
				JP	2001521075 T	06/11/01
				PL	340215 A-	15/01/01
				SE	9703886 A	25/04/99
				SK	5502000 A	09/04/01
				TR	200001120 T	00/00/00
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				DE	8916134 U	03/03/94
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				DE	68929260 D,T	17/05/01
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EP	0333228	A2	20/09/89	SE	0333228 T3	
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				DE	68913057 D,T	09/06/94
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				JP	2026972 A	29/01/90
				KR	9705852 B	21/04/97
				MX	167630 B	31/03/93
				US	4931355 A	05/06/90
WO	0188261	A1	22/11/01	AU	7048000 A	10/04/01
				EP	1290275 A	12/03/03
				SE	516427 C	15/01/02
				SE	0001688 A	09/11/01

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24

PCT

REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

International Application No.

International Filing Date

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference (if desired) (12 characters maximum) P16525PC00/CA

Box No. I TITLE OF INVENTION

"Hydraulically entangled nonwoven material and method for making it"

Box No. II APPLICANT ☐ This person is also inventor

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

SCA HYGIENE PRODUCTS AB
S-405 03 GÖTEBORG
Sweden

Telephone No.

Facsimile No.

Teleprinter No.

Applicant's registration No. with the Office

State (that is, country) of nationality: SE

State (that is, country) of residence: SE

This person is applicant for the purposes of: ☒ all designated States ☐ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

STRANDQVIST, Mikael
Dälavägen 87
S-437 36 LINDOME
Sweden

This person is: ☐ applicant only ☐ applicant and inventor ☒ inventor only (if this check-box is marked, do not fill in below.)

Applicant's registration No. with the Office

State (that is, country) of nationality:

State (that is, country) of residence:

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

☐ Further applicants and/or (further) inventors are indicated on a continuation sheet.

Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as: ☒ agent ☐ common representative

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

Ström & Gulliksson IP AB
Sjöporten 4
S-417 56 GÖTEBORG
Sweden

Telephone No. +46-31-507700

Facsimile No. +46-31-7790640

Teleprinter No.

Agent's registration No. with the Office

☐ Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Box No. V DESIGNATION OF STATES Mark the applicable check-boxes below; at least one must be marked.

The following designations are hereby made under Rule 4.9(a):

Regional Patent

- ☒ AP ARIPO Patent: GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, MZ Mozambique, SD Sudan, SL Sierra Leone, SZ Swaziland, TZ United Republic of Tanzania, UG Uganda, ZM Zambia, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT (if other kind of protection or treatment desired, specify on dotted line) utility model
- ☒ EA Eurasian Patent: AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☒ EP European Patent: AT Austria, BE Belgium, BG Bulgaria, CH & LI Switzerland and Liechtenstein, CY Cyprus, CZ Czech Republic, DE Germany, DK Denmark, EE Estonia, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, SI Slovenia, SK Slovakia, TR Turkey, and any other State which is a Contracting State of the European Patent Convention and of the PCT
- ☒ OA OAPI Patent: BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, GQ Equatorial Guinea, GW Guinea-Bissau, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT (if other kind of protection or treatment desired, specify on dotted line)

National Patent (if other kind of protection or treatment desired, specify on dotted line):

- | | | |
|--|--|--|
| ☒ AE United Arab Emirates | ☒ GM Gambia | ☒ NZ New Zealand |
| ☒ AG Antigua and Barbuda | ☒ HR Croatia | ☒ OM Oman |
| ☒ AL Albania | ☒ HU Hungary | ☒ PH Philippines |
| ☒ AM Armenia | ☒ ID Indonesia | ☒ PL Poland |
| ☒ AT Austria <u>and utility model</u> | ☒ IL Israel | ☒ PT Portugal |
| ☒ AU Australia | ☒ IN India | ☒ RO Romania |
| ☒ AZ Azerbaijan | ☒ IS Iceland | ☒ RU Russian Federation |
| ☒ BA Bosnia and Herzegovina | ☒ JP Japan | |
| ☒ BB Barbados | ☒ KE Kenya | ☒ SC Seychelles |
| ☒ BG Bulgaria | ☒ KG Kyrgyzstan | ☒ SD Sudan |
| ☒ BR Brazil | ☒ KP Democratic People's Republic of Korea | ☒ SE Sweden |
| ☒ BY Belarus | ☒ KR Republic of Korea | ☒ SG Singapore |
| ☒ BZ Belize | ☒ KZ Kazakhstan | ☒ SK Slovakia <u>and utility model</u> |
| ☒ CA Canada | ☒ LC Saint Lucia | ☒ SL Sierra Leone |
| ☒ CH & LI Switzerland and Liechtenstein | ☒ LK Sri Lanka | ☒ TJ Tajikistan |
| ☒ CN China | ☒ LR Liberia | ☒ TM Turkmenistan |
| ☒ CO Colombia | ☒ LS Lesotho | ☒ TN Tunisia |
| ☒ CR Costa Rica | ☒ LT Lithuania | ☒ TR Turkey |
| ☒ CU Cuba | ☒ LU Luxembourg | ☒ TT Trinidad and Tobago |
| ☒ CZ Czech Republic <u>and utility model</u> | ☒ LV Latvia | |
| ☒ DE Germany <u>and utility model</u> | ☒ MA Morocco | ☒ TZ United Republic of Tanzania |
| ☒ DK Denmark <u>and utility model</u> | ☒ MD Republic of Moldova | ☒ UA Ukraine |
| ☒ DM Dominica | | ☒ UG Uganda |
| ☒ DZ Algeria | ☒ MG Madagascar | ☐ US United States of America |
| ☒ EC Ecuador | ☒ MK The former Yugoslav Republic of Macedonia | |
| ☒ EE Estonia <u>and utility model</u> | ☒ MN Mongolia | ☒ UZ Uzbekistan |
| ☒ ES Spain | ☒ MW Malawi | ☒ VC Saint Vincent and the Grenadines |
| ☒ FI Finland <u>and utility model</u> | ☒ MX Mexico | ☒ VN Viet Nam |
| ☒ GB United Kingdom | ☒ MZ Mozambique | ☒ YU Yugoslavia |
| ☒ GD Grenada | ☒ NO Norway | ☒ ZA South Africa |
| ☒ GE Georgia | | ☒ ZM Zambia |
| ☒ GH Ghana | | ☒ ZW Zimbabwe |

Check-boxes below reserved for designating States which have become party to the PCT after issuance of this sheet

- ☒ NI Nicaragua
- ☐ ☐ ☐

Precautionary Designation Statement: In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. (Confirmation (including fees) must reach the receiving Office within the 15-month time limit.)

