

IQ.



Industria y Comercio
SUPERINTENDENCIA

Delegatura de Propiedad Industrial
División de Nuevas Creaciones

PCT
SOLICITUD

PATENTE DE INVENCION

04-106322

21. EXPEDIENTE No.

54. TITULO Materiales y Métodos de compuestos respirables y elásticos

51. CLASIFICACION INTERNACIONAL B32B 27/17, B29C 55/02, A41B 17/00, A41D 31/02, A61F 13/15

71. SOLICITANTE clonay plastic Products company, inc

DOMICILIO ohio, Estados Unidos

74. APODERADO Dilia Maria Rodriguez D'Aleman

22. BOGOTA, D.C., oct. 21/04

FORMULARIO ÚNICO DE SOLICITUD DE PATENTE
PCT
ENTRADA EN FASE NACIONAL

1) SOLICITUD DE:			
☒ Patente de invención		☐ Patente de Modelo de Utilidad	
☐ Capítulo I.		☒ Capítulo II.	
2) SOLICITANTE (71)	Nombre: CLOPAY PLASTIC PRODUCTS COMPANY, INC. Dirección: 8585 Duke Boulevard, Mason, Ohio 45040-3101 USA Nacionalidad o domicilio: Ohio, Estados Unidos Lugar de constitución: Delaware, Estados Unidos		IDENTIFICACIÓN C.C. ☐ NIT: ☐ C.E. ☐ OTRO ☐ Cual _____ NÚMERO _____
	Teléfono: _____ Fax: _____ E. Mail: _____		
3) REPRESENTANTE O APODERADO	Nombre: DILIA MARÍA RODRÍGUEZ D'ALEMAN Dirección: Carrera 11 N°. 93-43 Of. 404 Santafé de Bogotá D.C. Teléfono: 6350835 Fax: 6350824 E. Mail: clarkemodet@clarkemodet.com.co		IDENTIFICACIÓN C.C. ☒ NIT: ☐ C.E. ☐ OTRO ☐ NÚMERO: 41.654.882 TP: 20824 CSJ
4) INVENTOR (ES) (72)	Nombre: 1. WU, Pai-Chaun; 2. ROBINSON, Dale, Eugene; 3. BRADFORD, Richard, Arnold Dirección: 1. 11053 Huntwicke Place, Cincinnati, OH 45241 Estados Unidos; 2. 1712 Morey Avenue, Hamilton, OH 45011 Estados Unidos; 3. 2223 Mt. Zion Road, Brooksville, KY 41004, Estados Unidos Nacionalidad o Domicilio: Todos los anteriores Estadonldenses		
5) PCT (86) Solicitud Internacional No. PCT/US/03/08922 Fecha: Marzo 21, 2003 Publicación Internacional No. WO 03/082571 A1 Fecha: Octubre 9, 2003			
6) Título (54) MATERIALES Y MÉTODOS DE COMPUESTOS RESPIRABLES Y ELÁSTICOS			
7) Clasificación Internacional: B32B 27/12, B29C 55/02, A41B 17/00, A41D 31/02, A61F 13/15			
8) PRIORIDAD		33) País de Origen	(32) Fecha
SI ☒ NO ☐		ESTAD S UNIDOS	MARZO 22, 2002
			(31) Número de Solicitud 10/104,725
9) Comprobante de pag N°. 04-79,732 Fecha: OCTUBRE 12, 2004			
Instrucciones para el diligenciamiento del presente formulario. Ver reverso de esta pagina			

2

SUPERINDUSTRIA Y COMERCIO
Radicacion : 04106322 00000000
Fecha (MM): 2004-10-22 16:31:09
Tramite : 011 PCT-PATENT 379 FASE NUCI 411 PRESENTIN
Recomendacion: PARA OTUITION DE NUFUNS CREACIONES

Folios: 140

NIT : 800176089-2

RECIBO OFICIAL DE CAJA : 04 - 79,732
FECHA : OCTUBRE 12 DE 2004

CONSIGNACION

DEPOSITANTE	TIPO PAGO	BANCO	CUENTA	No. PAGO	FECHA PAGO	Vr. PAGO
CLARKE MODET Y CO. COLOMB	CONSIGNACION	BANCO POPULAR	050-00110-6	23291510	11/10/2004	3,951,000.00

C O N C E P T O

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

SOM: CUATROCIENTOS VEINTIDOS MIL PESOS

RESPONSABLE : _____

RECIBO DE CAJA APLICADO AL EXPEDIENTE No. _____

8582

10)

ANEXOS

- ☒ Comprobante de pago de la tasa de presentación de la solicitud
- ☐ Comprobante de pago por reivindicación de prioridad
- ☒ Documento que acredite la existencia y representación legal cuando el solicitante sea persona Jurídica
- ☒ Poderes, si fuera el caso
- ☐ Documento de cesión del inventor al solicitante o a su causante
- ☐ Declaraciones
- ☒ Copia de la solicitud Internacional. (Resumen, descripción, reivindicación, Dibujos).
- ☒ Traducción de la solicitud internacional al castellano. (Resumen, descripción, reivindicación, Dibujos)
- ☒ Copia 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 12 x 12 y 6 x 6 cm
- ☐ De ser el caso, información sobre otras solicitudes de patente o títulos obtenidos en el extranjero por el mismo titular o su causante, relacionados parcial o totalmente con la invención de esta solicitud.
- ☒ Otros
 1. Opinión escrita
 2. Solicitud PCT
 3. Notificación del reporte del examen preliminar

11) FIGURA CARACTERÍSTICA:

12) Solicitud concesión de la patente,

NOMBRE: DILIA RODRÍGUEZ D'ALEMAN

FIRMA:

C.C. 41.654.882 de Bogotá TP 20824 CSJ

Instrucciones para el diligenciamiento del presente formulario. Ver reverso de esta página

②

TRADUCCIÓN OFICIAL No. 04/288 de un documento escrito en inglés, el cual para su identificación se sella con el sello del traductor al tiempo con la presente. Esta traducción ha sido preparada por Juan Pablo Piedrahíta Aguilera, Traductor e Intérprete Oficial debidamente reconocido de conformidad con el Certificado de Idoneidad Profesional No. 0045 expedido por la Universidad Nacional de Colombia, por el Ministerio de Relaciones Exteriores y autorizado por el Ministerio del Interior y de Justicia, por resolución número 718 de 2003.

(Se traduce una Certificación Notarial, Legalización y Apostilla No. 172003, escritos en inglés, adjuntos a un poder otorgado por la compañía CLOPAY PLASTIC PRODUCTS COMPANY INC., con fecha 16 de Marzo, 2004, escrito en inglés y español)

(En español e inglés, un Poder otorgado por la compañía CLOPAY PLASTIC PRODUCTS COMPANY INC. con fecha Marzo 16, 2004, firmado por David C. Troller, una (1) hoja).

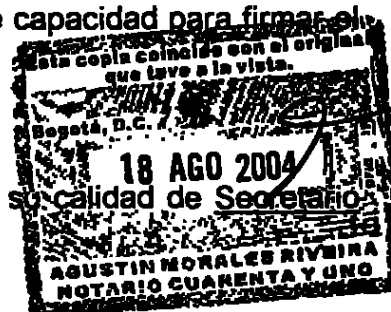
(Sello Notarial a Tinta: KATHERINE R. EDMAN, Notario Público, Estado de Ohio, Mi Comisión Vence el 27 de octubre, 2008)

CERTIFICADO NOTARIAL (Cuando el solicitante es una SOCIEDAD)

(Poderes otorgados en El Salvador, México, Estados Unidos de América y Venezuela)

Expedido hoy día 16 de Marzo, 2004, el suscrito Notario CERTIFICA que:

- 1). David C. Troller, (nombre de quien firma el poder), mayor de edad y domiciliado en Ohio, Estados Unidos de América, suscribió el anterior documento.
- 2) El otorgante le es conocido personalmente y tiene capacidad para firmar el documento.
- 3) El otorgante ha suscrito el anterior documento en su calidad de Secretario.



de la persona jurídica Clopay Plastic Products Company, Inc.

4) La mencionada persona jurídica con domicilio comercial en Mason, Ohio, Estados Unidos de América, está debidamente constituida, tiene actualmente existencia legal y el fin para el cual se otorga este poder se encuentra dentro de su objeto social.

5) El otorgante tiene en efecto la capacidad referida y su representación es legal y está autorizado para otorgar este poder.

6) Fundamento las certificaciones 3), 4) y 5) en los documentos auténticos que para tal fin me fueron exhibidos.

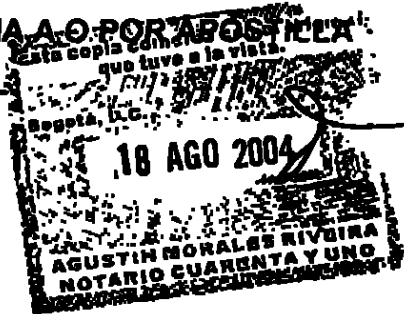
(Firmado) KATHERINE R. EDMAN, Notario Público

Mi Comisión Vence el 27 de octubre, 2008)

Nota: El Consulado de Colombia debe autenticar la firma del Notario Público.

Para todos los demás países el Señor Cónsul de Colombia o ante quien se torgue, debe expedir una certificación dejando constancia de: 1) la existencia legal de la sociedad, 2) que cumple actualmente con su objeto social, y 3) que la persona o personas que otorgan este poder están facultadas para hacerlo. El Cónsul también certificará que los tuvo a la vista los documentos que prueban y acreditan tales circunstancias.

LEGALIZACIÓN POR EL CÓNSUL DE COLOMBIA A O POR APOSTILLA



04/288
COLOMBIA
AGUIERA
TRADUCCION E INTERPRETE OFICIAL
BOQUETA, B.C.
718 DE MAYO 2003
MIN. INTERIOR Y DE JUSTICIA

Certificado de Crácter Oficial

ESTADO DE OHIO.

Condado de Warren }

CORTE DE LAS CAUSAS COMUNES

Yo, el suscrito Escribano de la Corte de Causas Comunes, un Corte de Derecho y de Rwegistro de dicho Condado, por el presente certifico que Katherine R. Edman es un Notario Público en y para dicho Condado, debidamente nombrado e idóneo; y que su comisión tiene fecha Octubre 27, 2003 y vence el 26 de Octubre, 2008.

EN TESTIMONIO DE LO CUAL, he suscrito mi nombre y he estampado el sello oficial de dicha Corte en Lebanon, Ohio hoy día 23 de Abril, 2004.

(Firmado) Ilegible, Escribano

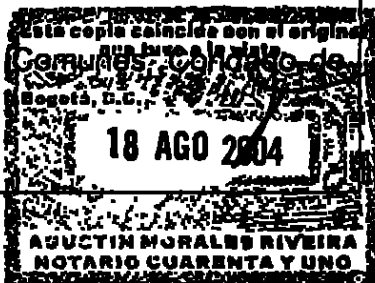
(Firmado) Ilegible, Escribano Encargado

(Sello de Oblea Dorada de la Cortes de Causas Comunes)

APOSTILLA

(Convención de la Haya de Octubre 5 de 1961)

1. País: Estados Unidos de América
Este documento público
2. Ha sido firmado por JAMES L. SPAETH
3. Obrando en calidad de Escribano de la Corte de Causas Comunes
4. Lleva el sello/estampilla de la Corte de Causas Comunes, Condado de Warren



04 / 2 8 2
... AGUILERA
... INFERETE OFICIAL
... DE MAYO 2003
... LAJON Y DE JUSTICIA

7

CERTIFICADA

5. En Columbus, Ohio
6. Hoy 6 de Mayo, 2004
7. Por el Secretario de Estado de Ohio
8. No. 172993
9. Sello/Estampilla (Sello Pre-impreso)
10. Firma (Firmado)

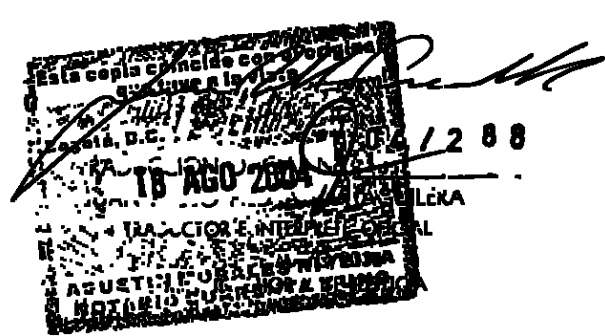
J. Kenneth Blackwell

Secretario de Estado de Ohio

Esta certificación certifica solamente la autenticidad de la firma del funcionario quien firmó el documento, la calidad en la cual obró el funcionario, y donde sea apropiado, la identidad del sello o estampilla que lleva el documento. Esta certificación no implica que el contenido del (los) documento(s) es correcto, ni que cuentan con la aprobación de esta oficina.

ES TRADUCCIÓN FIEL Y COMPLETA de la cual se deja copia en los archivos de esta oficina para su confrontación y a la cual me remito.

Bogotá, Junio 15, 2004.



APOSTILLE

(Convention de la Haye du 5 octobre 1961)

1. Country: United States of America

This public document

2. has been signed by JAMES L. SPAETH

3. acting in the capacity of Clerk of Court of Common Pleas

4. bears the seal/stamp of Court of Common Pleas, Warren County

CERTIFIED

5. at Columbus, Ohio

6. May 6, 2004

7. by the Secretary of State of Ohio.

8. No. 172993

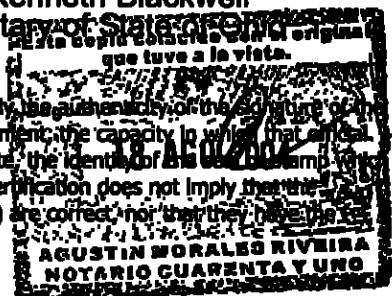
9. Seal/Stamp:

10. Signature:



J. Kenneth Blackwell
J. Kenneth Blackwell
Secretary of State of Ohio

This certification certifies only the authenticity of the signature of the official who signed the document, the capacity in which that official acted, and where appropriate, the identity of and seal or stamp of the document bears. This certification does not imply that the contents of the document(s) are correct, nor that they have the approval of this office.



04 / 2 8 8
PRODUCCION OFICIAL No. _____
DRA. FREDY R. AGUILERA
TRADUCTOR E INTERPRETE OFICIAL
18 DE MAYO 2003
MIN. INTERIOR Y DE JUSTICIA

COLOMBIA

Carrera 11 n° 93-43, Of. 404 Bogotá Colombia Tel: (57 1) 6350813-Fax: (57 1) 6350824-E-mail:clarkemodet@clarkemodet.com.co

PODER

Yo (nosotros), abajo firmante(s)

David C. Troller

en mi (nuestro) carácter de representante(s) legales de

clonay plastic Products, company, Inc.

una sociedad organizada y existente de acuerdo con las leyes de

Delaware

y en actual cumplimiento de su objeto social, con domicilio en

por el presente instrumento confiero (conferimos) poder especial a favor de DILIA MARIA RODRIGUEZ D'ALEMAN, con Cédula de Ciudadanía No. 41.654.882 de Bogotá, y tp. 20824 y CLAUDIA LUCIA CARO RAMIREZ, con Cédula de Ciudadanía No. 40.017.374 de Tunja, y tp. 36448, con domicilio en Bogotá, Colombia, para que actuando en su orden en nombre del (de la) otorgante le (la) representen ante cualquier entidad, autoridad y/o persona, especialmente ante las del orden Administrativo, Contencioso Administrativo, Judicial, Tribunales de Arbitramento y/o cualquier otro en lo referente a los siguientes asuntos:

- 1) Solicitar, tramitar, obtener y/o registrar cualquiera de las modalidades de Propiedad Industrial, tales como: patentes de invención, modelos de utilidad; diseños industriales, variedades vegetales; marcas, lemas, nombres y enseñas comerciales y denominaciones de origen; así como sus renovaciones, prórrogas, transferencias, cambios de nombre y/o domicilio, contratos y licencias.
- 2) Solicitar, tramitar, obtener y/o registrar derechos de autor, en cualquiera de sus presentaciones así como la protección de secretos industriales y know-how.
- 3) Solicitar, tramitar, obtener y/o registrar registros sanitarios, permisos y/o licencias de funcionamiento; así como sus renovaciones o prórrogas, transferencias, cambios de nombre y/o domicilio, contratos y licencias.
- 4) Ejercer acciones de oposición, observación, reclamos, reconsideración, reposición, apelación, cancelación administrativa o judicial, nulidad, protección al consumidor, concesión de licencias, protección de secretos industriales y demás acciones y recursos relacionados con derechos derivados de los asuntos arriba indicados y en contra de la competencia desleal, acciones derivadas de la obtención o explotación de licencias, acciones de indemnización de perjuicios. También podrá(n) intervenir en juicios civiles, comerciales, penales, contencioso-administrativos, tutelas y de policía; en acciones o juicios promovidos por el (la) mandante o en contra el (ella).
- 5) Registrar nombres de dominio ante la entidad competente.
- 6) En el ejercicio de este mandato los mandatarios arriba mencionados quedan facultados para: conciliar, cancelar, transigir, comprometer en árbitros, desistirse, recibir y tomar posesión de la cosa objeto de litigio y renunciar o desistirse a derechos concedidos o en curso de concesión, admitir los hechos del proceso.
- 7) Ratificar o no la agencia oficiosa.
- 8) Así mismo faculto (facultamos) a los mencionados apoderados para recibir notificaciones y designar apoderados judiciales o extrajudiciales, sustituir el presente poder y revocar las sustituciones que hicieron.

Dado y firmado en

a los días de

POWER OF ATTORNEY

I (we), the undersigned

David C. Troller

legal representative(s) of

Clonay Plastic Products Company, Inc.

an organization existing under the laws of

The State of Delaware, United States of America

and in present execution of its business activity, domiciled at
Mason, Ohio, United States of America

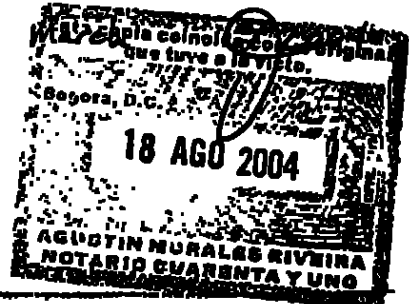
do hereby grant POWER OF ATTORNEY to DILIA MARIA RODRIGUEZ D'ALEMAN, Identification card No. 41.654.882 of Bogotá, and tp. 20824 and CLAUDIA LUCIA CARO RAMIREZ, tp. 36448, identification card No. 40.017.374 of Tunja, residing in Bogotá, Colombia, to act in the order of their appointment in behalf of grantor before any entity, authority and/or natural or juridical person, specially before those Administrative, Administrative-Contentious, Judicial, arbitration courts, and/or any other, in all matters concerning the following:

- 1) To apply, process, obtain and/or register any of the modalities of Industrial Property, such as: Patents of Invention, Utility Models; Designs, plant varieties; Marks, Slogans, Trade Names and emblems and appellations of Origin; as well as their renewals, assignments, changes of name and/or domicile, agreements and licenses.
- 2) To apply, process, obtain and/or register copyrights of any kind as well as protection of industrial secrets or know-how.
- 3) To apply, process, obtain and/or register sanitary registrations, operating authorizations and/or licenses; as well as their renewals or assignments, changes of name and/or domicile, agreements and licenses.
- 4) To bring actions of opposition, observations, claims, reconsideration, appeal or legal remedies, cancellations, nullity, protection to the consumer, granting of licenses, protection of trade secrets and other actions related with rights derived from the above-mentioned matters and against the unfair competition, actions resulting from the obtaining or exploitation of licenses, recovering damages actions. They can also intervene or participate in Civil, Commercial, Criminal or Contentious-Administrative Trials; the actions for writ mandamus, police actions; in actions, lawsuits or litigations instituted by the grantor or against him.
- 5) To register domain names before the competent entity.
- 6) To the effect of this mandate the above-named proxy are empowered to: conciliate, cancel, settle, submit to arbitration, withdraw and to receive and take possession of the litigation related object and waive or renounce the rights granted or in process of granting, admit the facts of the case.
- 7) To ratify or not the officious agency.
- 8) I (we) hereby appoint the afore mentioned attorneys with powers to receive notifications and to designate judicial and extrajudicial attorneys, substitute this Power of Attorney and to revoke such substitutions.

Granted and signed at

on this 16th day of

Firma signature



04/288

Traducción Oficial No. _____
Dra. ROSA PEDRAHITA AGUILAR
TRADUCTOR E INTERPRETE OFICIAL
N.º. 718 DE MAYO 2003
MIN. INTERIOR Y DE JUSTICIA

Certificate Official Character

THE STATE OF OHIO

Warren

County

COMMON PLEAS COURT

I the undersigned Clerk of the court of Common pleas, a Court of Law and Record of said County, do hereby certify that.....
 Katherine R. Edman
 is a..... Notary Public.....in and for said County, duly commissioned and qualified; and that his commission is dated..... October 27, 2003....., and expires October 26, 2008.....

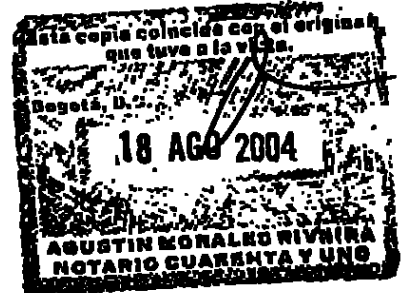
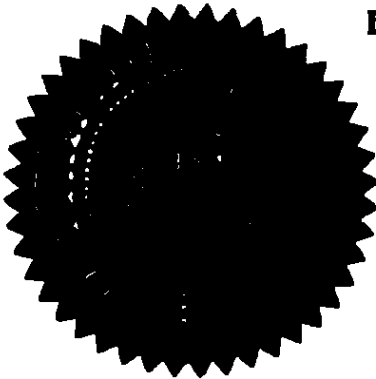
In Testimony Whereof, I hereunto subscribe my name and affix

the seal of said Court at..... Lebanon.....Ohio,

this.....23rd.....day of.....April.....2004.....

.....
 Clerk

By.....
 Deputy



04/288

ADUCCION OFICIAL No _____
UNN J F JGA IA AGUL KA
TRADUCCION E INTERPRETE OFICIAL
LA LE MA O JG3
MA IN RIOR Y J ST IA



KATHERINE R. EDMAN
Notary Public, State of Ohio
My Commission Expires Oct. 27, 2008
NOTARIAL CERTIFICATE

(When the applicant is a CORPORATION)

(Powers of attorney granted in: El Salvador, Mexico, U.S.A. and Venezuela)

This 16th day of March, 2004
the undersigned Notary CERTIFIES that:

1. David C. Troller
(name of the person who signs the power of attorney)

of legal age and domiciled in Ohio, United States of America set his hand on the foregoing document.

2. The grantor is to him personally known and that he/she has legal capacity to execute the document.

3. The grantor has executed the foregoing document in his capacity of Secretary of the juridical person Clogay Plastic Products Company, Inc.

4. The mentioned juridical person with place of business in Mason, Ohio, United States of America

is duly organized, has actual legal existence and that the purposes for which the power of attorney is granted are within the scope of its corporate purposes.

5. The grantor has in fact the referred quality and that his/her representation is legal and that he/she is empowered to grant this power of attorney.

6. I have based the above certifications 3, 4 and 5, on the authentic documents which for such purpose were exhibited to me.


Notary Public

My Commission Expires October 27, 2008

NOTA: Then the Colombian Consul must legalize the signature of the Notary Public.

NOTARIAL CERTIFICATE (When the applicant is an INDIVIDUALS)

On this _____ day of _____
the undersigned Notary CERTIFIES that:

1. _____
(name of the person who signs the Power of Attorney)

of legal age and domiciled at _____

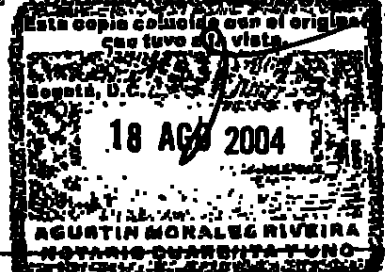
signed in his presence the foregoing document, the grantor is to him personally known and that he/she has legal capacity to execute the document.

Notary Public

NOTA: Then the Colombian Consul must legalize the signature of the Notary Public.

For all other countries the Colombian Consul or before who it is granted must issue a certification stating 1) the legal existence of the corporation, 2) that the corporate purposes are actually being accomplished, 3) that the person or persons who grant this Power of Attorney are empowered to do it. The Consul will certify also that the documents evidencing those circumstances were exhibited to him.

LEGALIZATION BY THE COLOMBIAN CONSUL OR BY APOSTILLE.



CERTIFICADO NOTARIAL

(Cuando el solicitante es SOCIEDAD)

(Poderes otorgados en: El Salvador, Estados Unidos, México y Venezuela)

A los _____ días del mes de _____ de _____
el Notario que suscribe DA FE de que:

1. _____
(nombre de la persona que firma el poder)

mayor de edad y domiciliado en _____

firmó de su puño

y letra el documento que antecede.

2. Conoce al (a la) otorgante y que este (a) está legalmente capacitado para el otorgamiento.

3. El otorgante ha firmado el referido documento en su carácter de _____

de la persona jurídica _____

4. La citada persona jurídica con sede en _____

está legalmente

constituida, que tiene actualmente existencia legal y que el acto para el cual se ha otorgado este poder está comprendido entre los que constituyen su objeto social.

5. El otorgante tiene efectivamente la representación que ostenta, que esta es legítima y que está facultado para otorgar este poder.

6. Las anteriores certificaciones de los puntos 3, 4 y 5, me constan porque he tenido a la vista los documentos auténticos.



KATHERINE R. EDMAN

Notary Public, State of Ohio

NOTA: A continuación de lo anterior, el Consol de Colombia debe autenticar la firma del Notario Público.

CERTIFICADO NOTARIAL (Cuando el solicitante es INDIVIDUO)

A los _____ días del mes de _____ de _____
el Notario que suscribe DA FE de que:

1. _____
(nombre de la persona que firma el poder)

mayor de edad y domiciliado en _____

firmó en su presencia

el documento que antecede, conoce al otorgante y que este está legalmente capacitado para el otorgamiento.

Notario Público

NOTA: A continuación de lo anterior, el Consol de Colombia debe autenticar la firma del Notario Público.

Para todos los demás países el Señor Consol de Colombia o ante quien se otorgue, debe expedir una certificación dejando constancia 1) de la existencia legal de la sociedad, 2) de que esta ejerce actualmente su objeto social, y 3) de que la persona o personas que otorgan el poder están facultadas para hacerlo, dejando constancia así mismo de que tuvo a la vista las pruebas que acreditan tales circunstancias.

LEGALIZACIÓN POR EL CONSUL DE COLOMBIA O POR APOSTILLA

995793v1

04/288

CCION OFICIAL No. _____
PABLO PEDRAJITA AVALUADA
TRADUCTOR E INTERPRETE OFICIAL
MAY 218 DE MAYO 2003
DEL MIN. INTERIOR Y DE JUSTICIA

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
9 October 2003 (09.10.2003)

PCT

(10) International Publication Number
WO 03/082571 A1

(51) International Patent Classification: B32B 27/12.
B29C 55/02, A41B 17/00, A41D 31/02, A61F 13/15

(74) Agents: KOZLOWSKI, Holly, D. et al.: Dinsmore &
Shohl L.L.P. 1900 Chemed Center, 255 East Fifth Street,
Cincinnati, OH 45202 (US).

(21) International Application Number: PCT/US03/08922

(81) Designated States (national): AE, AG, AL, AM, AT, AU,
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,
CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,
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(71) Applicant (for all designated States except US): CLOPAY
PLASTIC PRODUCTS COMPANY, INC. [US/US]:
8585 Duke Boulevard, Mason, OH 45040-3101 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): WU, Pai-Chuan
[US/US]: 11053 Huntwick Place, Cincinnati, OH
45241 (US). ROBINSON, Dale, Eugene [US/US]:
1712 Morey Avenue, Hamilton, IL 45011 (US). BRAD-
FORD, Richard, Arnold [US/US]: 2223 Mt. Zion Road,
Brooksville, KY 41004 (US).

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(54) Title: BREATHABLE AND ELASTIC COMPOSITE MATERIALS AND METHODS

(57) Abstract: In one embodiment, a breathable, incrementally stretched elastic composite material comprises an inner elastomeric film extrusion-laminated to an outer nonwoven web at each film surface. The inner elastomeric film has a random pattern of incremental stretch-formed macroholes therein and is substantially free of pore-forming filler. In another embodiment, a breathable, incrementally stretched elastic composite material comprises an elastomeric film extrusion-laminated to a nonwoven web at one or both of the film surfaces. The elastomeric film has a random pattern of incremental stretch-formed macroholes therein and is substantially free of pore-forming filler. Methods of manufacturing the composite materials comprise extrusion laminating and incremental stretching. Garments and disposable articles are formed at least in part from the composite material.

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BREATHABLE AND ELASTIC COMPOSITE MATERIALS AND METHODS

FIELD OF THE INVENTION

The present invention is directed to breathable, incrementally stretched elastic composite materials which comprise an inner elastomeric film extrusion-laminated to a nonwoven web, preferably at each film surface. The invention is further directed to garments and/or disposable articles formed at least in part from such composite materials and to methods of manufacturing such composite materials.

BACKGROUND OF THE INVENTION

Elastic composite materials are known in the art. For example, the Wu U.S. Patents Nos. 5,422,172 and 5,861,074 disclose elastic laminated sheets of a nonwoven fibrous web and an elastomeric film. Wu defines the term "elastic" as meaning stretchable under force and recoverable to its original or essentially original form upon release of that force. Wu discloses that the elastic laminate may be incrementally stretched to provide a very soft fibrous finish having the appearance of nonwoven fibers with superior bond strengths, thereby providing a composite material advantageous for use in garments and other applications where a soft finish is desirable. Wu further discloses that the elastic laminate is characterized as being impervious to the passage of fluid by virtue of the elastomeric film, while maintaining a soft feel on the fibrous web surface of the laminate, although various degrees of vapor or air permeability may be achieved by providing mechanical microvoids.

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Conventional processes for providing mechanical microvoids include hot needle punching, hot roll calendaring, ultrasonic perforation, or the like. Such mechanical processes may be cumbersome and/or difficult to control during high speed manufacture of composite materials. It is also known to provide air and water vapor permeability to polymer films by including therein one or more pore-forming fillers such as calcium carbonate, followed by stretching of the films to form micropores in areas adjacent to the filler. However, it is often difficult to provide a desired degree of permeability in elastic films using such techniques. Accordingly, there is a continued desire for breathable elastic materials which may be easily manufactured.

SUMMARY OF THE INVENTION

It is therefore an object of the invention to provide improved breathable elastic composite materials and to provide improved methods for manufacturing such materials.

In one embodiment, the invention is directed to breathable, incrementally stretched elastic composite materials. The composite materials comprise an inner elastomeric film extrusion-laminated to an outer nonwoven web at each film surface. The inner elastomeric film has a random pattern of incremental stretch-formed macroholes therein and is substantially free of pore-forming filler.

In an alternate embodiment, the breathable, incrementally stretched elastic composite materials comprise an elastomeric film extrusion-laminated to a nonwoven web at one or both of the film surfaces. The elastomeric film has a random pattern of incremental stretch-formed macroholes therein and is substantially free of pore-forming filler.

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In another embodiment, the invention is directed to garments. The garments are formed, at least in part, from a breathable, incrementally stretched elastic composite material according to the invention. In a further embodiment, the invention is directed to disposable articles formed, at least in part, from a breathable, incrementally stretched elastic composite material according to the invention.

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In yet another embodiment, the invention is directed to methods of manufacturing a breathable elastomeric composite material. The methods comprise extrusion laminating an elastomeric film to at least one nonwoven web at a film surface to tightly bond the nonwoven web thereto, and incrementally stretching the resulting laminate to form a random pattern of macroholes in the elastomeric film.

The elastomeric film is substantially free of pore-forming filler. In a specific embodiment, the elastomeric film is extrusion laminated to a nonwoven web at each film surface.

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The composite materials according to the present invention are advantageous in exhibiting a desirable combination of breathability and elasticity and may be easily manufactured according to the inventive methods. These and additional objects and advantages will be more fully apparent in view of the following detailed description which illustrates various modes contemplated for carrying out the invention. As will be realized, the invention is capable of other different obvious aspects, all without departing from the invention. Accordingly, the drawings and specification are illustrative in nature and not restrictive.

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BRIEF DESCRIPTION OF THE DRAWINGS

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While the specification concludes with claims particularly pointing out and distinctly claiming the present invention, the invention will be further understood

from the following detailed description taken in conjunction with the accompanying drawings in which:

Figs 1A and 1B are schematic diagrams of cross-sectional views of first and second embodiments, respectively, of composite materials according to the present invention;

Fig. 2 is a schematic diagram of an extrusion lamination section and an incremental stretch section of an apparatus suitable for use in an embodiment of the methods according to the invention;

Fig. 3 is an enlarged (50x) view of an inner elastomeric film layer of a composite material according to the present invention as described in Example 1;

Fig. 4 is an enlarged (500x) cross-sectional view of a composite material according to the invention as described in Example 1;

Fig. 5 is an enlarged (1000x) view of an inner elastomeric film layer of a composite material according to the present invention as described in Example 1; and

Fig. 6 graphically sets forth the air permeability of a composite film according to the invention as described in Example 1, as a function of pressure differential.

DETAILED DESCRIPTION

The present invention is directed to breathable, incrementally stretched elastic composite materials. Within the context of the present specification, the term "breathable" means that the composite materials exhibit air permeability. In additional embodiments, the composite materials are both air and moisture vapor-permeable. In specific embodiments, the composite materials have an air permeability of at least about 10 cc/min/cm² when a pressure of about 60 psi is applied thereto. In a more specific embodiment, the composite materials may have an

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air permeability of at least about 15 cc/min/cm^2 when a pressure of about 60 psi is applied thereto. Within the context of the present specification, the term "elastic" means stretchable under force and recoverable to an original or essentially original form upon release of the stretching force, while the term "elastomeric" is used to describe an elastic polymer material. In specific embodiments, the composite materials have a stretchability of at least about 150% and, when the stretching force is released, a permanent set or elongation of not more than about 15%. In further embodiments, the composite material has a stretchability of at least about 200% and, when the stretching force is released, a permanent set or elongation of not more than about 25%. Finally, within the context of the present specification, the term "incrementally stretched" means that the composite material includes alternating stretched zones and non-stretched zones across its length. The incremental stretch process will be described in further detail below.

Figs. 1A and 1B set forth cross-sectional schematic diagrams of first and second embodiments of composite materials according to the invention. In Fig. 1A, the composite material 10 comprises an inner elastomeric film 12 and an outer nonwoven web 14 at each film surface. The composite material 20 of Fig. 1B comprises an elastomeric film 22 having a nonwoven web 24 at one film surface. While many of the specific embodiments described herein will include two nonwoven webs along the lines of the composite material 10 of Fig. 1A, it should be understood that the invention as broadly disclosed encompasses composite material 20 as shown in Fig. 1B. Moreover, in the composite materials 10 and 20, the elastomeric films 12 and 22, respectively, are shown schematically as a single layer. It is equally within the scope of the invention that the elastomeric film comprises a multi-layer structure,

as will be described in further detail below with respect to individual embodiments of the invention.