Box No. VI PRIORITY CLAIM										
The priority of the following earlier application(s) is hereby claimed:										
Filing date of earlier application (day/month/year)	Number of earlier application	Where earlier application is:								
		national application: country or Member of WTO	regional application: regional Office	international application: receiving Office						
item (1) 28.03.2002	0200997-5	Sweden								
item (2)										
item (3)										
item (4)										
item (5)										
☐ Further priority claims are indicated in the Supplemental Box.										
The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) (only if the earlier application was filed with the Office which for the purposes of this international application is the receiving Office) identified above as: ☐ all items ☒ item (1) ☐ item (2) ☐ item (3) ☐ item (4) ☐ item (5) ☐ other, see Supplemental Box										
* Where the earlier application is an ARIPO application, indicate at least one country party to the Paris Convention for the Protection of Industrial Property or one Member of the World Trade Organization for which that earlier application was filed (Rule 4.10(b)(4)):										
Box No. VII INTERNATIONAL SEARCHING AUTHORITY										
Choice of International Searching Authority (ISA) (if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used): ISA / SE										
Request to use results of earlier search; references to that search (if an earlier search has been carried out by or requested from the International Searching Authority): <table style="width: 100%; border: none;"> <tr> <td style="width: 33%; border: none;">Date (day/month/year)</td> <td style="width: 33%; border: none;">Number</td> <td style="width: 33%; border: none;">Country (or regional Office)</td> </tr> <tr> <td style="border: none;">28.03.2002</td> <td style="border: none;">SE 02/00304</td> <td style="border: none;">Sweden</td> </tr> </table>					Date (day/month/year)	Number	Country (or regional Office)	28.03.2002	SE 02/00304	Sweden
Date (day/month/year)	Number	Country (or regional Office)								
28.03.2002	SE 02/00304	Sweden								
Box No. VIII DECLARATIONS										
The following declarations are contained in Boxes Nos. VIII (i) to (v) (mark the applicable check-boxes below and indicate in the right column the number of each type of declaration):				Number of declarations						
☐ Box No. VIII (i)	Declaration as to the identity of the inventor			:						
☐ Box No. VIII (ii)	Declaration as to the applicant's entitlement, as at the international filing date, to apply for and be granted a patent			:						
☐ Box No. VIII (iii)	Declaration as to the applicant's entitlement, as at the international filing date, to claim the priority of the earlier application			:						
☐ Box No. VIII (iv)	Declaration of inventorship (only for the purposes of the designation of the United States of America)			:						
☐ Box No. VIII (v)	Declaration as to non-prejudicial disclosures or exceptions to lack of novelty			:						

Box No. IX CHECK LIST; LANGUAGE OF FILING																																																							
This international application contains: (a) in paper form, the following number of sheets: <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%;">request (including declaration sheets)</td> <td style="width: 20%; text-align: right;">4</td> </tr> <tr> <td>description (excluding sequence listings and/or tables related thereto)</td> <td style="text-align: right;">9</td> </tr> <tr> <td>claims</td> <td style="text-align: right;">3</td> </tr> <tr> <td>abstract</td> <td style="text-align: right;">1</td> </tr> <tr> <td>drawings</td> <td style="text-align: right;">4</td> </tr> <tr> <td>Sub-total number of sheets</td> <td style="text-align: right;">21</td> </tr> <tr> <td>sequence listings</td> <td></td> </tr> <tr> <td>tables related thereto</td> <td></td> </tr> <tr> <td colspan="2"><i>(for both, actual number of sheets if filed in paper form, whether or not also filed in computer readable form; see (c) below)</i></td> </tr> <tr> <td>Total number of sheets</td> <td style="text-align: right;">21</td> </tr> </table> (b) ☐ only in computer readable form (Section 801(a)(i)) (i) ☐ sequence listings (ii) ☐ tables related thereto (c) ☐ also in computer readable form (Section 801(a)(ii)) (i) ☐ sequence listings (ii) ☐ tables related thereto Type and number of carriers (diskette, CD-ROM, CD-R or other) on which are contained the ☐ sequence listings: ☐ tables related thereto: <i>(additional copies to be indicated under items 9(ii) and/or 10(ii), in right column)</i>	request (including declaration sheets)	4	description (excluding sequence listings and/or tables related thereto)	9	claims	3	abstract	1	drawings	4	Sub-total number of sheets	21	sequence listings		tables related thereto		<i>(for both, actual number of sheets if filed in paper form, whether or not also filed in computer readable form; see (c) below)</i>		Total number of sheets	21	This international application is accompanied by the following item(s) (mark the applicable check-boxes below and indicate in right column the number of each item): <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%;">1. ☒ fee calculation sheet</td> <td style="width: 20%; text-align: right;">1</td> </tr> <tr> <td>2. ☒ original separate power of attorney</td> <td style="text-align: right;">1</td> </tr> <tr> <td>3. ☐ original general power of attorney</td> <td style="text-align: right;"></td> </tr> <tr> <td>4. ☐ copy of general power of attorney; reference number, if any:</td> <td style="text-align: right;"></td> </tr> <tr> <td>5. ☐ statement explaining lack of signature</td> <td style="text-align: right;"></td> </tr> <tr> <td>6. ☐ priority document(s) identified in Box No. VI as item(s):</td> <td style="text-align: right;"></td> </tr> <tr> <td>7. ☐ translation of international application into (language):</td> <td style="text-align: right;"></td> </tr> <tr> <td>8. ☐ separate indications concerning deposited microorganism or other biological material</td> <td style="text-align: right;"></td> </tr> <tr> <td>9. ☐ sequence listings in computer readable form (indicate type and number of carriers)</td> <td style="text-align: right;"></td> </tr> <tr> <td style="margin-left: 20px;">(i) ☐ copy submitted for the purposes of international search under Rule 13ter only (and not as part of the international application):</td> <td style="text-align: right;"></td> </tr> <tr> <td style="margin-left: 20px;">(ii) ☐ (only where check-box (b)(i) or (c)(i) is marked in left column) additional copies including, where applicable, the copy for the purposes of international search under Rule 13ter</td> <td style="text-align: right;"></td> </tr> <tr> <td style="margin-left: 20px;">(iii) ☐ together with relevant statement as to the identity of the copy or copies with the sequence listings mentioned in left column</td> <td style="text-align: right;"></td> </tr> <tr> <td>10. ☐ tables in computer readable form related to sequence listings (indicate type and number of carriers)</td> <td style="text-align: right;"></td> </tr> <tr> <td style="margin-left: 20px;">(i) ☐ copy submitted for the purposes of international search under Section 802(b-quater) only (and not as part of the international application)</td> <td style="text-align: right;"></td> </tr> <tr> <td style="margin-left: 20px;">(ii) ☐ (only where check-box (b)(ii) or (c)(ii) is marked in left column) additional copies including, where applicable, the copy for the purposes of international search under Section 802(b-quater)</td> <td style="text-align: right;"></td> </tr> <tr> <td style="margin-left: 20px;">(iii) ☐ together with relevant statement as to the identity of the copy or copies with the tables mentioned in left column</td> <td style="text-align: right;"></td> </tr> <tr> <td>11. ☒ other (specify):</td> <td style="text-align: right;">1</td> </tr> </table>	1. ☒ fee calculation sheet	1	2. ☒ original separate power of attorney	1	3. ☐ original general power of attorney		4. ☐ copy of general power of attorney; reference number, if any:		5. ☐ statement explaining lack of signature		6. ☐ priority document(s) identified in Box No. VI as item(s):		7. ☐ translation of international application into (language):		8. ☐ separate indications concerning deposited microorganism or other biological material		9. ☐ sequence listings in computer readable form (indicate type and number of carriers)		(i) ☐ copy submitted for the purposes of international search under Rule 13ter only (and not as part of the international application):		(ii) ☐ (only where check-box (b)(i) or (c)(i) is marked in left column) additional copies including, where applicable, the copy for the purposes of international search under Rule 13ter		(iii) ☐ together with relevant statement as to the identity of the copy or copies with the sequence listings mentioned in left column		10. ☐ tables in computer readable form related to sequence listings (indicate type and number of carriers)		(i) ☐ copy submitted for the purposes of international search under Section 802(b-quater) only (and not as part of the international application)		(ii) ☐ (only where check-box (b)(ii) or (c)(ii) is marked in left column) additional copies including, where applicable, the copy for the purposes of international search under Section 802(b-quater)		(iii) ☐ together with relevant statement as to the identity of the copy or copies with the tables mentioned in left column		11. ☒ other (specify):	1
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11. ☒ other (specify):	1																																																						
Figure of the drawings which should accompany the abstract: Fig. 3	Language of filing of the international application: English																																																						
Box No. X SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE <i>Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).</i> Gothenburg, March 21, 2003  Lisbeth Egeröd Ström & Guillksson IP AB																																																							

For receiving Office use only	
1. Date of actual receipt of the purported international application:	2. Drawings: ☐ received:
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:	☐ not received:
4. Date of timely receipt of the required corrections under PCT Article 11(2):	6. ☐ Transmittal of search copy delayed until search fee is paid
5. International Searching Authority (if two or more are competent): ISA /	
For International Bureau use only	
Date of receipt of the record copy by the International Bureau:	