In the composite materials of the invention, the elastomeric film is extrusion laminated to a nonwoven web at one or both of the film surfaces. In accordance with
5 an important feature of the invention, the extrusion lamination tightly bonds the elastomeric film to the nonwoven web or webs. Within the context of the present specification, the term "tightly bonded" means that the elastomeric film and the nonwoven web cannot be peeled apart from one another. Processing conditions suitable for providing a tight bond between the elastomeric film and the nonwoven
10 web or webs will be discussed in further detail below. As a result of the tight bonding between these layers of the composite material, fibers from the nonwoven web are embedded into the film and, upon incremental stretching, a random pattern of macroholes or pinholes is produced in the elastomeric film to render the composite materials breathable. The random pattern is typically controlled and uniform in
15 concentration along the length and width of the composite material. Additionally, the size of the macroholes is relatively uniform along the length and width of the composite material. In one embodiment, the composite materials are rendered breathable to such an extent that the materials are not liquid impervious. Thus, the composite materials according to such embodiments are suitable for applications
20 wherein a liquid barrier is not required. Depending on the compositions and physical parameters of the elastomeric film and nonwoven webs, the degree of tight bonding therebetween and the incremental stretching process conditions, the size of the pinholes or macroholes formed in the elastomeric film may be controlled. In specific embodiments, the average diameter of the macroholes may range from about 5 μm to
25 about 100 μm , more specifically from about 10 μm to about 50 μm , more specifically

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from about 15 μm to about 35 μm . These various conditions may also be used to control the concentration of pinholes or macroholes per surface area of composite material. While the concentration of macroholes may be varied depending on the particular use of the composite material, in specific embodiments, the concentration may range from about 5 to about 500 per inch^2 , more specifically from about 10 to about 100 per inch^2 , more specifically from about 25 to about 75 per inch^2 .

The elastomeric film employed in the composite materials according to the present invention may comprise any elastomeric material which is capable of formation into a film by die extrusion. Additionally, the elastomeric film may comprise a single monolayer film or, alternatively, may comprise a multilayer film comprising two or more layers, which typically are coextruded. While the specific desired elasticity of a film and the resulting composite material will be determined based on the desired application of the composite material, in one embodiment, the elastomeric film exhibits a permanent set of less than about 20%, more specifically from about 12 to about 18%, at 200% elongation. In yet another embodiment, the elastomeric film exhibits a stress relaxation of about 15-20% at 200% elongation. Examples of suitable elastomeric materials include elastomeric block copolymers, elastomer metallocene polymers and copolymers, for example the elastomeric metallocene olefin copolymers, elastomeric polyurethane homopolymers and copolymers, elastomeric polysiloxane homopolymers and/or copolymers, and the like, and mixtures of such elastomeric materials. Nonelastic polymers may also be included therein as long as the resulting film exhibits the desired elastic properties.

Suitable elastomeric block copolymers include those having at least one vinyl aromatic block and at least one rubber block. Specific aromatic vinyl monomers for forming such block copolymers include styrene and substituted styrene monomers, for

example alkyl-substituted styrenes and halogen-substituted styrenes, and mixtures thereof. The elastomeric block copolymers containing one or more of these styrene monomer blocks are commonly referred to as elastomeric styrenic block copolymers. Specific monomers for forming the rubber block include, but are not limited to, butadiene, isoprene, ethylene-propylene, ethylene-butylene, and the like. The block copolymers may comprise two blocks, three blocks or more. Commercially available block copolymers include the Kraton polymers available from Kraton Polymers, including, but not limited to, poly(styrene-butadiene-styrene), poly(styrene-isoprene-styrene), poly(styrene-ethylene-butylene-styrene), poly(styrene-ethylene-propylene-styrene), and the like.

The elastomeric metallocene olefin polymers and copolymers include, but are not limited to, polyolefins produced from the metallocene single-site catalysts. Typically, one or more olefins such as ethylene, propylene, styrene or the like is polymerized with butene, hexene, octene, mixtures thereof or the like, to provide elastomers suitable for use in the present invention. Examples include, but are not limited to, poly(ethylene-butene), poly(ethylene-hexene), poly(ethylene-octene), poly(ethylene-propylene) and/or polyolefin terpolymers thereof.

Additional elastomeric materials for use in the elastomeric film layer of the invention include poly(ester-ether), poly(ether-amide), poly(ethylene-vinyl acetate), poly(ethylene-methylacrylate), poly(ethylene-acrylic acid), poly(ethylene butylacrylate), poly(ethylene-propylene-diene), and ethylene-propylene rubber.

In one embodiment, the elastomeric film comprises a blend of at least one elastomeric styrenic block copolymer and at least one elastomeric metallocene olefin copolymer. The respective amounts of the copolymers may be varied depending on the desired elastic properties of the composite material. In a more specific

embodiment, such blends comprise from about 10 to about 90 weight percent of the styrenic block copolymer and from about 10 to about 90 weight percent of the metallocene olefin copolymer. In a further embodiment, such blends comprise from about 50 to about 90 weight percent of the styrenic block copolymer and from about 10 to about 50 weight percent of the metallocene olefin copolymer.

In additional embodiments, the elastomeric film may comprise one or more core layers A and one or more cap or skin layers B. Generally, such cap or skin layers may be provided in order to chemically isolate one layer from another or to physically isolate a layer from an environment of use. For example, when a blend of a Kraton elastomeric styrenic block copolymer and a metallocene polyethylene is employed in the elastomeric film, the film tends to exhibit a sticky surface feel and it may be desirable to provide the elastomeric film surfaces with a cap layer on each surface. Typically, a thin layer of polyolefin, for example polyethylene, polypropylene, or mixtures thereof, may be used as such a cap layer on either side of the core blend layer, whereby the elastomeric film will comprise a multilayer film of the structure A/B/A. The cap layers may be conveniently provided by coextrusion with the core layer.

As the random pattern of incremental stretch-formed macroholes is formed in the elastomeric film by the incremental stretching process, it is not necessary to include any type of pore-forming filler in the elastomeric film. Thus, the elastomeric film is substantially free of pore-forming filler. Within the context of the present specification, the term "substantially free of pore-forming filler" means that the elastomeric film contains an insufficient amount of pore-forming filler to render the film microporous upon incremental stretching due to microvoid formation adjacent the filler. In more specific embodiments, the elastomeric film contains less than about

20 weight percent pore-forming filler, more specifically, less than about 10 weight percent pore-forming filler, and yet more specifically, less than about 5 weight percent pore-forming filler. In further embodiments, the elastomeric film contains less than about 1 weight percent of the pore-forming filler. In a further embodiment, the elastomeric film does not contain any pore-forming filler.

The weight or thickness of the elastomeric film may be adjusted depending on the properties desired for the composite material. Typically, the elastomeric film may have a gauge of from about 25 to about 70 grams/m², and in more specific embodiments, the elastomeric film may have a gauge of from about 30 to about 40 grams/m².

As used herein "nonwoven fibrous web" is used in its generic sense to define a generally planar structure that is relatively flat, flexible and porous, and is composed of staple fibers or continuous filaments. For a detailed description of nonwovens, see "Nonwoven Fabric Primer and Reference Sampler" by E. A. Vaughn, Association of the Nonwoven Fabrics Industry, 3d Edition (1992). The nonwovens may be prepared by any conventional process, and may be, among others, carded, spun bonded, wet laid, air laid or melt blown, or any combination thereof, as such products are well known in the trade. The nonwoven fibrous webs may comprise fibers of polyolefins, including, but not limited to, polyethylene and/or polypropylene, and including metallocene-catalyzed polyolefins, polyesters, rayon, cellulose, nylon, and blends of such fibers. The fibers may also comprise bicomponent fibers, formed from two or more materials in any physical arrangement.

In one embodiment, the nonwoven web is not itself elastic. In a more specific embodiment, the nonwoven is stretchable, i.e., it elongates under force, even if it is not recoverable to its original form upon release of the stretching force. Typically,

nonwovens which are loosely formed may be more highly stretchable. In further embodiments, the nonwoven may be elastic. In one embodiment, the nonwoven web has a weight of less than about 40 g/m². In a more specific embodiment, the nonwoven web has a weight of less than about 25 g/m². In yet a further embodiment,
5 the nonwoven web has a weight of about 12 g/m².

In specific embodiments, the nonwoven web may comprise a spun-bonded polyolefin, for example spun-bonded polyethylene or spun-bonded polypropylene. Various spun-bonded polyolefin webs are commercially available and are suitable for use in the invention. Spun-bonded webs formed from polyethylene and
10 polypropylene are also suitable. For example, spun-bonded nonwovens formed from fibers which comprise a blend of polyethylene and polypropylene, at any proportion, and/or formed from fibers which comprise a coextrusion of polyethylene and polypropylene, are also suitable. These nonwovens are commercially available, for example, from BBA.

15 The composite materials according to the present invention may be used in various applications where breathability, for example air and moisture vapor permeability, and elastomeric properties are desired. In one embodiment, the composite materials are employed in the formation of garments, including diapers, pants, surgical gowns and the like. The composite materials are also advantageous for
20 use in forming disposable articles, including disposable garments of the type described above. Additionally, the composite materials may be employed in the formation of disposable sheets, dressings, hygienic products and the like. In a preferred embodiment, the composite materials of the invention are employed in baby diapers and baby training pants in areas where liquid impermeability is not required,
25 i.e., in side areas commonly referred to as "diaper ears." The composite materials

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exhibit a good combination of elasticity and retaining force, together with good breathability and softness, for advantageous use in such applications.

In accordance with an important feature, the composite materials of the invention may be easily manufactured. Specifically, the elastomeric film is extrusion
5 laminated to an outer nonwoven web at at least one film surface, to tightly bond the nonwoven web thereto. In a more specific embodiment, the elastomeric film is extrusion laminated to an outer nonwoven web at each film surface to tightly bond the nonwoven webs thereto. The extrusion lamination of the elastomeric film and the one or more nonwoven webs may be conducted according to any conventional extrusion
10 lamination techniques. Importantly, the extrusion lamination is conducted under conditions which tightly bond the elastomeric film with the nonwoven webs. The resulting laminate is then incrementally stretched to form a random pattern of macroholes in the inner elastomeric film. As discussed above, the elastomeric film is substantially free of pore-forming filler.

15 The incremental stretching is preferably conducted in a cross direction, referred to herein as CD intermesh stretching. A CD intermeshing stretcher typically comprises a pair of gear-like elements on parallel shafts. The shafts are disposed between two machine side plates, the lower shaft being located in fixed bearings and the upper shaft being located in bearings in vertically slidable members. The slidable
20 members are adjustable in the vertical direction by wedge shaped elements operable by adjusting screws. Screwing the wedges out or in will move the vertically slidable member respectively down or up to further engage or disengage the gear-like teeth of the upper intermeshing roll with the lower intermeshing roll. Micrometers mounted to the side frames are operable to indicate the depth of engagement of the teeth of the
25 intermeshing roll. Air cylinders are typically employed to hold the slidable members

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in their lower engaged position firmly against the adjusting wedges to oppose the upward force exerted by the material being stretched. These cylinders may also be retracted to disengage the upper and lower intermeshing rolls from each other for purposes of threading material through the intermeshing equipment or in conjunction with a safety circuit which would open all the machine nip points when activated.

The drive for the CD intermeshing stretcher must operate both upper and lower intermeshing rolls except in the case of intermeshing stretching of materials with a relatively high coefficient of friction.

The CD intermeshing elements are typically machined from solid material but can best be described as an alternating stack of two different diameter disks. In one embodiment, the intermeshing disks are about 6" in diameter, about 0.031" thick, and have a full radius on their edge. The spacer disks separating the intermeshing disks are about 5.5" in diameter and about 0.069" in thickness. Two rolls of this configuration would be able to be intermeshed up to 0.231" leaving 0.019" clearance for material on all sides. This CD intermeshing element configuration would have a 0.100" pitch.

The engagement of the CD intermeshing roll elements may be adjusted in order to provide the macroholes in the elastomeric film. In one embodiment, the engagement of the intermeshing roll elements is at least about 0.12 inch, more specifically from about 0.12 inch to about 0.20 inch.

Since the CD intermeshing elements are typically capable of large engagement depths, it is important that the equipment incorporate a means of causing the shafts of the two intermeshing rolls to remain parallel when the top shaft is raising or lowering. This is necessary to assure that the teeth of one intermeshing roll always fall between the teeth of the other intermeshing roll and potentially damaging physical contact

between intermeshing teeth is avoided. This parallel motion may be assured by a rack and gear arrangement wherein a stationary gear rack is attached to each side frame in juxtaposition to the vertically slidable members. A shaft traverses the side frames and operates in a bearing in each of the vertically slidable members. A gear resides on each end of this shaft and operates in engagement with the racks to produce the desired parallel motion.

If desired, the composite material may also be subjected to machine direction (MD) intermeshing stretching, although MD stretching may typically not be necessary as sufficient breathability is provided by the CD intermesh stretching. The MD intermeshing stretching equipment is typically identical to the CD intermeshing stretching equipment except for the design of the intermeshing rolls. The MD intermeshing rolls closely resemble fine pitch spur gears. In one embodiment, the rolls have a 5.933" diameter, 0.100" pitch, 30 diametral pitch, 14 1/2 degree pressure angle, and are basically a long addendum, topped gear. A second pass may be taken on these rolls with the gear hob offset 0.010" to provide a narrowed tooth with more clearance. With about 0.090" of engagement, this configuration will have about 0.010" clearance on the sides for material thickness. If desired, additional stretching may be performed, including tenter or machine direction orientation stretching, although, as noted above, for many applications, the CD intermeshing stretching will be sufficient.

Fig. 2 sets forth a schematic representation of one embodiment of the methods of the invention. An elastomeric film 6 is extruded from an extruder 1 through a die 2 and past an air knife 3, into a nip formed between rolls 4 and 5. The extrusion is conducted at or above the melt temperature of the film material, typically on the order of about 400-500°F. Conventionally, roll 4 may be a metal roll while roll 5 may be a rubber roll. Two nonwoven webs 9, 9 are supplied from rolls 13, 13 and the film 6

and webs 9 are passed through the nip of rolls 4 and 5 to laminate the webs to the film surfaces. The nip pressure is adjusted in order to obtain the desired tight bond between the nonwoven webs and the elastomeric film. Typically, pressures of greater than about 50 pounds per linear inch are employed. In a more specific embodiment, the nip pressure is from about 50 to about 150 pounds per linear inch, more specifically from about 50 to about 120 pounds per linear inch. The resulting laminate 12 is conducted by roll 7 past an optional preheated roller 20 and to the incremental stretch section where the laminate is passed through incremental cross direction (CD) stretcher rollers 10 and 11 to form the breathable, incrementally stretched elastomeric composite material 14. The material 14 may optionally be passed through an additional stretch section where it is subjected to further stretching. For example, the material 14 is shown in Fig. 2 as passing a further preheated roller 21 and through incremental machine direction (MD) stretcher rollers 10' and 11'. One skilled in the art will appreciate that preheated rollers 20 and 21 may be omitted if desired.

The following examples demonstrate specific embodiments of the multilayer microporous films according to the invention. In the examples, and throughout the specification, parts and percentages are by weight unless otherwise specified.

Example 1

In this example, a composite material according to the invention is prepared. A blend comprising about 70 weight percent poly(styrene-butadiene-styrene) block copolymer elastomer and about 30 weight percent of a metallocene polyethylene plastomer is extruded using conventional film extrusion techniques. The blend is coextruded as a core layer B with outer layers A comprising a mixture of about 80

weight percent very low density polyethylene (VLDPE) and about 20 weight percent low density polyethylene (LDPE) to form an elastomeric film of the structure A/B/A.

The resulting elastomeric film is extrusion laminated on each film surface with a high stretchable spun bonded polyethylene nonwoven web having a weight of about 5 30-grams/m². A nip pressure of about 60 pounds per linear inch is used to form a tight bond between the nonwoven webs and the elastomeric film. The laminate is then incrementally stretched using CD intermeshing stretching, with a roll engagement depth of about 0.120 inch.

The resulting composite material has a weight of about 95 grams/m² and 10 exhibits good breathability, good elasticity and a soft feel. When stretched about 100%, the composite material exhibits about 7% permanent set.

Figs. 3-5 show enlarged views of the composite material. Specifically, Fig. 3 comprises a 50x enlargement of the stretched elastomeric film of the composite material, with macroholes therein appearing in the circled areas. Fig. 4 comprises a 15 500x enlargement of the composite material, with the elastomeric film layer indicated at 32 and the nonwoven web layers indicated at 34. This view shows the tight bonding between the film and the nonwoven webs. Fig. 5 comprises a 1000x enlargement of the stretched elastomeric film of the composite material, with one macrohole shown therein having a diameter of about 20 μm.

20 The composite material of this example is subjected to measurement of airflow therethrough as a function of applied air pressure. The results are shown in Fig. 6 wherein air flow is indicated in cc/min/cm² and pressure is indicated in pounds per square inch.

Interestingly, it has been determined that composite materials according to the 25 present invention are not only stretchable and recoverable, but also exhibit increased

air permeability in their stretched state. In this example, the air permeability of the composite material is measured, in cubic feet per minute, as a function of the percent stretching. A "TexTest Air Permeability Tester," Model FX 3300, available from ATI (Advanced Testing Instruments) Corporation of Spartansburg, South Carolina, at a pressure of 125 Pa (0.018 psi) is employed. The results are set forth in Table 1.

Table 1

Measurement	Percent Stretched	CFM
1	0	0.16
2	50	0.44
3	100	0.85
4	150	1.10

The results in Table 1 demonstrate the increased air permeability of the composite material of this example upon stretching.

10. Example 2

In this example, a composite material according to the invention is prepared. An elastomeric film is prepared by extrusion laminating a blend of 90 weight percent poly(styrene-butadiene-styrene) block copolymer elastomer and about 10 weight percent of ethylene vinyl acetate copolymer. The elastomeric film is extrusion laminated on each film surface with a stretchable spun-bonded polypropylene nonwoven web. A nip pressure of about 60 pounds per linear inch is used to form a tight bond between the nonwoven webs and the elastomeric film. The laminate is preheated using a preheated roller having a temperature of about 210°F and is incrementally stretched using CD intermeshing stretching, with a roll engagement depth of about 0.130 inch.

The resulting composite material is stretchable and recoverable, exhibits good breathability, good elasticity and a soft feel. When stretched to about 200%, the

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composite material exhibits about 20% permanent set. The composite material has a weight of about 88 g/m².

The air permeability of the composite material of this example is measured in accordance with the procedures and apparatus described in Example 1. The results are set forth in Table 2.

Table 2

Measurement	Percent Stretched	CFM
1	0	0.08
2	50	0.78
3	100	1.09
4	150	1.15

Thus, the composite material of this example exhibits increased air permeability upon stretching.

10 The specific illustrations and embodiments described herein are exemplary only in nature and are not intended to be limiting of the invention defined by the claims. Further embodiments and examples will be apparent to one of ordinary skill in the art in view of this specification and are within the scope of the claimed invention.

WHAT IS CLAIMED IS:

1. A breathable, incrementally stretched elastic composite material comprising an inner elastomeric film extrusion-laminated to an outer nonwoven web at each film surface, wherein the inner elastomeric film has a random pattern of incremental stretch-formed macroholes therein and is substantially free of pore-forming filler.
5
2. The composite material of claim 1, having an air permeability of at least about 10 cc/min/cm² when a pressure of about 60 psi is applied thereto.
3. The composite material of claim 1, having a stretchability of at least about 200% with a permanent set of no more than about 25%.
4. The composite material of claim 1, wherein the inner elastomeric film comprises elastomeric block copolymer, elastomeric metallocene olefin polymer or copolymer, elastomeric polyurethane, elastomeric polysiloxane, or mixtures thereof.
5. The composite material of claim 4, wherein the inner elastomeric film comprises an elastomeric styrenic block copolymer.
6. The composite material of claim 5, wherein the inner elastomeric film comprises poly(styrene-butadiene-styrene), poly(styrene-isoprene-styrene), poly(styrene-ethylene-butylene-styrene), or combinations thereof.

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7. The composite material of claim 5, wherein the inner elastomeric film comprises a blend of an elastomeric styrenic block copolymer and an elastomeric metallocene polyethylene copolymer.

8. The composite material of claim 1, wherein the inner elastomeric film is a monolayer film.

9. The composite material of claim 1, wherein the inner elastomeric film comprises a multilayer film.

10. The composite material of claim 9, wherein the inner elastomeric film comprises a core layer including an elastomeric styrene block copolymer, coextruded at each surface with a polyolefin cap layer.

11. The composite material of claim 1, wherein the nonwoven webs individually comprise spun bonded polyolefin.

12. The composite material of claim 1, wherein each nonwoven web has a weight of less than about 40 g/m².

13. The composite material of claim 1, wherein, each nonwoven web has a weight of about 12 g/m².

14. A garment formed at least in part from the composite material of claim

15. A disposable article formed at least in part from the composite material of claim 1.

16. The disposable article of claim 15, comprising a diaper.

17. A breathable, incrementally stretched elastic composite material comprising an inner elastomeric film including a blend of an elastomeric styrenic block copolymer and an elastomeric metallocene polyethylene copolymer extrusion-laminated to an outer nonwoven spun bonded polyolefin web at each film surface,
5 wherein the inner elastomeric film has a random pattern of incremental-stretch formed macroholes therein and is substantially free of pore-forming filler.

18. A garment formed at least in part from the composite material of claim 17.

19. A disposable article formed at least in part from the composite material of claim 17.

20. The disposable article of claim 19, comprising a diaper.

21. A breathable, incrementally stretched elastic composite material, comprising an elastomeric film extrusion-laminated to a nonwoven web at one or both of the film surfaces, wherein the elastomeric film has a random pattern of incremental stretch-formed macroholes therein and is substantially free of pore-forming filler.

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22. A garment formed at least in part from the composite material of claim 21.

23. A disposable article formed at least in part from the composite material of claim 21.

24. The disposable article of claim 23, comprising a diaper.

25. A method of manufacturing a breathable elastomeric composite material, comprising

extrusion laminating an inner elastomeric film to an outer nonwoven web at each film surface to tightly bond the nonwoven webs thereto; and

5 incrementally stretching the resulting laminate to form a random pattern of macroholes in the inner elastomeric film,

wherein the inner elastomeric film is substantially free of pore-forming filler.

26. The method of claim 25, wherein the extrusion lamination is conducted at a nip pressure of greater than about 50 pounds per linear inch.

27. The method of claim 25, wherein the incremental stretching comprises cross direction (CD) intermesh stretching.

28. The method of claim 27, wherein the CD intermesh stretching employs an intermeshing roll engagement of at least about 0.12 inch.

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29. The method of claim 25, wherein the composite material has an air permeability of at least about 10 cc/min/cm² when a pressure of about 60 psi is applied thereto.

30. The method of claim 25, wherein the composite material has a stretchability of at least about 200% with a permanent set of no more than about 25%.

31. The method of claim 25, wherein the inner elastomeric film comprises an elastomeric styrenic block copolymer.

32. The method of claim 25, wherein the inner elastomeric film comprises a blend of an elastomeric styrenic block copolymer and an elastomeric metallocene polyethylene copolymer.

33. The method of claim 25, wherein the inner elastomeric film comprises a core layer including an elastomeric styrene block copolymer, coextruded at each surface with a polyolefin cap layer.

34. The method of claim 25, wherein the nonwoven webs individually comprise spun bonded polyolefin.

35. The method of claim 25, wherein each nonwoven web has a weight of less than about 40 g/m².

36. The method of claim 25, wherein, each nonwoven web has a weight of about 12 g/m².

37. A method of manufacturing a breathable elastomeric composite material, comprising

extrusion laminating an elastomeric film to an outer nonwoven web at one or both of the film surfaces to tightly bond the nonwoven web thereto; and

5 incrementally stretching the resulting laminate to form a random pattern of macroholes in the elastomeric film,

wherein the elastomeric film is substantially free of pore-forming filler.

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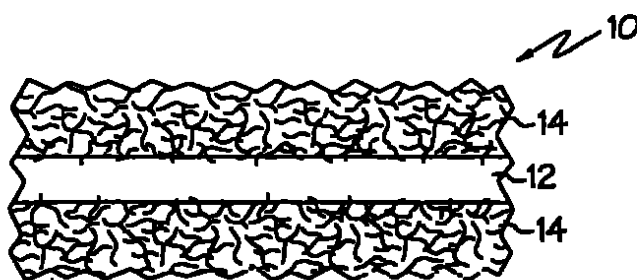


FIG. 1A

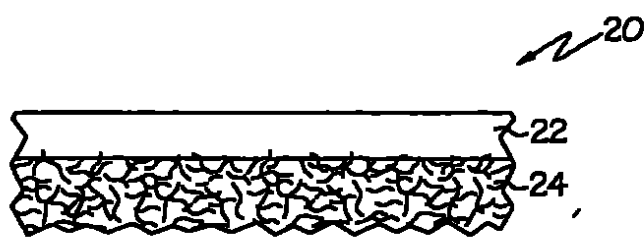


FIG. 1B

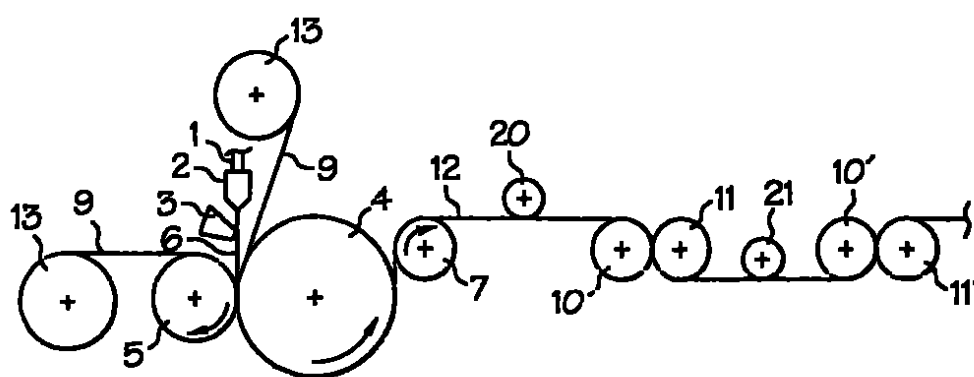


FIG. 2

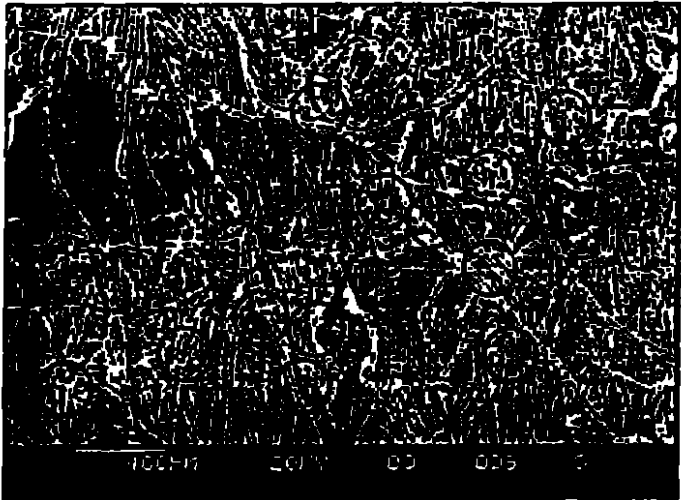
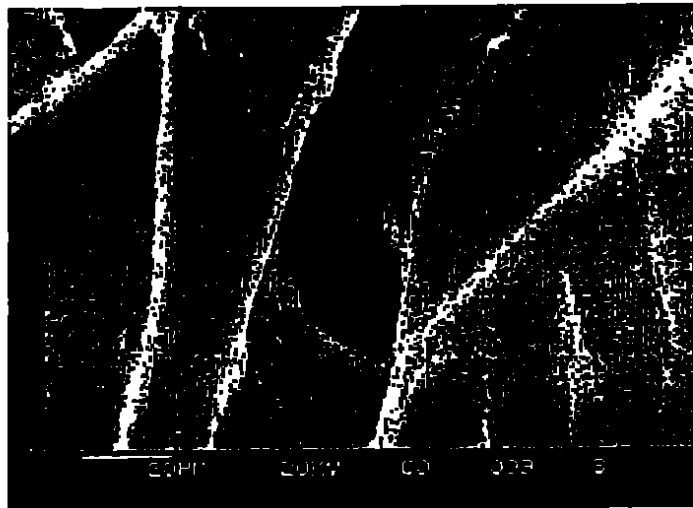


FIG. 3



FIG. 4

3 / 4



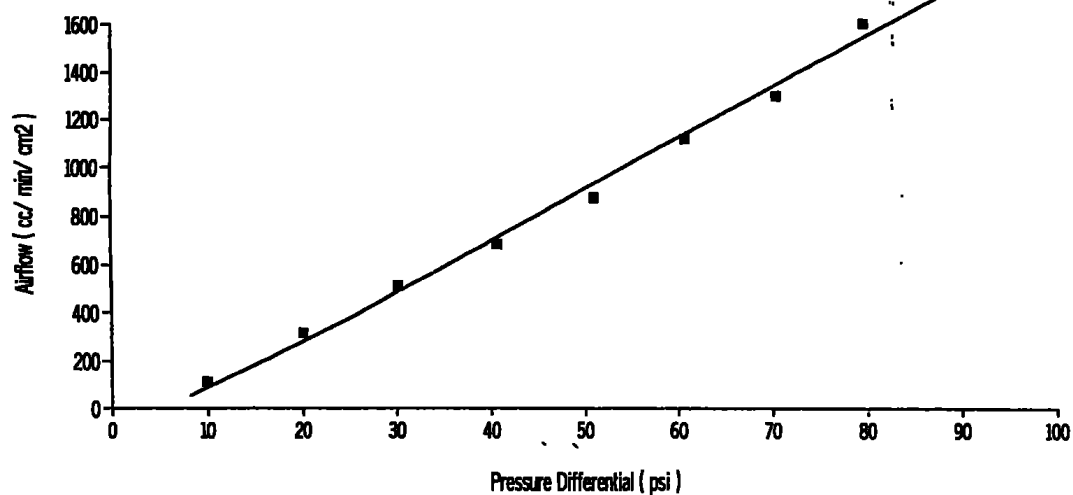


FIG. 6

INTERNATION SEARCH REPORT

Inter. Application No
PCT/US 03/08922

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 B32B27/12 B29C55/02 A41B17/00 A41D31/02 A61F13/15

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)

IPC 7 B32B A41B A41D B29C A61F

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

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

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 861 074 A (WU PAI-CHUAN) 19 January 1999 (1999-01-19) cited in the application	1,3-6, 11-25, 27,31, 32,34-37
Y	claims; examples column 3, line 15-63 column 5, line 24-42	2,7,8, 28,29
Y	WO 01 51548 A (CLOPAY PLASTIC PROD CO) 19 July 2001 (2001-07-19) page 23, line 11-15; claims 1,5-7,9-11,21,25-30; examples page 17, line 14 -page 18, line 2 -/-	2,7,8, 28,29

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in 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 document but published on or after the international filing date

"L" document which may throw doubts on priority claims) or which is cited to establish the publication date of another citation or other special reason (see 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.

"&" document member of the same patent family

Date of the actual completion of the international search

2 July 2003

Date of mailing of the international search report

14/07/2003

Name and mailing address of the ISA

European Patent Office, P.B. 5616 Palatinen 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl
Fax (+31-70) 340-3016

Authorized officer

Seiberlich, P

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INTERNATIONAL SEARCH REPORT

Application No
PCT/US 03/08922

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 01 79343 A (CLOPAY PLASTIC PROD CO) 25 October 2001 (2001-10-25) page 20, line 9 -page 21, line 2; claims 1,7,8,13-16,18,19; examples; table 3 page 12, line 17 -page 13, line 6 page 14, line 15 -page 16, line 11	2,7,8, 28,29
Y	WO 01 19592 A (CLOPAY PLASTIC PROD CO) 22 March 2001 (2001-03-22) page 14, line 14 -page 16, line 16; claims 1,6,7,12,13,15-26,29-32 page 17, line 8-18 page 25, line 5-8 page 22, line 2-9	8
A	US 5 407 979 A (WU PAI-CHUAN ET AL) 18 April 1995 (1995-04-18) the whole document	1-37
A	US 5 200 247 A (WU PAI-CHUAN ET AL) 6 April 1993 (1993-04-06) the whole document	1-37

INTERNATIONAL SEARCH REPORT

Continuation of patent family members

Application No

PCT/US 03/08922

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5861074	A	19-01-1999	US 5422172 A 06-06-1995
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		WO 0179343 A1 25-10-2001	
WO 0119592	A	22-03-2001	US 2002074691 A1 20-06-2002
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		DE 69223629 D1 29-01-1998	

INTERNATIONAL SEARCH REPORT

Information on patent family members

name

Application No

PCT/US 03/08922

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5407979	A	DE 69223629 T2	09-04-1998
		DK 598048 T3	09-02-1998
		EP 0598048 A1	25-05-1994
		ES 2112327 T3	01-04-1998
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		JP 2647262 B2	27-08-1997
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		WO 9303098 A1	18-02-1993
US 5200247	A	06-04-1993	NONE

PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

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

(PCT Rule 47.1(c), first sentence)

To:

KOZLOWSKI, Holly, D.
Dinsmore & Shohi LLP
1900 Chemed Center
255 East Fifth Street
Cincinnati, OH 45202
ETATS-UNIS D'AMERIQUE

Date of mailing (day/month/year)
09 October 2003 (09.10.03)

Applicant's or agent's file reference

IMPORTANT NOTICE

International application No.
PCT/US03/08922

International filing date (day/month/year)
21 March 2003 (21.03.03)

Priority date (day/month/year)
22 March 2002 (22.03.02)

Applicant

CLOPAY PLASTIC PRODUCTS COMPANY, INC.

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, US

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. 03/082571

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.

DATE RECEIVED: 10-23-03
ACTION:
DUE DATE:
DOCKETED: LMS

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Authorized officer

I.D. NUMBER: 2098-114
Judith Zahra

PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

PCT

To:

Kozłowski, Holly D.
DINSMORE & SHOHL LLP
1900 Chemed Center
255 East Fifth Street
Cincinnati, Ohio 45202
ETATS-UNIS D'AMERIQUE

FEB 13 04

WRITTEN OPINION
(PCT Rule 66)

Date of mailing
(day/month/year)

05.02.2004

Applicant's or agent's file reference

REPLY DUE

within 3 month(s)
from the above date of mailing

International application No.

PCT/US 03/08922

International filing date (day/month/year)

21.03.2003

Priority date (day/month/year)

22.03.2002

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

B32B27/12, B32B27/12

Applicant

CLOPAY PLASTIC PRODUCTS COMPANY, INC.

1. This written opinion is the first drawn up by this International Preliminary Examining Authority.

2. This opinion 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 RECEIVED: 2-13-04
ACTION: Written Opinion
DUE DATE: 5-5-04
DOCKETED: LHS
I.D. NUMBER: 2098-114

3. The applicant is hereby invited to reply to this opinion.

When? See the time limit indicated above. The applicant may, before the expiration of that time limit, request this Authority to grant an extension, see Rule 66.2(d).

How? By submitting a written reply, accompanied, where appropriate, by amendments, according to Rule 66.3. For the form and the language of the amendments, see Rules 66.8 and 66.9.

Also: For an additional opportunity to submit amendments, see Rule 66.4. For the examiner's obligation to consider amendments and/or arguments, see Rule 66.4 bis. For an informal communication with the examiner, see Rule 66.6.

If no reply is filed, the international preliminary examination report will be established on the basis of this opinion.

4. The final date by which the international preliminary examination report must be established according to Rule 69.2 is:

Name and mailing address of the international preliminary examining authority:



European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0 Tx: 523658 epmu d
Fax: +49 89 2399 - 4465

Authorized Officer

Formalities officer (incl. extension of time limits)
Fernández Gomez, L.
Telephone No. +49 89 2399-7449



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WRITTEN OPINION

International application No. **PCT/US 03/08922**

I. Basis of the opinion

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 opinion as "originally filed"*):

Description, Pages

1-18 as originally filed

Claims, Numbers

1-37 as originally filed

Drawings, Sheets

1A-44 as originally filed

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:

5. ☐ This opinion 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)).