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P16525PC00C		FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/16)	
International application No. PCT/SE 03/00486	International filing date (day/month/year) 25.03.2003	Priority date (day/month/year) 28.03.2002	
International Patent Classification (IPC) or both national classification and IPC D04H1/54, D04H1/54			
Applicant SCA HYGIENE PRODUCTS AB			
1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36. 2. This REPORT consists of a total of 5 sheets, including this cover sheet. ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 807 of the Administrative Instructions under the PCT). These annexes consist of a total of sheets.			
3. This report contains indications relating to the following items: I ☒ Basis of the opinion II ☐ Priority III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV ☐ Lack of unity of invention V ☒ Reasoned statement under Rule 66.2(a)(II) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI ☐ Certain documents cited VII ☐ Certain defects in the international application VIII ☐ Certain observations on the international application			
Date of submission of the demand 08.10.2003		Date of completion of this report 16.06.2004	
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80289 Munich Tel. +49 89 2399 - 0 Tx: 523856 epmu d Fax: +49 89 2399 - 4485		Authorized Officer Boccignone, M Telephone No. +49 89 2399-2843 	

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

 International application No. **PCT/SE 03/00486**
I. Basis of the report

1. With regard to the elements of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-9 as published

Claims, Numbers

1-16 as published

Drawings, Sheets

1/4-4/4 as published

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

30

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. **PCT/SE 03/00486**

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-16
	No: Claims	
Inventive step (IS)	Yes: Claims	1-16
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-16
	No: Claims	

2. Citations and explanations

see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/SE 03/00486

Reference is made to the following document/s/:

D1: US-A-6 163 943

D2: WO-A-01/88261

D3: EP-A-0 333 211

1. Essential technical features are missing in independent process claim 11, because the method steps described therein do not lead to the article of claim 1, in particular to an article having a basis weight variation in a non-random pattern and a plurality of higher basis weight cushions protruding from one major surface of said material, said cushions as a main component comprise pulp fibres and are surrounded by a lower basis weight network containing a higher amount of manmade fibers/filaments as compared to the cushions (Article 6 PCT).
2. However, were the above objections overcome it would appear that the subject-matter of the claims is novel and inventive over the cited prior art and that, as such, could meet the requirements of Article 33 PCT.

Document D1 shows (see from col. 2, line 42 to col. 4, line 52 and Example 1) a wetlaid and a foam formed hydraulically entangled nonwoven material containing at least 30 % by weight of pulp fibers and at least 20 % by weight manmade fibers or filaments.

The objective problem addressed by the current invention is (see page 2, lines 14 to 15) to provide a nonwoven material that combines properties like strength, absorptive capacity, softness and drapability. This is solved by having an article having a basis weight variation in a non-random pattern and a plurality of higher basis weight cushions protruding from one major surface of said material, said cushions as a main component comprise pulp fibres and are surrounded by a lower basis weight network containing a higher amount of manmade fibers/filaments as compared to the cushions.

A method for producing such a nonwoven is also claimed in claim 11.

Document D1 neither address this problem nor shows such features.

Document D2 discloses some of the features of claim 11, particularly that the foraminuous support member is in the form of a moulded, close-meshed screen of a thermoplastic material, said screen having apertures of the cross-dimensional size of 0.2-0.4 mm. It, however, neither shows the remaining features of the claim nor addresses such a problem. It also does not disclose the features of claim 1.

Document D3 does not address the problem. It refers to wet-laid, foam formed nonwoven material made of pulp and manmade fibers, however it is silent about the proportions of the materials. It is also silent about the feature "cushions" and about the foraminuous support of claim 11.

The remaining documents cited reflect a more remote state of the art.

Thus, the subject-matter of claim 1 is novel and inventive with respect to the available prior art (Article 33(1) PCT).

Dependent claims 2 to 10 define further features of the nonwoven material according to claim 1 and dependent claims 12 to 16 define further features of the method of producing a nonwoven material according to claim 11 and, thus, also appear to relate to novel and inventive subject-matter. The possibility of industrial application is obvious.

PATENT COOPERATION TREATY

33

PCT

From the INTERNATIONAL BUREAU

INFORMATION CONCERNING ELECTED
OFFICES NOTIFIED OF THEIR ELECTION

(PCT Rule 61.3)

To:

ANKOM
STRÖM & GULLIKSSON IP AB
Sjöporten 4
S-417 64 Göteborg
Sweden

2003-12-22

Ström & Gulliksson IP AB

LED

Date of mailing (day/month/year) 11 December 2003 (11.12.03)		IMPORTANT INFORMATION	
Applicant's or agent's file reference P16525PC00/C			
International application No. PCT/SE03/00486	International filing date (day/month/year) 25 March 2003 (25.03.03)	Priority date (day/month/year) 28 March 2002 (28.03.02)	
Applicant SCA HYGIENE PRODUCTS AB			

1. The applicant is hereby informed that the International Bureau has, according to Article 31(7), notified each of the following Offices of its election:

EP : AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE,
SI, SK, TR.

National : BG, CA, CN, DE, GB, IL, JP, KP, KR, MN, NO, PL, RO, RU, SK

2. The following Offices have waived the requirement for the notification of their election; the notification will be sent to them by the International Bureau only upon their request:

AP : GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW

EA : AM, AZ, BY, KG, KZ, MD, RU, TJ, TM

OA : BF, BJ, CF, CG, CI, CM, GA, GN, GO, GW, ML, MR, NE, SN, TD, TG

National : AE, AG, AL, AM, AT, AU, AZ, BA, BB, BR, BY, BZ, CH, CO, CR, CU, CZ, DK, DM, DZ, EC,
EE, ES, FI, GD, GE, GH, GM, HR, HU, ID, IN, IS, KE, KG, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
MG, MK, MW, MX, MZ, NI, NZ, OM, PH, PT, SC, SD, SE, SG, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ,
VC, VN, YU, ZA, ZM, ZW

3. Since the election(s) was (were) made after the expiration of 18 months from the priority date, the applicant is reminded that he must enter the national phase before the expiration of 20 months from the priority date before the Office(s) concerned. This must be done by paying the national fee(s) and furnishing, if prescribed, a translation of the international application (Article 22).

Some offices have fixed time limits expiring later than the above-mentioned time limit. For detailed information about the applicable time limits and the acts to be performed upon entry into the national phase before a particular Office, see Volume II of the PCT Applicant's Guide.

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer: David MALEK
Facsimile No. (41-22) 338-70-80	Telephone No. (41-22) 338 9888

PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

34

PCT

NOTICE INFORMING THE APPLICANT OF THE
COMMUNICATION OF THE INTERNATIONAL
APPLICATION TO THE DESIGNATED OFFICES

(PCT Rule 47.1(c), first sentence)

To:

STRÖM & GULLIKSSON IP AB
Sjöporten 4
S-417 64 Göteborg
SUEDE

ANKOM

2003-10-23

Ström & Gulliksson IP AB

Date of mailing(day/month/year) 09 October 2003 (09.10.03)		
Applicant's or agent's file reference P16525PC00/C		IMPORTANT NOTICE
International application No. PCT/SE03/00486	International filing date(day/month/year) 25 March 2003 (25.03.03)	Priority date(day/month/year) 28 March 2002 (28.03.02)
Applicant SCA HYGIENE PRODUCTS AB		

1. Notice is hereby given that the International Bureau has communicated, as provided in Article 20, the international application to the following designated Offices on the date indicated above as the date of mailing of this notice:

AU, AZ, BY, CH, CN, CO, DE, DZ, HU, JP, KG, KP, KR, MD, MK, MZ, RU, TM

In accordance with Rule 47.1(c), third sentence, those Offices will accept the present notice as conclusive evidence that the communication of the international application has duly taken place on the date of mailing indicated above and no copy of the international application is required to be furnished by the applicant to the designated Office(s).