6. Additional observations, if necessary:

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WRITTEN OPINION

International application No. **PCT/US 03/08922**

V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1,3-6,11-25,27,31,32,34-37 (NO) 2,7-10,26,28-30,33 (YES)
Inventive step (IS)	Claims	2,7,8,28,29 (NO) 9,10,26,30,33 (YES)
Industrial applicability (IA)	Claims	1-37 (YES)

2. Citations and explanations

see separate sheet

Re Item V

Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following document/s/:

D1: US-A-5861074
D2: WO-A-0151548
D3: WO-A-0119592
D4: WO-A-0179343

1. Claims 1, 3-6, 11-25, 27, 31, 32 and 34-37

Document D1 discloses elastic composite materials obtained by incrementally stretching a laminate comprising an (inner) elastomeric film having nonwoven fibrous webs laminated on both (outer) surfaces thereof. The polymeric materials used for the film layer are free of pore-forming fillers. The obtained films are useful in a number of applications such as pants, surgical gowns or diapers etc.

The laminate or composite materials according to D1 show various degrees of vapour or air permeability obtained e.g. by providing mechanical microvoids. The applicant's attention is directed to the passages cited in the Search Report for further features of the obtainable films (e.g. nature of the inner elastomeric film/col 3, l 27-49, examples and claim 8; nature of the non-woven web/col 3, l 50-63, examples and claims 7, 10; permanent set after stretching/Tables 6, 7; features concerning the manufacturing process, e.g. CD intermesh stretching/col 5, l 24-42 and examples).

The present application does not exclude the presence of microvoids obtained by mechanical treatment.

Thus, the disclosure in D1 appears to anticipate the subject-matter of present claims 1, 3-6, 11-25, 27, 31, 32 and 34-37 (Article 33(2) PCT).

2. Claims 2, 7, 8, 28 and 29

Document D2, which is considered to represent the most relevant state of the art to the subject-matter of present claim 2, discloses breathable incrementally stretched elastic composite materials preferably comprising incrementally stretched microporous films having a nonwoven fibrous web laminated onto the surface thereof (see the passages

presence of a further web laminated onto the film, the skilled person would regard it as a normal option to include a second web (as known from D1) into the breathable laminates known from D2 in order to solve the problem posed.

The subject-matter of present claims 2, 8 and 29 is therefore not considered to meet the requirements of Article 33(3) PCT.

(ii) As regards the selection of a specific material used for the inner film or the selection of specific stretching conditions, the applicant's attention is drawn to documents D2 (p 15/16) and D1 (Example II), which *expressis verbis* suggest the use of metallocene catalysed polymers or ethylene-based copolymers produced from single-site catalysts.

According to D1, the conditions used for incrementally stretching the laminate of fibrous web and elastomeric film are selected, for instance, such that the CD intermeshing stretcher operates with a depth of roller engagement of e.g. up to 0.12 inch. The results of such CD incremental or intermesh stretching produces laminates that have good stretchability and recoverability in combination with superior bond strengths and soft fibrous textures (cf. D1, col 6/1-7).

Moreover, incremental stretching techniques (e.g. employed on an extrusion laminate of a nonwoven fibrous web of spun-bonded filaments and microporous-formable thermoplastic film) using a CD intermeshing stretcher with a depth of roller engagement of 0.025-0.12 inch were known to produce laminates that have excellent breathability and liquid-barrier properties and, again, superior bond strengths and soft cloth-like textures (cf. e.g. document D3, pp 21/22 and claims and document D4, p 20/21 and claims).

Thus, these features have already been employed for the same purpose in the manufacture of similar laminates. It would therefore be obvious to the person skilled in the art, namely when the same result is to be achieved, to apply them with corresponding effect to a breathable material according to document D2, thereby arriving at the subject-matter of present claim 28.

The subject-matter of claims 7 and 28 does therefore also not involve an inventive step (Article 33(3) PCT).

3. Claims 9, 10, 26, 30 and 33

The subject-matter of present claims 9, 10, 26, 30 and 33 differs from the breathable composites disclosed in D2, which is considered to represent the most relevant state of the art also to the subject-matter of these claims, in the selection of a specific polymer blend avoiding the incorporation of a pore-forming filler, in the presence of a second

cited in the Search Report, in particular claims 21-32 and pp 8/9).

D2 discloses the extrusion of films (i.a. with lamination) where in the formulations were fed from an extruder through a slot die (to form the extrudate) into the nip of a rubber roll and a metal roll with an air knife. For extrusion lamination, an incoming web strip of fibrous material from a roller is also introduced into the nip of the rubber roll and the metal roll (cf. D2, pp 27/28 and Fig. 1).

The compressive force at the nip and the air knife are controlled such that the film is made without pin holing. Stretching conditions (such as temperature controlled rollers before the CD and MD incremental stretching rollers, temperatures and the depths of engagements, web temperature during stretching) are controlled in order to obtain desired properties such as web stability or moisture vapour transmission properties (cf. D2, p 28 and pp 31/32).

The films according to D2 have an air permeability of e.g. 102-280 cc/cm²/min (at 90 psi/non-embossed microporous film, cf. e.g. Table 3, examples no. 13-16/p 34).

It is clear from the disclosure in D2, that the porous structure of the film may be achieved either by means of a dispersed pore-forming filler (see e.g. claim 1) or by means of a specific polymer blend, which renders it *"unnecessary to use pore-forming fillers to provide microporosity upon incremental stretching"* (cf. D2, p 17/1 20-22).

Thus, the subject-matter of present claims 2, 7, 8, 28 and 29 differs from the disclosure in D2 in

(i) the selection of a specific polymer blend avoiding the incorporation of a pore-forming filler and in

(ii) the presence of a second web laminated onto the second surface of the inner film.

As regards present claims 7 and 28, in addition to the use of a second web, these claims differ from the materials of D2 either in the selection of a specific material used for the inner film (claim 7) or in the selection of specific stretching conditions employed (claim 28).

(i) As regards the presence of a further web laminated onto the inner film, the following is to be noted:

The problem to be solved may be regarded as to provide further breathable incrementally stretched composite materials suitable for garments or disposable articles like diapers.

It is clear from the disclosure in D1, that an extrusion lamination of the film forming formulation is possible onto one nonwoven fibrous web only or between two fibrous webs (see D1, claims, examples and Fig. 1).

Thus, in the absence of any indication of an unexpected technical effect due to the

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**WRITTEN OPINION
SEPARATE SHEET**

International application No. PCT/US 03/08922

web laminated onto the second surface of the inner film and either
(i) in the nature of the inner film, i.e. being a multi-layer film (claims 9, 10 and 33) or
(ii) in the selection of a specific nip pressure used for the extrusion lamination (claim 26)
or (iii) in properties of the obtainable composite materials (claim 30).

None of the available documents appears to disclose or suggest a multi-layered film extrusion laminated between two webs. The documents also appear to be silent about the specific nip pressure or the elastic properties (stretchability of 200% and permanent set of no more than 25%) defined in present claims 26 or 30.

The claimed subject-matter therefore appears to be novel and to be founded on an inventive step (Art. 33(2) and (3) PCT).

5

MATERIALES Y MÉTODOS DE COMPUESTOS RESPIRABLES Y
ELÁSTICOS

CAMPO DE LA INVENCION

La presente invención está dirigida a materiales compuestos elásticos, incrementalmente extendidos que comprenden una extrusión de película elastomérica interior laminada en una red no tejida, preferiblemente en cada superficie de película. La invención está dirigida adicionalmente a prendas y/o artículos desechables formados al menos en parte de materiales compuestos y con métodos para la elaboración de tales materiales compuestos.

ANTECEDENTES DE LA INVENCION

Los materiales de compuestos elásticos son conocidos en la técnica. Por ejemplo, las Patentes U.S. de Wu No. 5,422,172 y 5,861,074 describen láminas laminadas elásticas de una red fibrosa no tejida y una película elastomérica. Wu define el término "elástico" con el significado de extensible bajo fuerza y recuperable a su forma original o esencialmente original luego de la

liberación de esa fuerza. Wu describe que la lámina elástica se puede extender incrementalmente para suministrar un terminado fibroso muy suave que tiene la apariencia de fibras no tejidas con resistencias de unión superiores, suministrando de esta manera un material compuesto ventajoso para uso en prendas y otras aplicaciones donde el terminado suave es deseable. Wu describe adicionalmente que la lámina elástica se caracteriza por ser impermeable al paso de fluido en virtud de la película elastomérica, aunque manteniendo una sensación suave sobre la superficie de red fibrosa de la lámina, aunque se pueden lograr varios grados de permeabilidad al vapor o aire al suministrar micro vacíos mecánicos.

Los procesos convencionales para suministrar micro vacíos mecánicos incluyen pulsado de aguja en caliente, calandrado de rodillo caliente, perforación ultrasónica, o similar. Tales procesos mecánicos pueden ser problemáticos y/o difíciles de controlar durante la elaboración a alta velocidad de los materiales compuestos. También es conocido suministrar permeabilidad al aire y a vapor de agua a películas poliméricas al incluir en estas uno o más llenadores formadores de poro tales como

carbonato de calcio seguido del extendimiento de las películas para formar micro poros en áreas adyacentes al llenador. Sin embargo, es a menudo difícil suministrar un grado deseado de permeabilidad en películas elásticas que utilizan tales técnicas. De acuerdo con esto, es un deseo continuo para los materiales elásticos respirables que puedan ser fácilmente elaborados.

RESUMEN DE LA INVENCION

Es por lo tanto un objeto de la invención suministrar materiales compuestos elásticos respirables mejorados y suministrar métodos elaborados para elaboración de tales materiales.

En una modalidad, la invención está dirigida a materiales de compuesto elástico respirables, incrementalmente extendidos. Los materiales compuestos comprenden una extrusión de película elastomérica interior laminada en una red no tejida exterior en cada superficie de la película. La película elastomérica interior tiene un patrón aleatorio de macro huecos con incremento formados extendidos allí y sustancialmente libres de llenador formador de poro.

En una modalidad alternativa, los materiales compuestos elásticos incrementalmente extendidos comprenden una extrusión de película elastomérica laminada a una red de no tejido en una o ambas de las superficies de la película. La película elastomérica tiene un patrón aleatorio de macro huecos en incremento formados extendidos allí y es sustancialmente libre llenador formador de poro.

En otra modalidad, la invención está dirigida a prendas. Las prendas son formadas, al menos en parte, de material compuesto elástico incrementalmente extendido de acuerdo con la invención. En una modalidad adicional, la invención está dirigida a artículos desechables formados, al menos en parte, de material compuesto elástico respirable, incrementalmente extendido de acuerdo con la invención.

En aún otra modalidad, la invención está dirigida a métodos para elaborar un material compuesto elastomérico respirable. Los métodos comprenden extrusión laminando una película elastomérica en al menos una red de no tejido en una superficie de película para unir

estrechamente la red de no tejido a esta, y extendiendo incrementalmente la lámina resultante para formar un patrón aleatorio de macro huecos en la película elastomérica. La película elastomérica está sustancialmente libre de llenador formador de polvo. En una modalidad específica, la película elastomérica es laminada con extrusión a una red de no tejido en cada superficie de la película.

Los materiales compuestos de acuerdo con la presente invención son ventajosos para exhibir una combinación deseable de respirabilidad y elasticidad y pueden ser fácilmente elaborados de acuerdo con los métodos de la invención. Estos y los objetos y ventajas adicionales serán más completamente evidentes en vista de la siguiente descripción detallada que ilustra varios modos contemplados para llevar a cabo la invención. Como será claro, la invención es capaz de otros aspectos obvios diferentes, todos sin apartarse de la invención. De acuerdo con esto, los dibujos y especificaciones son de naturaleza ilustrativa y no restrictiva.

BREVE DESCRIPCIÓN DE LOS DIBUJOS

Aunque la especificación concluye con reivindicaciones que puntualizan particularmente y reivindican claramente la presente invención, la invención será adicionalmente entendida de la siguiente descripción detallada tomada en conjunto con los dibujos que la acompañan en los cuales:

Las figuras 1A y 1B son diagramas esquemáticos de vistas en sección transversal de primera y segunda modalidades, respectivamente, de los materiales compuestos de acuerdo con la presente invención;

La figura 2 es un diagrama esquemático de una sección de laminación de extrusión y una sección con extensión en incremento de un aparato adecuado para uso en una modalidad de los métodos de acuerdo con la invención;

La figura 3 es una vista agrandada (50x) de una capa de película elastomérica interior de un material

compuesto de acuerdo con la presente invención como se describió en el ejemplo 1;

La figura 4 es una vista en sección transversal agrandada (500x) de un material compuesto de acuerdo con la invención como se describió en el ejemplo 1;

La figura 5 es una vista agrandada (100x) de una capa de película elastomérica interior de un material compuesto de acuerdo con la presente invención como se describió en el ejemplo 1; y

La figura 6 establece gráficamente la permeabilidad del aire de una película decompuesto de acuerdo con la invención como se describió en el ejemplo 1, como una función del diferencial de presión.

DESCRIPCIÓN DETALLADA

La presente invención está dirigida a materiales decompuesto elástico respirable, incrementalmente extendido. Dentro del contexto de la presente especificación, el término "respirable" significa que los materiales de compuesto exhiben permeabilidad al aire. En

las modalidades adicionales, los materiales de compuesto son ambos permeables al aire y al vapor de humedad. En las modalidades específicas, los materiales de compuesto tienen una permeabilidad al aire de al menos aproximadamente 10 cc/min/cm² cuando la presión de aproximadamente 60 psi es aplicada a esta. En una modalidad más específica, los materiales de compuesto pueden tener una permeabilidad al aire de al menos aproximadamente 15 cc/min/cm² cuando una presión de aproximadamente 60 psi se aplica a esta. Dentro del contexto de la presente especificación, el término "elástico" significa tensionable bajo fuerza y recuperable a una forma original o esencialmente original luego de la liberación de la fuerza de extensión, aunque el término "elastomérico" se utiliza para describir un material elástico de polímero. En unas modalidades específicas, los materiales de compuesto tienen una extensibilidad de al menos aproximadamente 150% y, cuando la fuerza de extensión es liberada, una consolidación o elongación permanente de no más de aproximadamente el 15%. En modalidades adicionales, el material de compuesto tiene una extensibilidad de al menos aproximadamente 200% y, cuando se libera la fuerza de extensión, una consolidación o elongación permanente

de no más de aproximadamente el 25%. Finalmente, dentro del contexto de la presente especificación, el término "incrementalmente extendido" significa que el material de compuesto incluye zonas alternativas extendidas y zonas no extendidas a través de su longitud. El proceso con extensión en incremento será descrito con detalle adicional adelante.

Las figuras 1A y 1B establecen diagramas esquemáticos en sección transversal de primeras y segundas modalidades de los materiales de compuesto de acuerdo con la invención. En la figura 1A, el material de compuesto 10 comprende una película elastomérica interior 12 y una red no tejida exterior 14 en cada superficie de película. El material compuesto 20 de la figura 1B comprende una película elastomérica 22 que tiene una red no tejida 24 en una superficie de película. Aunque muchas de las modalidades específicas descritas aquí incluirán dos redes no tejidas a lo largo de las líneas del material compuesto 10 de la figura 1A, se debe entender que la invención tal como se describe ampliamente comprende material de compuesto 20 como se muestra en la figura 1B. Más aún, en los materiales de compuesto 10 y 20, las películas elastoméricas 12 y 22, respectivamente

son mostradas esquemáticamente como una capa simple. Está igualmente dentro del alcance de la invención que la película elastomérica comprenda una estructura de multicapa, como se describirá con detalle adicional adelante con respecto a las modalidades individuales de la invención.

En los materiales de compuesto de la invención, la película elastomérica es laminada por extrusión en una red no tejida en una o ambas de la superficie de la película. De acuerdo con una característica importante de la invención, la laminación por extrusión une estrechamente la película elastomérica a la red o redes no tejidas. Dentro del contexto de la presente especificación, el término "estrechamente unida" significa que la película elastomérica y la red no tejida no pueden ser separadas una de la otra. Las condiciones de procesamiento adecuadas para suministrar una unión estrecha entre la película elastomérica y la red o redes no tejidas serán discutidas con detalle adicional adelante. Como resultado de la unión estrecha entre estas capas de material compuesto, las fibras de la red no tejidas están embebidas en una película y, luego del rendimiento en incremento, se produce un patrón aleatorio

de macro huecos o agujeros es producida en la película elastomérica para hacer los materiales de compuesto respirables. El patrón aleatorio es típicamente controlado y uniforme en concentración a lo largo de del largo y ancho del material compuesto. Adicionalmente, el tamaño de los macro huecos es relativamente uniforme a lo largo y el ancho del material de compuesto. En una modalidad, el material de compuesto se hace respirable en tal proporción que los materiales no son impermeables a los líquidos. Así, los materiales de compuesto de acuerdo con tales modalidades son adecuados para aplicaciones en donde no se requiera una barrera para líquido. Dependiendo de las composiciones y los parámetros físicos de la película elastomérica y las redes no tejidas, el grado de estrecha unión entre estos y las condiciones de proceso con incremento en extensión, el tamaño de los agujeros o macro huecos formados en la película elastomérica se puede controlar. En modalidades específicas, el diámetro promedio de los macro huecos está en el rango de 5 μm , a aproximadamente 100 μm , más específicamente desde aproximadamente 10 μm , hasta aproximadamente 50 μm , más específicamente desde aproximadamente 15 μm , a aproximadamente 35 μm , Estas varias condiciones pueden ser utilizadas para controlar

la concentración de agujeros o macro huecos por área de superficie de material de compuesto. Aunque la concentración de macro huecos se puede variar dependiendo del uso particular del material de compuesto, en las modalidades específicas, la concentración puede variar desde aproximadamente 5 a aproximadamente 500 por pulgada², más específicamente desde aproximadamente 10 a aproximadamente 100 por pulgada², más específicamente desde aproximadamente 25 a aproximadamente 15 por pulgada².

La película elastomérica empleada en los materiales de compuesto de acuerdo con la presente invención puede comprender cualquier material elastomérico que sea capaz de la formación de una película mediante extrusión con boquilla. Adicionalmente, la película elastomérica puede comprender una película monocapa simple o, alternativamente, puede comprender una película multicapa que comprenda dos o más capas, que típicamente son coextruidas. Aunque la elasticidad deseada específica de una película y el material compuesto resultante se determinará con base en la aplicación deseada del material de compuesto, en una modalidad, la película elastomérica exhibe una consolidación permanente de menos

de aproximadamente el 20%, más específicamente desde aproximadamente 12 a aproximadamente 18%, con un 200% de elongación. En aún otra modalidad, la película elastomérica exhibe una relación de tensión de aproximadamente 15-20% con 200% de elongación. Ejemplos de materiales elastoméricos adecuados incluyen copolímeros de bloque elastomérico, polímeros y copolímeros de metalloceno elastómero, elastómero, por ejemplo los copolímeros de olefina de metalloceno elastomérico, homopolímeros y copolímeros de poliuretano elastomérico, homopolímeros y/o copolímeros de polisiloxano elastomérico, y similares, y mezclas de tales materiales elastoméricos. Los polímeros no elásticos pueden estar incluidos allí en tanto que la película resultante exhiba las propiedades elásticas deseadas.

Los copolímeros adecuados de bloque elastomérico incluyen aquellos que tienen al menos un bloque vinil aromático y un bloque de caucho. Los monómeros específicos vinil aromáticos para formar tales copolímeros de bloque incluyen estiren y monómeros de estireno sustituidos, por ejemplo estirenos alquil sustituidos y estirenos halógeno-sustituidos, y mezclas

de estos. Los copolímeros de bloque elastomérico que contienen uno o más de estos bloques de monómero estireno son comúnmente denominados como copolímeros de bloque estirenico elastomérico. Los monómeros específicos para formar el bloque de caucho incluyen, pero no están limitados a butadieno, isopreno, etileno-propileno, etileno-butileno, y similares. Los copolímeros de bloque pueden comprender dos bloques, tres bloques o más. Los copolímeros de bloque comercialmente disponibles incluyen polímeros de Kraton disponibles de Kraton Polimers, incluyen, pero no están limitados a, poli(estireno-butadienoestireno), poli(estireno-isopreno-estireno), poli(estireno-etileno-butileno-estireno), poli(estireno-etileno-propileno-estireno), y similares.

Los polímeros y copolímeros de olefina metalloceno elastoméricos incluyen, pero no están limitados a, poliolefinas producidas de catalizadores de sitio simple de metalloceno. Típicamente, una o más olefinas tales como etileno, propileno, estireno o similares se polimeriza con buteno, hexeno, octeto, mezclas de estos o similares o, para suministrar elastómeros adecuados para el uso en la presente invención. Los ejemplos incluyen, pero no están limitados a, poli(etileno-buteno), poli(etileno-

octeno), poli(etileno-propileno) y/o terpolimeros de poliolefina de estos.

Los materiales elastoméricos adicionales para uso en la capa de película elastomérica de la invención incluyen poli(éster-éter), poli(éter-amida), poli(etileno-vinil acetato), poli(etileno-metilacrilato), poli(etileno-ácido acrílico), poli(etileno butilacrilato), poli(etileno-propileno-dieno), y caucho de etileno-propileno.

En una modalidad, la película elastomérica comprende una mezcla de al menos un copolímero de bloque estirénico elastomérico y al menos un copolímero de olefina de metaloceno elastomérico. Las cantidades respectivas de los copolímeros pueden variar dependiendo de las propiedades elásticas deseadas del material de compuesto. En una modalidad más específica, tales mezclas comprenden desde aproximadamente 10 a aproximadamente 90% en peso de los copolímeros de bloque de estiren y desde aproximadamente 10 a aproximadamente 90% en peso de los copolímeros de olefina de metaloceno. En una modalidad adicional, tales mezclas comprenden desde aproximadamente 50 a 90% en peso de los copolímeros de bloque estirénico

y desde aproximadamente 10A a aproximadamente 50% en peso del copolímero de olefina de metaloceno.

En modalidades adicionales, la película elastomérica puede comprender una o más capas de núcleo A y una o más capas de tapa o piel B. Generalmente, tales capas de tapa o piel pueden ser suministradas con el fin de aislar químicamente una capa de otra o de aislar físicamente una capa de un ambiente de uso. Por ejemplo, cuando una mezcla de un copolímero de bloque estirenico elastomérico de Kraton y un polietileno de metaloceno se emplea en la película elastomérica, la película tiende a exhibir una sensación superficial pegajosa y puede ser deseable suministrar superficies de película elastomérica con capa de tapa en cada superficie. Típicamente, una capa delgada de poliolefina, por ejemplo polietileno, polipropileno, o mezclas de estos se pueden utilizar como tal capa de tapa o cualquier lado de la capa de mezcla de núcleo, por medio del cual la película elastomérica comprenderá una película multicapa de la estructura A/B/A. Las capas de tapa pueden ser convenientemente suministradas mediante coextrusión con la capa de núcleo.

Como el patrón aleatorio de macro huecos de incremento formados extendidos se forma en la película elastomérica mediante el proceso de incremento de extensión, no es necesario incluir ningún tipo de llenador formador de poro en la película elastomérica. Así, la película elastomérica es sustancialmente libre del llenador formador de poro. Dentro del contexto de la presente especificación el término "sustancialmente libre de llenador formador de poro" significa que la película elastomérica contiene una cantidad insuficiente de llenador formador de poro para hacer la película micro porosa luego del incremento de extendimiento debido a la formación de micro vacíos adyacentes al llenador. En modalidades más específicas, la película elastomérica contiene menos de aproximadamente 20% en peso de llenador formador de poro, más específicamente, menos de aproximadamente 10% en peso de llenador formador de poro, y aún más específicamente, menos de aproximadamente 5% en peso de llenador formador de poro. En modalidades adicionales, la película elastomérica contiene menos de aproximadamente 1% en peso de llenador formador de poro. En una modalidad adicional, la película elastomérica no contiene ningún llenador formador de poro.

El peso o grosor de la película elastomérica se puede ajustar dependiendo de las propiedades deseadas para el material de compuesto. Típicamente, la película elastomérica puede tener una proporción desde aproximadamente 25 a aproximadamente 70 gramos/m², y en modalidades más específicas, la película elastomérica puede tener una proporción desde aproximadamente 30 a aproximadamente 40 gramos/m².

Como se utiliza aquí "red fibrosa no tejida" se utiliza en su sentido genérico para definir una estructura generalmente plana que es relativamente llana flexible y porosa, y está compuesta de fibras de hebra o filamentos continuos. Para una descripción detallada de no tejidos, ver "Nonwoven Fabric Primer and Reference Sampler" por E. A. Vaughn, Association of the Nonwoven Fabrics Industry, 3 edición) 1992). Los no tejidos se pueden preparar mediante cualquier proceso convencional y pueden ser, entre otros, cardados, unidos por hilado, injertados en húmedo, injertados en aire, o soplados por fusión, o cualquier combinación de estos, en razón de que tales productos son bien conocidos en el negocio.

Las redes fibrosas no tejidas pueden comprender fibras de poliolefinas, incluyendo, pero no limitadas a, polietileno y/o polipropileno, e incluyendo poliolefinas catalizadas con metaloceno, poliéster, rayón, celulosa, nylon y mezclas de tales fibras. Las fibras también pueden comprender fibras de componentes, formadas de dos o más materiales en cualquier disposición física.

En una modalidad, la red no tejida no es en sí misma elástica. En una modalidad más específica, el no tejido es extensible, es decir, este se elonga bajo fuerza, aún si esta no es recuperable a su forma original luego de liberar la fuerza de extensión. Típicamente, los no tejidos que son libremente formados pueden ser más altamente tensionables. En modalidades adicionales, el no tejido puede ser elástico. Si en una modalidad, la red no tejida tiene un peso de menos de aproximadamente 40 g/m^2 . En una modalidad más específica, la red no tejida tiene un peso de menos de aproximadamente 25 g/m^2 . En aún una modalidad adicional, la red no tejida tiene un peso de aproximadamente 212 g/m^2 .

En modalidades específicas, la red no tejida puede comprender poliolefinas unidas por hilado, por ejemplo

polietileno unido por hilado o polipropileno unido por hilado. Varias redes de poliolefina unidas por hilado están comercialmente disponibles y son adecuadas para uso en la invención. Las redes unidas por hilado formadas de polietileno y polipropileno también son adecuadas. Por ejemplo, los no tejidos unidos por hilado formados de fibras que comprenden una mezcla de polietileno y polipropileno, en cualquier proporción y/o formadas de fibras que comprenden una coextrusión de polietileno y polipropileno, también son adecuadas. Estos no tejidos son comercialmente disponibles, por ejemplo, de BBA.

Los materiales de compuesto de acuerdo con la presente invención se pueden utilizar en varias aplicaciones donde se desea respirabilidad, permeabilidad al aire y al vapor de agua, y propiedades elastoméricas. En una modalidad, los materiales de compuesto son empleados en la formación de prendas, incluyendo pañales, pantaloncitos, batas quirúrgicas y similares. Los materiales de compuesto también son ventajosos para uso en la formación de artículos desechables, que incluyen prendas desechables del tipo descrito anteriormente. Adicionalmente, los materiales de compuesto pueden ser empleados en la formación de láminas desechables,

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vestimentas, productos higiénicos y similares. En una modalidad preferida, los materiales de compuesto de la invención son empleados en pañales para nene y pantaloncitos de entrenamiento de nene en áreas donde no se requiere impermeabilidad a líquido, es decir, en áreas laterales comúnmente denominadas como "orejas de pañal". Los materiales de compuesto exhiben una buena combinación de elasticidad y fuerza de retención, junto con buena respirabilidad y suavidad, para uso ventajoso en tales aplicaciones.

De acuerdo con una característica importante, los materiales de compuesto de la invención pueden ser fácilmente elaborados. Específicamente, la película elastomérica es laminada por extrusión en una red no tejida exterior en al menos una superficie de película, para unir estrechamente la red no tejida a esta. En una modalidad más específica, la película elastomérica es laminada por extrusión en una red no tejida exterior en cada superficie de la película para unir estrechamente las redes no tejidas a esta. La laminación por extrusión de la película elastomérica y las una o más redes de no tejidos pueden ser conducidas de acuerdo con cualquiera técnicas de laminación de extrusión convencional. De

manera importante, la laminación por extrusión es conducida bajo condiciones que unen estrechamente la película elastomérica con las redes no tejidas. La lámina resultante es entonces crecientemente extendida para formar un patrón aleatorio de macro huecos en la película elastomérica interior. Como se discutió anteriormente, la película elastomérica está sustancialmente libre de llenadores formadores de poro.

El incremento en extendimiento es preferiblemente conducido en dirección transversal, denominado aquí como extensión interengranaje CD. Un entendedor interengranaje CD típicamente comprende un par de elementos similares a piñones sobre ejes paralelos. Los ejes están dispuestos entre dos platos laterales de máquina, estando el eje inferior localizado en soportes fijos y el eje superior estando localizado en soportes en miembros verticalmente deslizables. Los miembros deslizables son ajustables en la dirección vertical por medio de elementos con forma de cuña operables mediante tornillos de ajuste. Desatornillando o atornillando las cuñas se moverán el miembro verticalmente deslizable respectivamente hacia abajo o arriba para un acoplamiento o desacoplamiento adicional de los dientes similares a piñón del rodillo de

interengranaje superior con el rodillo de interengranaje inferior. Los micrómetros montados en las estructuras laterales son operables para indicar la profundidad del acoplamiento de los dientes del rodillo interengranante. Los cilindros de aire son típicamente empleados para mantener los miembros deslizables en su posición acoplada inferior firmemente contra las cuñas de ajuste para oponerse a la fuerza hacia arriba ejercida por el material que está siendo extendido. Estos cilindros también pueden ser extraídos para desacoplar los rodillos interengranantes superior e inferior uno del otro para propósitos de hilar material a través del equipo interengranante o en conjunto con un circuito de seguridad que abriría todos los puntos de línea de contacto de máquina cuando se activan. El impulso para el entendedor interengranante CD debe operar los dos rodillos interengranante superior e inferior excepto en el caso de extendimiento interengranante de materiales con un relativamente alto coeficiente de fricción.

Los elementos interengranantes CD son típicamente maquinados de material sólido pero pueden ser mejor descritos como una pila alternante de dos discos de diámetro diferente. En una modalidad, los discos

interengranantes son de aproximadamente 6 pulgadas de diámetro, aproximadamente 0,031 pulgadas de grueso, y tienen un radio completo en su borde. Los discos espaciadores que separan los discos interengranantes son de aproximadamente 5,5 pulgadas de diámetro y aproximadamente 0,69 pulgadas de grosor. Dos rodillos de esta configuración serán capaces de ser interengranados hasta 0,231 pulgadas dejando 0,019 pulgadas de espacio para material en todos los lados. Esta configuración de elemento interengranante CD tendría una inclinación de 0,100 pulgadas.

El acoplamiento de los elementos de rodillo interengranante CD se puede ajustar con el fin de suministrar los macro huecos en la película elastomérica. En una modalidad, el acoplamiento de los elementos de rodillo interengranantes es de al menos aproximadamente 0,12 pulgadas, más específicamente de aproximadamente 0,12 pulgadas a aproximadamente 0,20 pulgadas.

En razón de que los elementos interengranantes CD son típicamente capaces de profundidades de acoplamiento mayores, es importante que el equipo incorpore unos medios para hacer que los ejes de los dos rodillos

interengranantes permanezcan paralelos cuando el eje superior está levantando o descendiendo. Es necesario asegurar que los dientes de uno de los rodillos interengranantes siempre caiga entre los dientes del otro rodillo interengranantes y se evite potencialmente daño del contacto físico entre los dientes interengranantes. Este movimiento paralelo puede ser asegurado mediante una disposición de bastidor y piñón en donde el bastidor de piñón estacionario se une a cada estructura lateral en yuxtaposición a los miembros verticalmente deslizables. Un eje atraviesa las estructuras laterales y opera en un soporte en cada uno de los miembros verticalmente deslizables. Un piñón reside en cada extremo de este eje y opera en acoplamiento con los bastidores para producir el movimiento paralelo deseado.

Si se desea, el material de compuesto también puede ser sometido a extendimiento interengranante en dirección de la máquina (MD), aunque el extendimiento MD puede típicamente no ser necesario en razón de que se suministra suficiente respirabilidad del extendimiento interengranante CD. El equipo de extendimiento de interengranante MD es típicamente idéntico al equipo de extendimiento de interengranante CD excepto en el diseño

de los rodillos interengranante. Los rodillos interengranante MD semejan cercanamente ruedas dentadas de paso pequeño. En una modalidad, los rodillos tienen un diámetro de 5,933 pulgadas, 0,100 pulgadas de inclinación, 30 inclinación diamétrica, 14 1/2 grados de ángulo de presión, y son básicamente un piñón de remate de adendo largo. Un segundo paso puede ser tomado en estos rodillos con la fresa matriz de piñón descentrada 0,010 pulgadas para suministrar un diente angosto con más espacio. Con aproximadamente 0,090 pulgadas de acoplamiento, esta configuración tendrá aproximadamente 0,010 pulgadas de espacio a los lados para grosor de material. Si se desea, se puede desarrollar un extendimiento adicional, incluyendo extendimiento de orientación en la dirección de la rama tensora o de la máquina aunque, como se anotó anteriormente, para muchas aplicaciones, el extendimiento interengranaje CD será suficiente.

La figura 2 establece una representación esquemática para una modalidad de los métodos de la invención. Una película elastomérica 6 se extruye de una extrusora 1 a través de una boquilla 2 y pasa un cuchillo de aire 3, en una línea de contacto formada entre los rodillos 4 y 5.

La extrusión es conducida en o por encima de la temperatura de fusión del material de película, típicamente del orden de aproximadamente 400-500°F. Convencionalmente, el rodillo 4 puede ser un rodillo de metal aunque el rodillo 5 puede ser un rodillo de caucho. Dos redes no tejidas 9,9 son suministradas de los rodillos 13, 13 y la película 6 y las redes 9 son pasadas a través de las líneas de contacto de los rodillos 4 y 5 para laminar las redes en la superficie de película. La presión de la línea de contacto se ajusta con el fin de obtener la unión estrecha deseada entre las redes no tejidas y la película elastomérica. Típicamente, las presiones mayores de aproximadamente 50 libras pulgada lineal se emplean. En una modalidad más específica, la presión de la línea de unión va de aproximadamente 50 a aproximadamente 150 libras por pulgada lineal, más específicamente desde aproximadamente 50 a aproximadamente 120 libras por pulgada lineal. La lámina resultante 12 es conducida por el rodillo 7 pasado un rodillo precalentado opcional 20 y la sección de extendido creciente en donde la lámina es pasada a través de rodillos entendedores en la dirección transversal de incremento (CD) 10 y 11 para formar un material compuesto elastomérico incrementalmente tensionado respirable 14.

El material 14 puede ser opcionalmente pasado a través de una sección de extendido adicional donde es sometida a extendimiento adicional. Por ejemplo, el material 14 es mostrado en la figura 2 pasando un rodillo precalentado adicional 21 y a través de rodillos tensionadores de incremento en la dirección de la máquina (MD) 10' y 11'. Un experto en la técnica apreciará que los rodillos precalentados 20 y 21 se pueden admitir si se desea.

Los siguientes ejemplos demuestran modalidades específicas de las películas multi porosas multicapa de acuerdo con la invención. En los ejemplos, y a través de la especificación, las partes y los porcentajes son en peso a menos que se especifique otra cosa.

Ejemplo 1

En este ejemplo, se prepara un material de compuesto de acuerdo con la invención. Una mezcla comprende aproximadamente 70% en peso de elastómero de copolímero de bloque de poli(estireno-butadieno-estireno) y aproximadamente 30% en peso de un plastomero de polietileno metaloceno es extruido utilizando técnicas de extrusión de película convencional.