2. The following designated Offices have waived the requirement for such a communication at this time:

AE, AG, AL, AM, AP, AT, BA, BB, BG, BR, BZ, CA, CR, CU, CZ, DK, DM, EA, EC, EE, EP, ES, FI, GB, GD, GE, GH, GM, HR, ID, IL, IN, IS, KE, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MG, MN, MW, MX, NI, NO, NZ, OA, OM, PH, PL, PT, RO, SC, SD, SE, SG, SK, SL, TJ, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW

The communication will be made to those Offices only upon their request. Furthermore, those Offices do not require the applicant to furnish a copy of the international application (Rule 49.1(a-bis)).

3. Enclosed with this notice is a copy of the international application as published by the International Bureau on 09 October 2003 (09.10.03) under No. 03/083197

4. **TIME LIMITS** for filing a demand for international preliminary examination and for entry into the national phase

The applicable time limit for entering the national phase will, subject to what is said in the following paragraph, be 30 MONTHS from the priority date, not only in respect of any elected Office if a demand for international preliminary examination is filed before the expiration of 19 months from the priority date, but also in respect of any designated Office, in the absence of filing of such demand, where Article 22(1) as modified with effect from 1 April 2002 applies in respect of that designated Office. For further details, see *PCT Gazette* No. 44/2001 of 1 November 2001, pages 19926, 19932 and 19934, as well as the *PCT Newsletter*, October and November 2001 and February 2002 issues.

In practice, time limits other than the 30-month time limit will continue to apply, for various periods of time, in respect of certain designated or elected Offices. For regular updates on the applicable time limits (20, 21, 30 or 31 months, or other time limit), Office by Office, refer to the *PCT Gazette*, the *PCT Newsletter* and the *PCT Applicant's Guide*, Volume II, National Chapters, all available from WIPO's Internet site, at <http://www.wipo.int/pct/en/index.html>.

For filing a demand for international preliminary examination, see the *PCT Applicant's Guide*, Volume I/A, Chapter IX. Only an applicant who is a national or resident of a PCT Contracting State which is bound by Chapter II has the right to file a demand for international preliminary examination (at present, all PCT Contracting States are bound by Chapter II).

It is the applicant's sole responsibility to monitor all these time limits.

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Judith Zahra
Facsimile No.(41-22) 740.14.35	Telephone No.(41-22) 338.91.11

MATERIAL NO TEJIDO ENREDADO HIDRÁULICAMENTE
Y MÉTODO PARA ELABORARLO

ANTECEDENTES TÉCNICOS

La presente invención se refiere a un material no tejido formado en húmedo o por medio de espuma, enredado hidráulicamente, que contiene al menos 30% en peso de fibras de pulpa y al menos un 20% en peso de fibras sintéticas. Se refiere además a un método para elaborar dicho material.

El hidroenredamiento o entrelazado (spunlacing) es una técnica que fue introducida al comienzo de los años 70, ver por ejemplo la patente canadiense no. 841.938. El método implica formar un tejido fibroso, ya sea en seco o en húmedo, después de lo cual se enredan las fibras por medio de chorros de agua muy finos a alta presión. Varias filas de los chorros de agua se dirigen contra la fibra, estando el tejido soportado por una varilla móvil. El tejido fibroso enredado es secado entonces. Las fibras usadas en el material pueden ser fibras naturales, especialmente fibras de pulpa de celulosa, fibras sintéticas cortadas, como por ejemplo poliéster,

poliamida, polietileno, polipropileno, o fibras regeneradas cortadas, por ejemplo viscosa, rayón, lyocell o similares, y mezclas de fibras de pulpa y fibras cortadas. Los materiales entrelazados pueden producirse con gran calidad a un costo razonable, y poseen una alta capacidad de absorción. Ellos pueden ser usados, por ejemplo, como material de limpieza para uso en el hogar o en la industria, como materiales desechables en asistencia médica, y para propósitos de higiene, etc.

A través, por ejemplo, de EP-B-0 333 211 y EP-B-0 333 228, se conocen las fibras hidroenredadas en las cuales uno de los componentes de la fibra son filamentos continuos en forma de fibras meltblown.

En WO 96/02701, se describe el hidroenredamiento de un tejido fibroso formado por espuma. Las fibras incluidas en el tejido fibroso, pueden ser fibras de pulpa y otras fibras naturales, y fibras sintéticas.

Durante el hidroenredamiento, el tejido fibroso se soporta sobre un tambor cilíndrico de metal, ya sea perforado o de malla. Un ejemplo de una unidad de hidroenredamiento de esta clase, se describe por ejemplo

en EP-A-0 223 614. Sin embargo, las unidades de soporte en forma de malla como las utilizadas en conexión con la producción de papel, son del tipo de ocurrencia mas frecuente, como se muestra por ejemplo en EP-A-0 483 816. Una desventaja de usar mallas de este tipo, es que durante el hidrogenredamiento se ejerce una acción fuerte sobre el tejido fibroso por causa de los chorros de agua, que penetra al interior y queda atrapada entre los hilos metálicos.

WO 01/88261 describe el uso de un tamiz moldeado de malla fina de material termoplástico como unidad de soporte durante el hidrogenredamiento de un tejido fibroso. La remoción del producto final de tal tamiz se simplifica en comparación con los hilos de malla.

Cuando se elabora un material no tejido, especialmente un material que se pretende usar como material de limpieza, hay muchas propiedades que son importantes, tales como la capacidad de absorción, la velocidad de absorción, la resistencia en húmedo, la suavidad, la caída, el bajo despeluzado, la gran capacidad de limpieza, etc. Es difícil sin embargo, combinar todas estas propiedades en un único material. Por ejemplo, es posible elaborar tipos

de telas suaves, fuertes y de bajo despeluzado a partir de material no tejido hidroenredamiento, usando fibras 100% sintéticas. Sin embargo las propiedades de absorción de tal material serán bajas. Los materiales que contienen una gran cantidad de fibras de pulpa tienen una alta capacidad de absorción, pero una pobre resistencia en húmedo y alto despeluzado. Las propiedades de resistencia en húmedo y despeluzado pueden mejorarse por la adición de productos químicos, tales como agentes para resistencia en húmedo y aglomerantes.

RESUMEN DE LA INVENCION

El objeto de la presente invención es proveer un material no tejido hidroenredamiento que combine propiedades como resistencia en húmedo, capacidad de absorción, suavidad y caída. Esto se ha logrado por medio de un material no tejido formado en húmedo o por medio de espuma, enredado hidráulicamente, que contiene al menos 30% en peso de fibras de pulpa y al menos un 20% en peso de fibras sintéticas o filamentos, dicho material no tejido teniendo una variación de peso base en un patrón no aleatorio en el que comprende una variedad de almohadillas de mayor peso base que sobresalen de una

superficie mayor de dicho material, dichas almohadillas como un componente principal comprenden fibras de pulpa y están rodeadas por una red de peso de base menor, la cual contiene una cantidad relativamente alta de fibras sintéticas o de filamentos comparada con la de las almohadillas.

Se cree que esta estructura específica provee:

- una tela con apariencia del material;
- alta resistencia debida a la red de las fibras sintéticas;
- alta capacidad de absorción proporcionada por el alto contenido de pulpa de las almohadillas, y la estructura tridimensional formada por éstas;
- alta suavidad y caída debidas a la variedad de indicaciones de doblamiento proporcionadas por el patrón de la red.

La superficie opuesta mayor del material, es preferiblemente sustancialmente lisa. Esto mejorara la capacidad del material para limpiar una superficie seca de cualquier liquido sobrante.

El material contiene preferiblemente 40%, y más preferiblemente alrededor de 50%, en peso de fibras de pulpa. Preferiblemente contiene al menos 30%, y más preferiblemente al menos 40% en peso de fibras sintéticas o filamentos. Las fibras sintéticas son en una modalidad fibras cortadas con una longitud entre 6 mm y 25 mm.