La mezcla es coextruida como una capa de núcleo B con las capas exteriores A comprendiendo una mezcla de aproximadamente 80% en peso de polietileno de muy baja densidad (VLDPE) y aproximadamente 20% en peso de polietileno de baja densidad (LDPE) para formar una película elastomérica de estructura A/B/A.

La película elastomérica resultante es laminada por extrusión en cada superficie de la película con una red no tejida de polietileno unida por hilado altamente extensible que tiene un peso de aproximadamente 30 gramos/m². La presión de la línea de unión de aproximadamente 60 libras por pulgada lineal se utiliza para formar una unión estrecha entre las redes no tejidas y la película elastomérica. La lámina es entonces extendida incrementalmente utilizando extendimiento interengranaje CD, con una profundidad de acoplamiento de rodillo de aproximadamente 0,120 pulgadas.

El material de compuesto resultante tiene un peso de aproximadamente 95 gramos/m² y exhibe buena respirabilidad, buena elasticidad y de sensación suave. Cuando se extiende aproximadamente el 100% el material de

compuesto exhibe aproximadamente una consolidación permanente del 7%.

Las figuras 3-5 muestran vistas agrandadas del material de compuesto. Específicamente, la figura 3 comprende un agrandamiento 50x de la película elastomérica extendida del material de compuesto, con macro huecos allí que aparecen en las áreas circuladas. La figura 4 comprende un agrandamiento 500x del material de compuesto, con la capa de película elastomérica indicada en 32 y capas de red no tejida indicadas en 34. Esta vista muestra la unión estrecha entre la película y las redes no tejidas. La figura 5 comprende un agrandamiento 1000x de la película elastomérica extendida del material de compuesto, con un macro hueco mostrado allí que tiene un diámetro de aproximadamente 20 μm .

El material de compuesto de este ejemplo es sometido a medición de flujo de aire a su través como una función de presión de aire aplicada. Los resultados son mostrados en la figura 6 en donde el flujo de aire se indica en cc/min/cm^2 y la presión se indica en libras por pulgada cuadrada.



De manera interesante, se ha determinado que los materiales de compuesto de acuerdo con la presente invención no son solo extendibles y recuperables, sino también exhiben una permeabilidad al aire incrementada en su estado extendido. En este ejemplo, la permeabilidad al aire del material de compuesto se mide, en pies cúbicos por minuto, como una función del extendimiento porcentual. Un "Tex Test Air Permeability Tester," Modelo FX 3300, disponible de ATI (Advanced Testing Instruments) Corporation de Spartansburg, Carolina del Sur, a una presión de 125 a (0,018 psi) se empleó. Los resultados se establecen en la Tabla 1.

Tabla 1

Medición	Extendimiento en porcentaje	CFM
1	0	0,16
2	50	0,44
3	100	0,85
4	150	1,10

Los resultados de la Tabla 1 demuestran la permeabilidad que siente el aire del material de compuesto de este ejemplo luego de extendimiento.

Ejemplo 2

En este ejemplo, se prepara un material de compuesto de acuerdo con la invención. Una película elastomérica se prepara mediante extrusión laminando una mezcla de 90% en peso de elastómero de copolímero de bloque de poli(estireno-butadieno-estireno) y aproximadamente 10% en peso de un polímero de etileno vinil acetato. La película elastomérica es laminada por extrusión en cada superficie de la película con una red no tejida de polipropileno unida por hilado extensible. Una presión de línea de unión de aproximadamente 60 libras por pulgada lineal se utiliza para formar una unión estrecha entre las redes no tejidas y la película elastomérica. La lámina es precalentada utilizando un rodillo precalentado que tiene una temperatura de aproximadamente 210°F y es extendida incrementalmente utilizando entendimiento interengranaje CD, con una profundidad de acoplamiento de rodillo de aproximadamente 0,130 pulgadas.

El material de compuesto resultante es tensionable recuperable, exhibe buena respirabilidad, buena elasticidad y sensación suave. Cuando se extiende a aproximadamente el 200%, el material de compuesto exhibe

aproximadamente 20% de consolidación permanente. El material de compuesto tiene un peso de aproximadamente 88 g/m².

La permeabilidad al aire del material de compuesto de este ejemplo se mide de acuerdo con el procedimiento y aparatos descritos en el ejemplo 1. Los resultados se establecen en la Tabla 2.

Tabla 2

Medición	Extendido en porcentaje	CFM
1	0	0,08
2	50	0,78
3	100	1,09
4	150	1,15

Así, el material de compuesto de este ejemplo exhibe una permeabilidad al aire incrementada luego de extendimiento.

Las ilustraciones específicas y las modalidades descritas aquí tienen naturaleza de solo ejemplos y no pretenden ser limitantes de la invención definida por las reivindicaciones. Las modalidades adicionales y los ejemplos serán evidentes para un experto en la técnica en

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vista de esta especificación y están dentro del alcance de la invención reivindicada.

REIVINDICACIONES

1. Un material de compuesto elástico respirable, incrementalmente extendido que comprende una extrusión de película elastomérica interior laminada en una red no tejida exterior en cada superficie de película, en donde la película elastomérica interior tiene un patrón aleatorio de macro huecos formados con extensión incrementada allí y está sustancialmente libre de llenador formador de poro.

2. Un material de compuesto de la reivindicación 1, que tiene una permeabilidad al aire de al menos aproximadamente 10 cc/min/cm² cuando se aplica una presión de aproximadamente 60 psi a esta.

3. El material de compuesto de la reivindicación 1, que tiene una extendibilidad de al menos aproximadamente 200% con una consolidación permanente de no más de aproximadamente 25%.

4. El material de compuesto de la reivindicación 1, en donde la película elastomérica interior comprende copolímero de bloque elastomérico, polímero o copolímero

de olefina de metalloceno elastomérico, poliuretano elastomérico, polisiloxano elastomérico, o mezclas de estos.

5. El material de compuesto de la reivindicación 4, en donde la película elastomérica interior comprende un copolímero de bloque estirénico elastomérico.

6. El material de compuesto de la reivindicación 5, en donde la película elastomérica interior comprende poli(estireno-butadieno-estireno), poli(estireno-isopreno-estireno), poli(estireno-etileno-butileno-estireno), o combinaciones de estos.

7. El material de compuesto de la reivindicación 5, en donde la película elastomérica interior comprende una mezcla de un copolímero de bloque estirenico elastomérico y un copolímero de polietileno metalloceno elastomérico.

8. El material de compuesto de la reivindicación 1, en donde la película elastomérica interior es una película monocapa.

9. El material de compuesto de la reivindicación 1, en donde la película elastomérica interior comprende una película multicapa.

10. El material de compuesto de la reivindicación 9, en donde la película elastomérica interior comprende una capa de núcleo que incluye un copolímero de bloque de estireno elastomérico, coextruido en cada superficie con una capa de tapa de poliolefina.

11. El material de compuesto de la reivindicación 1, en donde las redes no tejidas individualmente comprenden poliolefina unido por hilado.

12. El material de compuesto de la reivindicación 1, en donde cada red no tejida tiene un peso de menos de aproximadamente 40 g/m².

13. El material de compuesto de la reivindicación 1, en donde, cada red no tejida tiene un peso de aproximadamente 12 g/m².

14. Una prenda formada al menos en parte del material de compuesto de la reivindicación 1.

15. Un artículo desechable formado al menos en parte del material de compuesto de la reivindicación 1.

16. El artículo desechable de la reivindicación 15, que comprende un pañal.

17. Un material de compuesto elástico respirable, incrementalmente extendido que comprende una película elastomérica interior que incluye una mezcla de un copolímero de bloque estirenico elastomérico y una extrusión de copolímero de polietileno metaloceno elastomérico laminado en una red de poliolefina unida por hilado no tejida exterior en cada superficie de película, en donde la película elastomérica interior tiene un patrón aleatorio de macro huecos formados con tensión en incremento allí y es sustancialmente libre de llenador formador de poro.

18. Una prenda formada al menos en parte del material compuesto de la reivindicación 17.

19. Un artículo desechable formado al menos en parte del material compuesto de la reivindicación 17.

20. El artículo desechable de la reivindicación 19, que comprende un pañal.

21. Un material de compuesto elástico respirable, incrementalmente extendido que comprende una extrusión de película elastomérica laminada a una red de no tejido en una o ambas de la superficie de la película, en donde la película elastomérica tiene un patrón aleatorio de macro huecos formados en extensión en incremento allí y es sustancialmente libre de llenador formador de poro.

22. Una prenda formada al menos en parte del material compuesto de la reivindicación 21.

23. Un artículo desechable formado al menos en parte del material de compuesto de la reivindicación 21.

24. El artículo desechable de la reivindicación 23, que comprende un pañal.

25. Un método para elaborar un material de compuesto elastomérico respirable, que comprende

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Laminar con extrusión una película elastomérica interior a una red no tejida exterior en cada superficie de película para unir estrechamente las redes no tejidas a esta;

Extender incrementalmente la lamina resultante para formar un patrón aleatorio de macro huecos en la película elastomérica interior,

En donde la película elastomérica interior esta sustancialmente libre de llenador formador de poro.

26. El método de la reivindicación 25, en donde la laminación por extrusión es conducida a una presión de línea de contacto mayor de aproximadamente 50 libras por pulgada lineal.

27. El método de la reivindicación 25, en donde entendimiento en incremento comprende extendimiento interengranado (CD) en dirección transversal.

28. El método de la reivindicación 27, en donde el entendimiento interengranado CD emplea un acoplamiento de

rodillo interengranante de al menos aproximadamente 0,12 pulgadas.

29. El método de la reivindicación 25, en donde el material de compuesto tiene una permeabilidad al aire de al menos aproximadamente 10 cc/min/cm² cuando se aplica una presión de al menos aproximadamente 60 psi a esta.

30. El método de la reivindicación 25, en donde el material de compuesto tiene una extendibilidad de al menos aproximadamente 200% con una consolidación permanente de no más de aproximadamente 25%.

31. El método de la reivindicación 25, en donde la película elastomérica interior comprende un copolímero de bloque estirenico elastomérico.

32. El método de la reivindicación 25, en donde la película elastomérica interior comprende una mezcla de un copolímero de bloque estirénico elastomérico y un copolímero de polietileno metaloceno elastomérico.

33. El método de la reivindicación 25, en donde la película elastomérica interior comprende una capa de

núcleo que incluye un copolímero de bloque de estireno elastomérico, coextruido en cada superficie con una capa de tapa de poliolefina.

34. El método de la reivindicación 25, en donde las redes no tejidas individualmente comprenden poliolefina unida por hilado.

35. El método de la reivindicación 25, en donde cada red no tejida tiene un peso de menos de aproximadamente 40 g/m².

36. El método de la reivindicación 25, en donde, cada red no tejida tiene un peso de aproximadamente 12 g/m².

37. Un método de elaboración de material de compuesto elastomérico respirable que comprende

Laminar por extrusión una película elastomérica

A una red no tejida exterior en una o ambas de la superficie de película para unir estrechamente la red no tejida a esta; y

Extender incrementalmente la lamina resultante para formar un patrón aleatorio de macro huecos en la película elastomérica,

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En donde la película elastomérica está
sustancialmente libre de llenador formador de poro.

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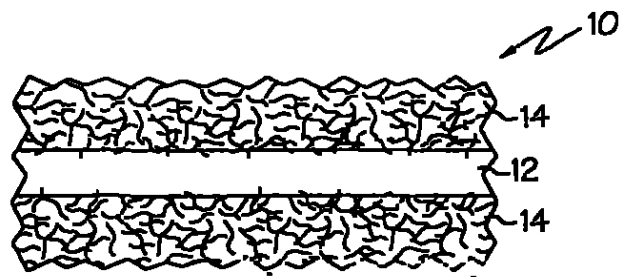


FIG. 1A

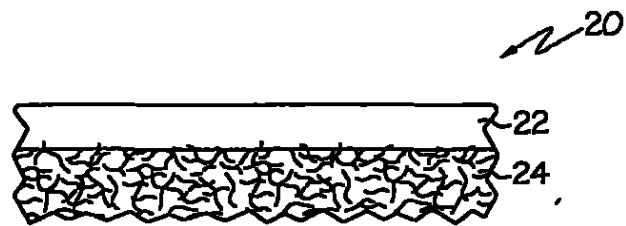


FIG. 1B

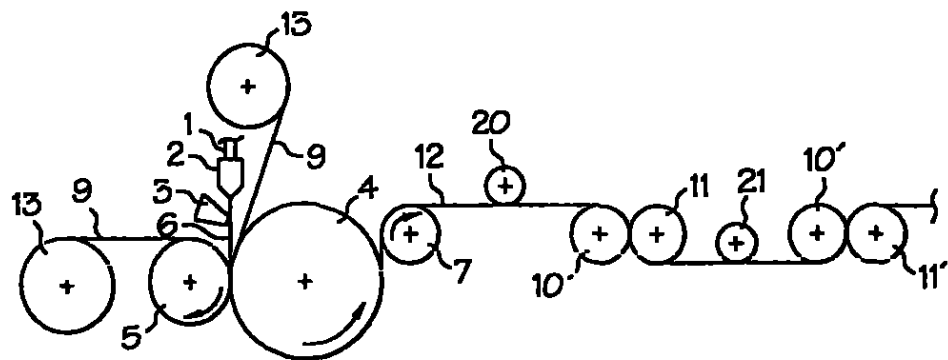


FIG. 2

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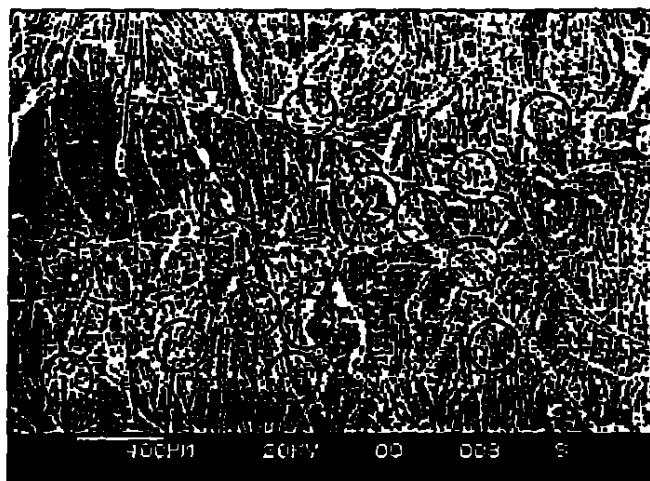


FIG. 3

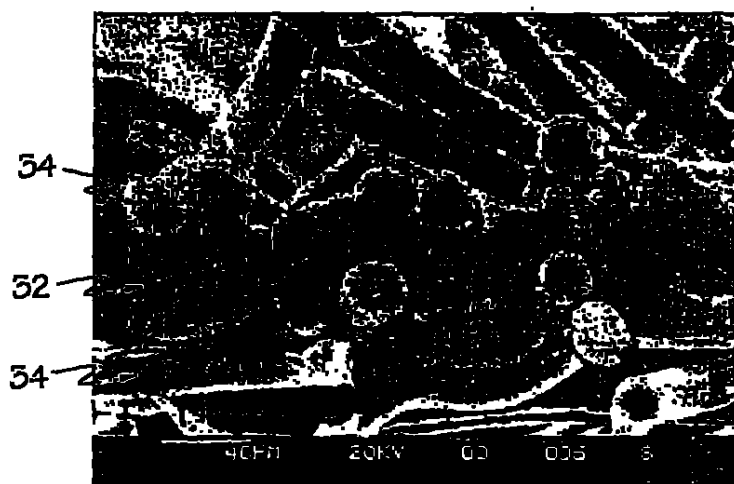


FIG. 4

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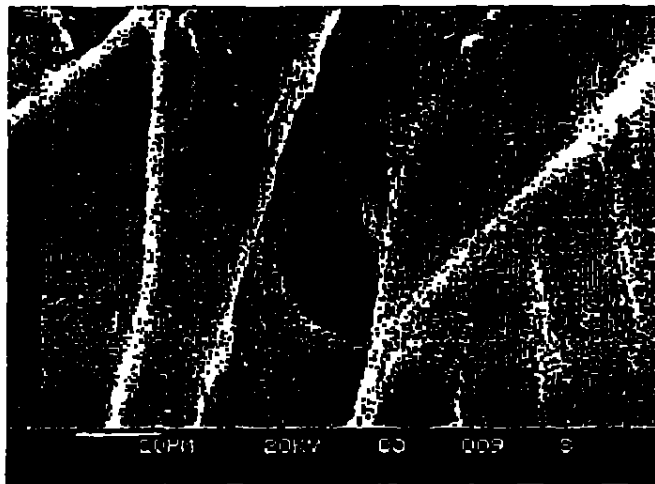


FIG. 5

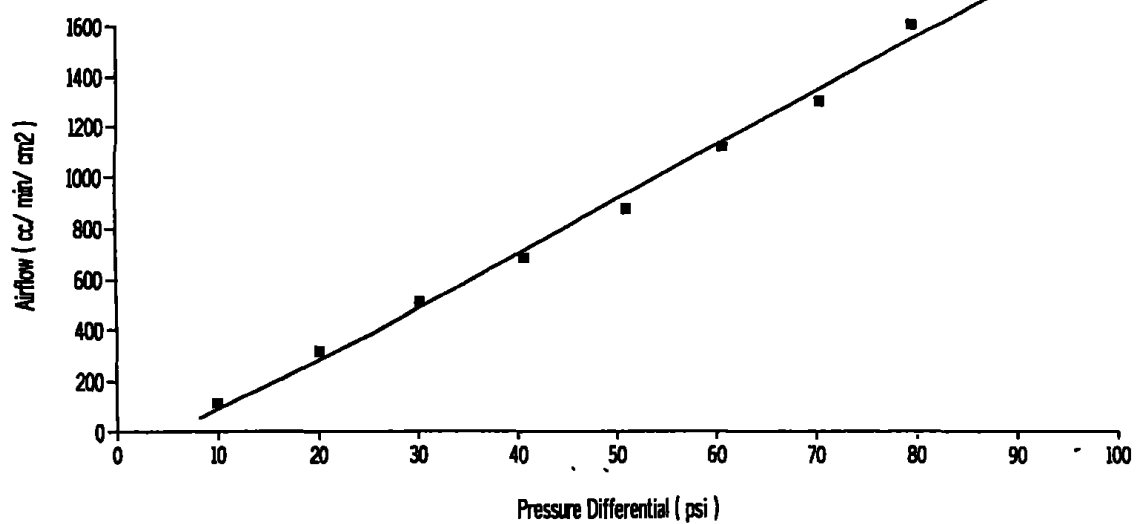


FIG. 6

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Docket No. 2098-114 PCT

PATENT

CERTIFICATE OF FACSIMILE

I hereby certify that this paper is being transmitted
via facsimile to: Authorized Officer Gomez Fernandez;
European Patent Office; D-80298, Munich, Germany
at facsimile no. 011 49 89 2399 4465 on May 5, 2004.