Se prefiere que el material tenga una capacidad de absorción de agua de al menos 5 g/g.

Se prefiere además que el material tenga una velocidad de absorción, WAT, en MD no mayor a 1,5 s/m, preferiblemente no mayor a 1 s/m, y en CD de no mas que 2,5 s/m, preferiblemente no mas que 2 s/m.

En una modalidad preferida, las almohadillas tienen una longitud y un ancho entre 0,2 y 4 mm, preferiblemente entre 0,5 y 2 mm. Se prefiere además que la distancia entre las almohadillas adyacentes este entre 0,2 y 4 mm, preferiblemente entre 0,5 y 2 mm.

La presente invención también se refiere a un método para producir material no tejido como se estableció

anteriormente, dicho método comprende una dispersión de fibra en húmedo o por formación de espuma, para formar un tejido fibroso que contiene al menos 30% en peso de fibra de pulpas y al menos 20% en peso de fibras sintéticas o filamentos, calculado sobre el peso total de las fibras en dicho tejido fibroso, e hidroenredamiento del tejido fibroso seguido por el subsiguiente drenaje y secado, en donde

Al menos parte de la etapa de hidroenredamiento se lleva a cabo sobre unidades de soporte con pequeños agujeros en la forma de un tamiz moldeado de malla cerrada, de un material termoplástico, dicho tamiz teniendo aberturas con un diámetro de 0,2-4 mm y la distancia entre las aberturas estando entre 0,2-4 mm

Preferiblemente las aberturas en dicho tamiz tienen un tamaño de 0,5-2 mm, y la distancia entre las aberturas está entre 0,5-2 mm.

En una modalidad, el tejido fibroso se forma sobre una formación de malla y es sometida a un primer hidroenredamiento mientras es soportada sobre una formación de malla, y es transferido entonces ha dicho

tamiz moldeado de malla cerrada en donde se lo somete ha un hidroenredamiento adicional. Preferiblemente, dicho hidroenredamiento adicional se realiza sobre la cara opuesta del tejido fibroso, en comparación con el primer hidroenredamiento.

En una modalidad preferida, el tejido es sometido después del drenaje a un secado no compactante, tal como el secado por medio de aire, secado por IR o similares. Con miras a mantener el volumen y la absorbencia del material, preferiblemente no se hace presión sobre el tejido fibroso durante el drenaje y secado.

DESCRIPCIÓN DE LOS DIBUJOS

La invención se describirá mas abajo con referencia a algunas modalidades descritas en los dibujos que la acompañan.

La Figura 1 es una vista esquemática de un dispositivo para el hidroenredamiento de un tejido fibroso.

La Figura 2 muestra una vista esquemática en perspectiva, sobre una escala ampliada de un tamiz usado para soportar al tejido fibroso durante el hidrogenredamiento.

La Figura 3 es una fotografía tomada de un material no tejido de acuerdo con la invención, con una amplificación de al menos 30 veces.

Las Figuras 4 y 5 son fotografías del microscopio electrónico (SEM), de un material no tejido de acuerdo con la invención.

DESCRIPCIÓN DE LAS MODALIDADES

El dispositivo, que esquemáticamente se muestra en la Figura 1, para la elaboración del así llamado material hidrogenredamiento o spunlaced, comprende un vaso 10, por ejemplo una pulpeadora, en la cual se prepara una dispersión de fibra húmeda o espumada, la cual se distribuye por medio de una caja en la cabecera 11 sobre una unidad de soporte con pequeños agujeros 12. Esta unidad de soporte con pequeños agujeros 12 es preferiblemente una malla de cualquier tipo convencional usado en la industria de elaboración de papel, y el cual

es adecuado para la formación y para una primera etapa de hidroenredamiento para entrelazar al menos las fibras sintéticas presentes en el tejido. El tejido fibroso formado 13 es luego sometido a hidroenredamiento desde varias filas de boquillas 14, a partir de las cuales se dirigen chorros de agua a muy alta presión hacia un tejido fibroso, mientras se encuentra soportado por la unidad de soporte con pequeños agujeros 12. El tejido fibroso se seca sobre cajas de succión 15. De ese modo, los chorros de agua efectúan un enredado del tejido fibroso, esto es entrelazamiento de las fibras. Las presiones apropiadas en las boquillas de enredamiento, se adaptan al material fibroso, al gramaje del tejido fibroso, etc. El agua de las boquillas 14 de enredamiento se remueve por medio de cajas de succión 15 y se bombea a una planta de purificación de agua, y luego se recircula a las estaciones de enredado.

Para una descripción adicional del hidroenredamiento o, como también se le llama, tecnología de spunlacing, se hace referencia por ejemplo a la patente canadiense mencionada antes No. 841 938.

El tejido fibroso 13 es formado por espuma o en forma húmeda. En un proceso en húmedo, las fibras se dispersan en un líquido, normalmente agua, en forma similar a como se hace en un proceso de elaboración de papel, y la dispersión de la fibra diluida se deposita sobre una unidad de soporte con pequeños agujeros en donde es drenada para formar un material del tipo de tejido continuo. La dispersión de la fibra puede diluirse hasta el tipo de consistencia que es típicamente utilizada en un proceso convencional de elaboración de papel. Un proceso de formación por espuma es una variante del proceso en húmedo, donde se añade un tensoactivo a la dispersión de fibra, la cual se espuma, y la dispersión de fibra espumada se deposita sobre el soporte con pequeños agujeros. Se consigue una distribución muy plana de las fibras en un proceso de formación por espuma, y también es posible usar fibras más largas que en un proceso convencional en húmedo.

Las fibras utilizadas para formar la dispersión de fibra son una mezcla de fibras de pulpa de celulosa, y fibras sintéticas cortadas o filamentos sintéticos. Las fibras de pulpa pueden seleccionarse a partir de cualquier tipo de pulpa y de mezclas de las mismas. Preferiblemente la

pulpa se caracteriza por ser de fibras de celulosa completamente naturales, y pueden incluir algodón así como también fibras de madera. Las fibras de pulpa preferidas son pulpas madera blanda para elaboración de papel, aunque la pulpa de madera dura y la que no es de madera, tal como cáñamo y sisal pueden usarse. La longitud de las fibras de pulpa puede variar entre menos de 1 mm para la pulpa de madera dura y pulpa reciclada, hasta 6 mm para ciertos tipos de pulpa de madera blanda. La dispersión de fibra debería contener al menos 30% en peso, de fibras de pulpa, calculada sobre el peso total de fibra.

Las fibras sintéticas pueden ser cualquier fibra sintética adecuada o fibras de celulosa regenerada. Ejemplos de fibras sintéticas comúnmente usadas son poliéster, polietileno, polipropileno, poliamida, polilactidos y/o copolímeros de los mismos. Ejemplos de fibras regeneradas son rayón, viscosa, lyocell. Las fibras sintéticas pueden estar en forma de fibras cuya longitud ha sido cortada. Una longitud preferida de fibras cortadas utilizadas en un proceso en húmedo o por formación de espuma, está entre 6 mm y 25 mm. La finura de las fibras puede variar entre 0,3 dtex y 6 dtex. La

dispersión de fibra debería contener al menos 20% en peso de fibras sintéticas calculado sobre el peso total de fibra.

Los filamentos sintéticos son preferiblemente filamentos spunlaid o meltblown o polímeros termoplásticos apropiados, tales como polietileno, polipropileno, poliamida, poliéster y polilactidos. Por supuesto también pueden usarse copolímeros de estos polímeros, así como también polímeros naturales con propiedades termoplásticas.

El tejido 13 se rota 180° y se transfiere a una segunda unidad de soporte con pequeños agujeros 16, la cual, en una modalidad preferida, está constituida por un tamiz plástico moldeado de malla cerrada, como se describe en WO 01/88261. El tamiz plástico de acuerdo con la invención puede constar de una capa, como se muestra en la Figura 2, o de dos o varias capas colocadas una sobre la otra. Posiblemente, el tamiz puede estar reforzado con mallas de refuerzo 17 los cuales se extienden en la dirección deseada de la máquina del tamiz plástico / malla de enredamiento 16. Las mallas de refuerzo también pueden disponerse en la dirección transversal del tamiz,

o, tanto en dirección longitudinal como transversal. La producción del tamiz plástico puede tener lugar, por ejemplo en la forma descrita en la patente norteamericana No. 4.740.409. El tamiz plástico se proporciona con una variedad de aberturas 18, que serán descritas con detalle más adelante.

El tejido se hidrogena una segunda vez a partir de varias filas de boquillas 19 mientras se soportan sobre la unidad plástica del tamiz 16. El segundo hidrogenamiento tiene lugar a partir del lado opuesto del tejido fibroso 13 comparado con el primer hidrogenamiento. El tejido fibroso se drena sobre cajas de succión 20.

El drenaje adicional del tejido fibroso puede tener lugar sobre cajas de succión 21, mientras que el tejido 13 ha sido transferido al drenaje de malla 22. Este drenaje adicional puede opcionalmente tener lugar mientras que el tejido fibroso se encuentra aún soportado por la unidad de tamiz plástico 16.

El material enredado es luego llevado a una estación de secado 23 para secarlo antes de que al material terminado

se le haya sacado el agua y se haya transformado. El secado puede realizarse por soplado de aire caliente a través del tejido fibroso, por medio de secadores IR o de cualquier otra técnica de secado no compactante. Preferiblemente, no tiene lugar un prensado del tejido fibroso durante el drenaje y secado del mismo. El material, después de la conversión, puede ser sometido a diferentes tipos de tratamientos, tales como por ejemplo descarga en corona o plasma 24, tratamiento con productos químicos de cualquier clase deseada, etc. El tratamiento por descarga en corona o plasma, se hace preferiblemente después de secado mientras que los productos químicos pueden añadirse ya sea a la dispersión de fibras o después del drenaje del tejido, por medio de estampación por rociado o similares.

En las modalidades mostradas en la Figura 2, las aberturas 15 en el tamiz 16, exhiben una forma rectangular, pero es evidente que esta forma puede variarse a cualquier figura geométrica. Las mallas en el tamiz exhiben en forma conveniente un tamaño de abertura dentro del intervalo de 0,2-4 mm, preferiblemente 0,5-2 mm. El tamaño de abertura se define aquí como el tamaño entre los bordes de los lados opuestos o esquinas. Las

aberturas son, o bien sustancialmente del mismo tamaño o de diferentes tamaños, u están ya sea uniformemente distribuidas a través del tamiz, o distribuidas para formar patrones con grupos alternantes de aberturas de diferentes tamaños. La forma de la sección transversal de las aberturas en la dirección z también puede variarse, y puede ser, por ejemplo sustancialmente rectangular, alternativamente convexa o cóncava. La distancia entre las aberturas puede variar entre 0,2-4 mm, preferiblemente entre 0,5 y 2 mm. La distancia entre las aberturas se define como la distancia mas corta entre aberturas adyacentes.

En caso de que el tamiz conste de dos o de varias capas dispuestas una sobre la otra, las diferentes capas pueden exhibir diferentes tamaños de abertura entre ellas, por ejemplo con aberturas mayores en la capa superior y más pequeñas en la inferior. Esto se muestra en WO 01/88261. De esta forma, las fibras pueden penetrar por las aberturas mayores de la capa superior, pero ser retenidas por la capa inferior durante el enredamiento.

La superficie que está destinada a soportar al tejido fibroso, puede ser sustancialmente lisa, o exhibir una

estructura tridimensional con miras a impartir la correspondiente estructura tridimensional al material hidrogenado.

Pueden usarse también otros soportes con pequeños agujeros tales como mallas y otros tipos de tamices, los cuales tienen aberturas de los tamaños establecidos antes.

Cuando se hidrogena la dispersión de fibras a través de las aberturas del tamiz 16 las fibras de pulpa mas cortas, que son las que mas fácilmente se mueven, seguirán en mayor medida al agua que se drena a través de las aberturas 18 y se acumularán en dichas aberturas, mientras que las fibras sintéticas mayores que son menos móviles y se entrelazan más fácilmente por acción de los chorros de agua, permanecerán en su lugar en mayor medida sobre el tamiz 16 y crearan una red fibrosa fuerte. Esto resultara en un material que tiene una variedad de almohadillas 25 que sobresalen de una superficie mayor del material, dichas almohadillas como el principal componente comprenden fibras de pulpa 26 que durante el drenaje se han acumulado en las aberturas 18 del tamiz 16. El término "componente principal" en este contexto

significa que más del 50% en peso, preferiblemente más del 60% en peso, y más preferiblemente más del 70% en peso de las fibras presentes en dichas almohadillas, son fibras de pulpa 26. Una menor proporción de las fibras en las almohadillas 16 serán por supuesto fibras sintéticas.

Las almohadillas 25 de fibra de pulpa están rodeadas por una red 27, que contiene una cantidad relativamente alta de fibras sintéticas 28, en comparación con las almohadillas 25. En una modalidad preferida más del 50% en peso, preferiblemente más del 60% en peso, y más preferiblemente más del 70% en peso de las fibras presentes en dicha red, son fibras sintéticas 28. Las fibras sintéticas 28 mas largas son más fácilmente enredadas y se entrelazaran con las demás para formar una red 27 continua fuerte, la cual impartirá una alta resistencia al material. Las almohadillas de fibra de pulpa contribuyen a la absorbencia del material. Esto se muestra en las Figuras 4 y 5 que presentan fotografías SEM de un material de acuerdo con la invención, y en las cuales puede verse la acumulación de fibras de pulpa 26 para formar las almohadillas 25. Además puede verse como estas almohadillas 25 están rodeadas por una red. Esto

también puede verse en las fotografías del microscopio de luz en la Figura 3.

Con miras a proveer un pronunciado efecto de almohadilla, al menos 30% en peso, y preferiblemente al menos 40% de las fibras en el material deberían ser fibras de pulpa, y con miras a proporcionar una red fuerte de fibras sintéticas entrelazadas, por lo menos 20% en peso y preferiblemente al menos 30% en peso de las fibras en el material deberían ser fibras sintéticas.

Las dimensiones largo y ancho de las almohadillas 25 corresponderán con el tamaño de las aberturas 18 del tamiz 16, y el ancho de los hilos de la red 27 entre las almohadillas 25 corresponderá a la distancia entre aberturas adyacentes 18 del tamiz 16.

La superficie opuesta mayor del material es preferiblemente sustancialmente lisa, comparada con la primera superficie que tiene una estructura tridimensional pronunciada proveída por la variedad de almohadillas sobresalientes. Esto le da al material dos caras, siendo una de ellas más "rugosa" y adaptada para remover y capturar líquidos, fluidos viscosos y

partículas sólidas de una superficie. La superficie opuesta más lisa está adaptada para limpiar un líquido de una superficie seca.

Se han realizado ensayos sobre materiales producidos como se describe más adelante.

Una dispersión de fibra formada por espuma se hizo a partir de agua, tensoactivo y una mezcla de fibras de pulpa y fibras sintéticas de longitud cortada. Se añadió un tensoactivo al agua en una cantidad de 0,03% en peso. La dispersión de fibras espumadas fue colocada sobre una malla y la formación se hizo con un contenido de aire en la espuma de 30-50% en volumen. El tejido fibroso se hidrogenó sobre la misma malla usada para la formación. El tejido fue transferido entonces a un tamiz plástico moldeado de malla cerrada como se describió arriba, teniendo agujeros de tamaño 0,89 x 0,84 mm y la distancia entre los agujeros de 0,46 mm. El tejido fue entonces hidrogenado por la cara opuesta. La parte principal del hidrogenado se hizo sobre la primera raya en forma tal de dar resistencia máxima al material. La energía total suministrada al hidrogenado fue alrededor de 200 kWh/tonelada de material.

El tejido fibroso fue entonces drenado en las cajas de succión al vacío y secado por el así llamado secado a través de aire (TAD por sus siglas en inglés).

Las fibras usadas para formar el tejido fibroso tenían la siguiente composición:

Ej. 1: 25% en peso de poliéster (PET) de KoSa, 1,7 dtex/19 mm;

17% en peso de polipropileno (PP) de Fibervisions, 1,7 dtex/18 mm;

58% en peso de fibras de pulpa blanqueadas con sulfato de Korsnäs, Vigor Fluff.

Ej. 2: 40% en peso de polipropileno (PP) de Fibervisions, 1,7 dtex/18 mm;

50% en peso de fibras de pulpa blanqueadas con sulfato de Korsnäs, Vigor Fluff.

Como material de referencia se uso un material de limpieza no tejido producido por SCA Hygiene Products AB bajo la marca registrada E-Tork Strong™. Esta hecha por formación en húmedo de una mezcla de fibra e hidroenredado de la misma. Sin embargo no se ha usado ningún tamiz plástico moldeado de malla cerrada, pero el proceso de hidroenredamiento se realiza sobre una malla

convencional para elaboración de papel. El material no tiene el patrón de estructura tridimensional como el reivindicado por la presente invención, sino una distribución de fibra más uniforme. La composición de fibra en el material de referencia fue como sigue:

Ref.: 25% en peso de poliéster (PET) de KoSa, 1,7
 dtex/19 mm;
 17% en peso de polipropileno (PP) de Steen, 1,7
 dtex/18 mm;
 58% en peso de fibras de pulpa blanqueadas con
 sulfato de Korsnäs, Vigor Fluff.

Así, la composición de fibra es la misma que para el Ej. 1, excepto que las fibras de PP son de otro fabricante.

Las evaluaciones concernientes a las propiedades de resistencia, tanto en condiciones secas como húmedas, absorbencia, velocidad de trenzado, se realizaron y los resultados se presentan en la tabla 1 abajo:

57

Tabla 1

		Ej. 1	Ej. 2	Ref.
Gramaje	g/m ²	76,4	88,0	83,0
Espesor	µm	623	641	357
Volumen 2kPa	cm ³ /g	8,2	7,3	4,3
Rigidez a la tensión MD	N/m	30230	38385	57518
Rigidez a la tensión CD	N/m	2096	6488	6689
Índice de rigidez a la tensión	Nm/g	104	179	236
Resistencia a la tensión MD, seco	N/m	3126	3061	1499
Rigidez a la tensión CD, seco	N/m	672	745	630
Índice de tensión, seco	Nm/g	19	17	12
Estiramiento MD	%	28	33	13
Estiramiento CD	%	71	45	44
Raíz cuadrada del estiramiento (MDCD)	%	45	39	24
Trabajo hasta ruptura MD	J/m ²	647	714	251
Trabajo hasta ruptura CD	J/m ²	347	238	261
Índice de trabajo hasta ruptura	J/g	6	5	3
Resistencia a la tensión MD, agua	N/m	2066	3028	568
Resistencia a la tensión CD, agua	N/m	330	619	185
Índice de tensión, agua	Nm/g	10,8	15,6	3,9
Resistencia relativa, agua	%	57	91	33
Res. a la tensión MD, tensoactivo	N/m	1536	3002	407
Res. a la tensión CD, tensoactivo	N/m	330	647	122
Índice de tensión, tensoactivo	Nm/g	9,3	18,2	2,5
Resistencia relativa, tensoactivo	%	49	96	15
Absorción DIN, agua	g/g	6,0	5,1	3,9
Velocidad de absorción WAT, dir.-x (CD)	s/m	0,4	0,7	1,7
Velocidad de absorción WAT, dir.-y (MD)	s/m	0,8	1,3	2,7
Despeluzado en húmedo	part./m ²	397	228	259

La rigidez a la tensión, la resistencia a la tensión, el trabajo para ruptura y el estiramiento fueron medidos de acuerdo con el método de prueba SCAN-P44:81.

La absorción DIN fue medida de acuerdo con el método de prueba DIN 54 540, parte 4, con la modificación de que la muestra estaba suspendida verticalmente durante la calada y no en posición horizontal como en el método estándar.

La velocidad de absorción WAT fue medida de acuerdo con el método de prueba SCAN-P 62:88. Sin embargo se hizo la siguiente modificación de la muestra: en lugar de apuntar a un gramaje total entre 100 y 150 g/m² del haz de la muestra, hemos apuntado a un espesor de 1 mm. No se hicieron medidas de la velocidad de absorción en la dirección z.

Estos resultados muestran unas propiedades de resistencias superiores, tanto en condiciones secas como húmedas, para los materiales no tejidos de acuerdo con la invención. Se cree que esto es debido a la fuerza de la red que se crea por la presencia de las fibras sintéticas presentes en el material, siendo dicha red mas o menos continua. La escogencia de las fibras sintéticas también

juega un importante papel en la resistencia del material, y se ve por los resultados de la prueba que en el Ej. 2 que contiene 40% en peso de fibras de polipropileno (1,7 dtex/18 mm), han mejorado las propiedades de resistencia en comparación con el Ej. 1 que contenía una mezcla de fibras de poliéster y polipropileno, 25% de poliéster (1,7 dtex/19 mm) y 17% de polipropileno (1,7 dtex/18 mm). Sin embargo ambos materiales presentan una resistencia considerablemente más alta, esto es, resistencia a la tensión (seco, húmedo, tensoactivo), estiramiento y trabajo para la ruptura, comparado con el material de referencia.

Los materiales de acuerdo con la invención son menos rígidos que el material de referencia.

Los materiales de acuerdo con la invención tienen además propiedades mejoradas de absorción, tanto la absorbencia total y la absorción como la velocidad de trenzado (WAT), en comparación con el material de referencia. Se cree que esto es debido a una combinación de la alta concentración de fibras de pulpa presentes en la variedad de almohadillas que sobresalen a un lado del material, dichas almohadillas de fibra de pulpa siendo capaces de

absorber y retener líquido, y la red de fibras predominantemente sintéticas, dicha red estando adaptada para distribuir el líquido en el material.

REIVINDICACIONES

1. Un material no tejido enredado hidráulicamente en húmedo o formado por espuma conteniendo al menos 30% en peso de fibras de pulpa, y al menos 20% en peso de fibras sintéticas o filamentos caracterizado en,

que dicho material no tejido tiene una variación en peso base en un patrón no aleatorio en que comprende una variedad de almohadillas (25) de peso base mayor que sobresalen de una superficie mayor de dicho material, dichas almohadillas como un componente principal que comprende fibras (26) de pulpa y están rodeadas por una red (27) de peso base menor la cual contiene una cantidad relativamente alta de fibras sintéticas o filamentos (28) en comparación con las almohadillas (25)

2. Un material no tejido como el reivindicado en la reivindicación 1, caracterizado en,
que la superficie opuesta mayor del material es sustancialmente liso.

3. Un material no tejido como el reivindicado en las reivindicaciones 1 y 2, caracterizado en, que contiene al menos 40%, preferiblemente al menos 50% en peso de fibras de pulpa.
4. Un material no tejido como el reivindicado en cualquiera de las reivindicaciones 1-3, caracterizado en, que contiene al menos 30%, preferiblemente al menos 40% en peso de fibras sintéticas o filamentos.
5. Un material no tejido como el reivindicado en cualquiera de las reivindicaciones anteriores, caracterizado en, que dichas fibras sintéticas son fibras cortadas de una longitud entre 6 mm y 25 mm.
6. Un material no tejido como el reivindicado en cualquiera de las reivindicaciones anteriores, caracterizado en, que tiene una capacidad de absorción de agua de al menos 5 g/g.

7. Un material no tejido como el reivindicado en cualquiera de las reivindicaciones anteriores, caracterizado en,
que tiene una velocidad de absorción, WAT, en MD de no más que 1,5 s/m, y en CD de no más que 2,5 s/m.
8. Un material no tejido como el reivindicado en la reivindicación 7, caracterizado en,
que tiene una velocidad de absorción, WAT, en MD de no más que 1 s/m, y en CD de no más que 2 s/m.
9. Un material no tejido como el reivindicado en cualquiera de las reivindicaciones anteriores, caracterizado en,
que dichas almohadillas (25) tienen una longitud y un ancho entre 0,2 y 4 mm, preferiblemente entre 0,5 y 2 mm.
10. Un material no tejido como el reivindicado en cualquiera de las reivindicaciones anteriores, caracterizado en,

que el ancho de los hilos de la red (27) entre almohadillas adyacentes (25) está entre 0,2 y 4 mm, preferiblemente entre 0,5 y 2 mm.

11. Un método para producir un material no tejido como el reivindicado en la reivindicación 1, que comprende una dispersión de fibra formada en húmedo o en espuma para formar un tejido fibroso que contiene el menos 30% en peso de fibras de pulpa y al menos 20% en peso de fibras sintéticas o filamentos, calculados sobre el peso total de las fibras en dicho tejido fibroso, e hidroenredamiento del tejido fibroso seguido por el subsiguiente drenaje y secado, caracterizado en,

que al menos parte de la etapa de hidroenredamiento se realiza sobre una unidad de soporte que contiene pequeños agujeros en la forma de un tamiz (16) moldeado de malla cerrada de un material termoplástico, dicho tamiz teniendo aberturas (18) con un diámetro de 0,2-4 mm y la distancia entre las aberturas estando entre 0,2-4 mm.

12. El método como el reivindicado en la reivindicación 11, caracterizado en, que las aberturas (18) en dicho tamiz (16) son de tamaño 0,5-2 mm, y la distancia entre las aberturas está entre 0,2-5 mm.
13. El método como el reivindicado en las reivindicaciones 11 o 12, caracterizado en, que el tejido fibroso (13) se forma sobre una formación de malla (12) y es sometido a un primer hidroenredamiento mientras que se soporta sobre dicha formación de malla, y es luego transferido a dicho tamiz (16) moldeado de malla cerrada, donde es sometido a un hidroenredamiento adicional.
14. El método como el reivindicado en la reivindicación 13, caracterizado en, que dicho hidroenredamiento adicional se realiza en la cara opuesta del tejido fibroso (13) en comparación con el primer hidroenredamiento.
15. El método como el reivindicado en cualquiera de las reivindicaciones 11-14, caracterizado en,

que el tejido después de drenado es sometido a un secado no compactante, tal como un secado a través de aire, secado IR o similares.

16. El método como el reivindicado en la reivindicación 15, caracterizado en, que no tiene lugar una presión sobre las fibras durante el drenaje y el secado.



FORMAT DE DIGITALIZACION
RELACION DE ANEXOS



Royal
Technologies S.A.
Proyecto: [illegible] Fecha: [illegible]

62

Expediente No			No de Follo
Item		No de unidades	
1	CD		
2	DVD		
3	REVISTA		
4	LIBRO		
5	PERIODICO		
6	DISQUETES		
7	SOBRE DE MANILA		
8	SOBRE BLANCO TAMAÑO CARTA		
9	SOBRE BLANCO TAMAÑO OFICIO	X	I
10	OTROS:		

Observaciones: Arte Final

68

SUPERINDUSTRIA Y COMERCIO

Radicacion : 84100106 00000000

Folios: 68

Fecha (GMD): 2004-10-27 17:00:38

Tramite : 011 PCT-PATENT 379 FASE NACI 411 PRESENTAL

Dependencia: 2000 DIVISION DE NUEVAS CREACIONES

NIT : 800176009-2

RECIBO OFICIAL DE CAJA : 04 - 83,603

FECHA : OCTUBRE 25 DE 2004

***** CONSIGNACION *****

DEPOSITANTE	TIPO PAGO	BANCO	CUENTA	No. PAGO	FECHA PAGO	Vr. PAGO
CAVELIER ABOGADOS	CONSIGNACION	BANCO POPULAR	050-00110-6	32758692	25/10/2004	55,455,000.00

***** CONCEPTO *****

CANT. RENTISTICO	CONCEPTO	TOTAL CONCEPTO
1 50005-01-01 SOLICITUDES	1 TRAMITES DE SOL. DE PATENTE DE IN	422,000.00
	TOTAL :	422,000.00

SON: CUATROCIENTOS VEINTIDOS MIL PESOS

RESPONSABLE : 

RECIBO DE CAJA APLICADO AL EXPEDIENTE No. _____

Cdo 11256-841-0560

REQUISITOS NECESARIOS PARA PRESENTACION Y AGILIZACION DEL
TRAMITE

	USUARIO	RADICADOR
PATENTE DE INVENCION ✓	()	() ✓
- Indicación de que se solicita la concesión de una patente.	()	() ✓
- Datos de identificación del solicitante o de la persona que se presenta la solicitud.	()	() ✓
- Descripción de la invención.	()	() ✓
- Dibujos de ser estos pertinentes.	()	() ✓
- Comprobante de Pago de las tasas establecidas.	()	() ✓
COMPLETA ✓	INCOMPLETA ()	()
DISEÑO INDUSTRIAL ()		
- Indicación de que se solicita el registro de Diseño Industrial	()	()
- Datos de identificación del solicitante o de la persona que presenta la solicitud.	()	()
- Representación gráfica o fotográfica del Diseño Industrial o muestra del Material que incorpora el diseño.	()	()
- Comprobante de pago de las tasas establecidas	()	()
COMPLETA ()	INCOMPLETA ()	()
ESQUEMA DE TRAZADO ()		
- Indicación de que solicita el registro de un Esquema de trazado.	()	()
- Datos de identificación del solicitante o de la persona que presenta La solicitud.	()	()
- Representación gráfica del esquema de trazado	()	()
- Comprobante de pago de las tasas establecidas.	()	()
COMPLETA ()	INCOMPLETA ()	()

Firma Responsable:

Fecha:

2020
Bogotá DC

Doctor
EMILIO FERRERO
Apoderado
SCA HYGIENE PRODUCTS AB

REFERENCIA:	Radicación No.	04-108186
	Solicitud Internacional	PCT/SE03/00486
	Fecha inicio fase nacional	28-10-2004
	Trámite	011
	Evento	379
	Actuación	416
	Oficio No.	1624
	Folios	001

Teniendo en cuenta que la solicitud de privilegio de patente que se tramita bajo el expediente indicado en la referencia, reúne los requisitos de forma establecidos en la Decisión 486 de la Comisión de la Comunidad Andina, el Tratado de Cooperación en Materia de Patentes (PCT), el Reglamento y la Circular Única de la Superintendencia de Industria y Comercio, se envía el extracto de la solicitud a la Oficina de Comunicaciones para efecto de su publicación en la Gaceta de Propiedad Industrial.

Cúmplase
Dado en Bogotá DC

18 NOV. 2004


ALIX CARMENZA CÉSPEDES DE VERGEL
Jefe de la División de Nuevas Creaciones

202047

DIVISION DE NUEVAS CREACIONES

RADICACIÓN EXPEDIENTE No. 04-108186

EL EXTRACTO DE LA PRESENTE SOLICITUD DE PATENTE DE INVENCION

PCT FUE PUBLICADO EN LA GACETA DE PROPIEDAD INDUSTRIAL No 548

DE FECHA 28 DE ENERO DEL 2005, EL TERMINO HABIL SEÑALADO POR

LA LEY EXPIRA EL 27 DE ABRIL DEL 2005

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 _**

Bogotá D.C., Octubre de 2006