Raouel Jersenden

IN THE EUROPEAN PATENT OFFICE - MUNICH, GERMANY
AS THE INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

In re International Application No. PCT/US03/08922

Applicant: Clopay Plastic Products Company, Inc., et al.

Intl. Filing Date: 21 March 2003 Authorized Officer : Fernández Gomez, L.

For: Breathable and Elastic Composite Materials and Methods

RESPONSE TO WRITTEN OPINION

Authorized Officer Gomez Fernandez
European Patent Office
D-80298 Munich
Germany

Dear Sir:

In response to the Written Opinion dated February 5, 2004, please replace application sheets 19-25 with the attached Substitute Sheets 19-28.

In the Substitute Sheets, claims 1, 17, 21, 25 and 27 have been amended to recite that the macroholes have an average diameter of from about 10 μm to about 100 μm , as set forth in the specification, for example at page 6, lines 23-25. Additionally, claim 9 is rewritten in independent form to include the limitations of previous claim 1 from which it depended. Claims 26, 30 and 33 have been rewritten in independent form in order to include the limitations of previous claim 25 from which they respectively depended. Additionally, claims 38-52 have been added. Support for these claims may be found at pages 6 and 7 of the specification. It is believed that these changes do not involve any introduction of new matter, whereby entry of the Substitute Sheets is believed to be in order and is respectfully requested.

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In the Written Opinion, the Examiner asserted that claims 1, 3-6, 11-25, 27, 31, 32 and 34-37 lacked novelty in view of D1, U.S. Patent No. 5,861,074, and that claims 2, 7, 8, 28 and 29 lacked inventive step over D2, WO 01/51548. The Examiner indicated that claims 9, 10, 26, 30 and 33 exhibited both novelty and inventive step, and that all of claims 1-37 exhibited industrial applicability.

As will be set forth in detail below, Applicants submit that claims 1, 3-6, 11-25, 27, 31, 32 and 34-37 exhibit novelty and that claims 2, 7, 8, 28 and 29 exhibit inventive step. Accordingly, reconsideration of the assertions of lack of novelty and/or inventive step set forth in the Written Opinion is respectfully requested:

More particularly, as defined by claims 1, 17 and 21, the invention is directed to a breathable, incrementally stretched elastic composite material comprising an inner elastomeric film extrusion laminated to an outer nonwoven web at each film surface (claims 1 and 17) or extrusion-laminated to a nonwoven web at one or both of the film surfaces (claim 21). The elastomeric film has a random pattern of incrementally stretch-formed macroholes having an average diameter from about 10 μm to about 100 μm therein, and is substantially free of pore-forming filler. According to claim 17, the elastomeric film includes a blend of an elastomeric styrenic block copolymer and an elastomeric metallocene polyethylene copolymer, and the nonwoven web is spun bonded polyolefin.

As discussed in the present specification, for example beginning at page 6, line 4, the extrusion lamination tightly bonds the elastomeric film to the nonwoven web or webs, whereby fibers from the nonwoven web are imbedded into the film. This in turn allows formation of the random pattern of macroholes upon incremental stretching, without undesirable tearing of the elastomeric film or separation of the film and the nonwoven web(s). Moreover, the macroholes are advantageous in providing the ability to obtain greater breathability as compared with micropores formed by stretching of pore-forming filler

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containing films and the ability to maintain liquid impermeability as compared with holes formed by perforation techniques such as hot punch needling or hot roll calendaring.

D1 is a prior patent of one of the inventors of the present application and is based on U.S. Patent No. 5,422,172 discussed in the present application in the background section beginning at page 1, line 9. Specifically, D1 discloses elastic laminated sheets of a nonwoven fibrous web and an elastomeric film which may be incrementally stretched to provide a composite material having a very soft fibrous finish which is advantageous for use in garments and other applications. While D1 generally discloses that various degrees of vapor or air permeability may be achieved by providing mechanical microvoids at column 3, lines 18-20, Applicants find no teaching or suggestion by D1 relating to a breathable, incrementally stretched elastic composite material as presently claimed and including a random pattern of incremental stretch-formed macroholes having an average diameter from about 10 μm to about 100 μm , and particularly being substantially free of pore-forming filler. In fact, other than the broad reference at column 3, lines 18-20 relating to "providing mechanical microvoids", Applicants find no other teaching or suggestion by D1 relating to microvoids or breathability.

The background portion of the present invention references conventional processes for providing mechanical microvoids, including hot needle punching, hot roll calendaring, and ultrasonic perforation. However, acknowledgement of such conventional techniques does not teach or suggest a composite material as presently claimed. Importantly, the background portion of the application further states that it is also known to provide air and water vapor permeability to polymer films by including therein one or more pore-forming fillers such as calcium carbonate, followed by stretching of the films to form micropores in areas adjacent to the filler. D1 provides no teaching or suggestion to avoid such conventional processes using pore-forming fillers to provide mechanical microvoids. On the other hand,

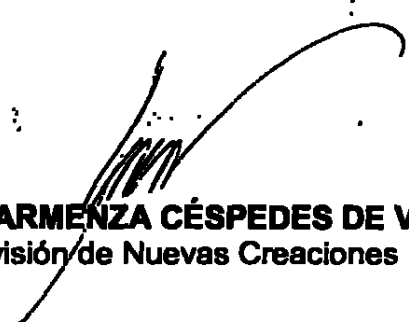
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Bogotá D C

Doctor(a)
DILIA MARIA RODRIGUEZ D'ALEMAN.
Apoderado(a)

REFERENCIA:	Radicación N°	04-106322
	Solicitud internacional	PCT/US03/08922
	Fecha límite fase nacional	22/10/2004
	Trámite	011
	Evento	379
	Actuación	416
	Oficio N°	1478
	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 los artículos 26 y 27 de la Decisión 486, de la Comisión de la Comunidad Andina, y en las demás disposiciones vigentes sobre la materia, se envía el extracto de la solicitud a la oficina de comunicaciones para efecto de su publicación en la Gaceta de Propiedad Industrial, conforme lo establece el artículo 40 de la Decisión 486.

Cúmplase
Dado en Bogotá D C,


ALIX CARMENZA CÉSPEDES DE VERGEL
Jefe División de Nuevas Creaciones

202051

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the present claims recite that the composite materials are substantially free of such pore-forming fillers.

Finally, claims 25 and 37 are directed to methods of manufacturing a breathable elastomeric composite material. According to claim 25, the method comprises the first step of extrusion laminating an inner elastomeric film to an outer nonwoven web at each film surface to tightly bond the nonwoven webs thereto. According to claim 37, the first step comprises extrusion laminating an elastomeric film to an outer nonwoven web at one or both of the film surfaces to tightly bond the nonwoven web thereto. Importantly, the methods of claims 25 and 37 further comprise incrementally stretching the resulting laminate to form a random pattern of macroholes having an average diameter of from about 10 μm to about 100 μm in the inner elastic film, provided that the inner elastic film is substantially free of pore-forming filler. Applicants find no teaching or suggestion in D1 of such a method wherein incremental stretching provides a random pattern of such macroholes in the inner elastomeric film, without the use of pore-forming filler. While D1 discloses incremental stretching, there is no teaching or suggestion that the incremental stretching is intended to or results in a random pattern of macroholes as claimed.

In view of these deficiencies in the teachings of D1, Applicants submit that claims 1, 17, 21, 25 and 37, and claims 3-6, 11-16, 18-25, 27, 31, 32 and 34-36 dependent thereon, exhibit novelty over D1. Accordingly, reconsideration is respectfully requested.

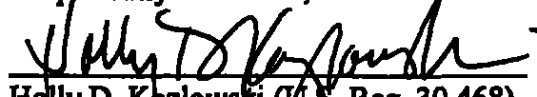
With respect to claims 2, 7, 8, 28 and 29, the Examiner relies on D2 as disclosing the air permeability, elastomeric film compositions and intermeshing roll engagement respectively recited in these claims. However, D2 fails to teach or suggest the limitations of claims 1 and 25 from which these claims directly or indirectly depend. Accordingly, these claims exhibit inventive step over D2 and reconsideration of the inventiveness of these claims is respectfully requested.

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More particularly, D2 is also a prior publication of one of the coinventors of the present application. D2 is directed to antibacterial microporous films and a high speed method of making them (page 1, lines 10-11). Initially, Applicants find no teaching or suggestion in D2 of any film which contains macroholes having an average diameter from about 10 μm to about 100 μm therein as recited in claims 1 and 25, or relating to a film having a random pattern of incremental stretch-formed macroholes as required by claims 1 and 25, and particularly substantially free of pore-forming filler. To the contrary, the majority of the teachings of D2 are directed to microporous films comprising a thermoplastic polymer with suitable additives and pore-forming fillers (page 17, lines 6-9). Beginning at page 17, line 14, D2 also discloses that microporous-formable polymer compositions may be obtained from blended polymers such as a blend of alkanoyl polymer and polyvinyl alcohol or alkanoyl polymer, destructured starch and ethylene copolymer. However, Applicants find no teaching or suggestion by D2 that such blends can provide a random pattern of incremental stretch-formed macroholes having an average diameter of from about 10 μm to about 100 μm therein as required by claims 1 and 25. Thus, notwithstanding any teachings of D2 related to air permeability, elastomeric blend compositions or incremental stretch intermeshing roll engagement, D2 does not defeat inventive step for claims 2, 7, 8, 28 and 29. Accordingly, reconsideration of the inventive step of these claims is respectfully requested.

It is believed that this represents a complete response to the Written Opinion, and a favorable Preliminary Examination Report for all of claims 1-52 is respectfully requested.

Respectfully submitted,


Holly D. Kozlowski (U.S. Reg. 30,468)
Dinsmore & Shohl LLP
1900 Chemed Center
255 East Fifth Street
Cincinnati, Ohio 45202
(513) 977-8568

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WHAT IS CLAIMED IS:

1. A breathable, incrementally stretched elastic composite material comprising an inner elastomeric film extrusion-laminated to an outer nonwoven web at each film surface, wherein the inner elastomeric film has a random pattern of incremental stretch-formed macroholes having an average diameter of from about 10 μm to about 100 μm therein and is substantially free of pore-forming filler.
2. The composite material of claim 1, having an air permeability of at least about 10 cc/min/cm² when a pressure of about 60 psi is applied thereto.
3. The composite material of claim 1, having a stretchability of at least about 200% with a permanent set of no more than about 25%.
4. The composite material of claim 1, wherein the inner elastomeric film comprises elastomeric block copolymer, elastomeric metallocene olefin polymer or copolymer, elastomeric polyurethane, elastomeric polysiloxane, or mixtures thereof.
5. The composite material of claim 4, wherein the inner elastomeric film comprises an elastomeric styrenic block copolymer.
6. The composite material of claim 5, wherein the inner elastomeric film comprises poly(styrene-butadiene-styrene), poly(styrene-isoprene-styrene), poly(styrene-ethylene-butylene-styrene), or combinations thereof.

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7. The composite material of claim 5, wherein the inner elastomeric film comprises a blend of an elastomeric styrenic block copolymer and an elastomeric metallocene polyethylene copolymer.
8. The composite material of claim 1, wherein the inner elastomeric film is a monolayer film.
9. A breathable, incrementally stretched elastic composite material comprising an inner elastomeric film extrusion-laminated to an outer nonwoven web at each film surface, wherein the inner elastomeric film has a random pattern of incremental stretch-formed macroholes therein and is substantially free of pore-forming filler, and wherein the inner elastomeric film comprises a multilayer film.
10. The composite material of claim 9, wherein the inner elastomeric film comprises a core layer including an elastomeric styrene block copolymer, coextruded at each surface with a polyolefin cap layer.
11. The composite material of claim 1, wherein the nonwoven webs individually comprise spun bonded polyolefin.
12. The composite material of claim 1, wherein each nonwoven web has a weight of less than about 40 g/m².
13. The composite material of claim 1, wherein, each nonwoven web has a weight of about 12 g/m².

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14. A garment formed at least in part from the composite material of claim 1.
15. A disposable article formed at least in part from the composite material of claim 1.
16. The disposable article of claim 15, comprising a diaper.
17. A breathable, incrementally stretched elastic composite material comprising an inner elastomeric film including a blend of an elastomeric styrenic block copolymer and an elastomeric metallocene polyethylene copolymer extrusion-laminated to an outer nonwoven spun bonded polyolefin web at each film surface, wherein the inner elastomeric film has a random pattern of incremental-stretch formed macroholes having an average diameter of from about 10 μm to about 100 μm therein and is substantially free of pore-forming filler.
18. A garment formed at least in part from the composite material of claim 17.
19. A disposable article formed at least in part from the composite material of claim 17.
20. The disposable article of claim 19, comprising a diaper.
21. A breathable, incrementally stretched elastic composite material, comprising an elastomeric film extrusion-laminated to a nonwoven web at one or both of the film

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surfaces, wherein the elastomeric film has a random pattern of incremental stretch-formed macroholes having an average diameter of from about 10 μm to about 100 μm therein and is substantially free of pore-forming filler.

22. A garment formed at least in part from the composite material of claim 21.

23. A disposable article formed at least in part from the composite material of claim 21.

24. The disposable article of claim 23, comprising a diaper.

25. A method of manufacturing a breathable elastomeric composite material, comprising

extrusion laminating an inner elastomeric film to an outer nonwoven web at each film surface to tightly bond the nonwoven webs thereto; and

incrementally stretching the resulting laminate to form a random pattern of macroholes having an average diameter of from about 10 μm to about 100 μm in the inner elastomeric film,

wherein the inner elastomeric film is substantially free of pore-forming filler.

26. A method of manufacturing a breathable elastomeric composite material, comprising

extrusion laminating an inner elastomeric film to an outer nonwoven web at each film surface at a nip pressure of greater than about 50 pounds per linear inch to tightly bond the nonwoven webs thereto; and

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incrementally stretching the resulting laminate to form a random pattern of macroholes in the inner elastomeric film,
wherein the inner elastomeric film is substantially free of pore-forming filler.

27. The method of claim 25, wherein the incremental stretching comprises cross direction (CD) intermesh stretching.

28. The method of claim 27, wherein the CD intermesh stretching employs an intermeshing roll engagement of at least about 0.12 inch.

29. The method of claim 25, wherein the composite material has an air permeability of at least about 10 cc/min/cm² when a pressure of about 60 psi is applied thereto.

30. A method of manufacturing a breathable elastomeric composite material, comprising

extrusion laminating an inner elastomeric film to an outer nonwoven web at each film surface to tightly bond the nonwoven webs thereto; and

incrementally stretching the resulting laminate to form a random pattern of macroholes in the inner elastomeric film,

wherein the inner elastomeric film is substantially free of pore-forming filler and wherein the composite material has a stretchability of at least about 200% with a permanent set of no more than about 25%.

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31. The method of claim 25, wherein the inner elastomeric film comprises an elastomeric styrenic block copolymer.

32. The method of claim 25, wherein the inner elastomeric film comprises a blend of an elastomeric styrenic block copolymer and an elastomeric metallocene polyethylene copolymer.

33. A method of manufacturing a breathable elastomeric composite material, comprising
extrusion laminating an inner elastomeric film to an outer nonwoven web at each film surface to tightly bond the nonwoven webs thereto; and
incrementally stretching the resulting laminate to form a random pattern of macroholes in the inner elastomeric film,
wherein the inner elastomeric film is substantially free of pore-forming filler and
wherein the inner elastomeric film comprises a core layer including an elastomeric styrene block copolymer, coextruded at each surface with a polyolefin cap layer.

34. The method of claim 25, wherein the nonwoven webs individually comprise spun bonded polyolefin.

35. The method of claim 25, wherein each nonwoven web has a weight of less than about 40 g/m².

36. The method of claim 25, wherein, each nonwoven web has a weight of about 12 g/m².

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37. A method of manufacturing a breathable elastomeric composite material, comprising
extrusion laminating an elastomeric film to an outer nonwoven web at one or both of the film surfaces to tightly bond the nonwoven web thereto; and
incrementally stretching the resulting laminate to form a random pattern of macroholes having an average diameter of from about 10 μm to about 100 μm in the elastomeric film,
wherein the elastomeric film is substantially free of pore-forming filler.

38. The composite material of claim 1, wherein the macroholes have an average diameter of from about 10 μm to about 50 μm .

39. The composite material of claim 1, wherein the macroholes have an average diameter of from about 15 μm to about 35 μm .

40. The composite material of claim 1, wherein the concentration of macroholes therein is in a range of from about 5 to about 500 per inch^2 .

41. The composite material of claim 1, wherein the concentration of macroholes therein is in a range of from about 10 to about 100 per inch^2 .

42. The composite material of claim 1, wherein the concentration of macroholes therein is in a range of from about 25 to about 75 per inch^2 .

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43. The composite material of claim 17, wherein the macroholes have an average diameter of from about 10 μm to about 50 μm .

44. The composite material of claim 17, wherein the macroholes have an average diameter of from about 15 μm to about 35 μm .

45. The composite material of claim 17, wherein the concentration of macroholes therein is in a range of from about 5 to about 500 per inch^2 .

46. The composite material of claim 17, wherein the concentration of macroholes therein is in a range of from about 10 to about 100 per inch^2 .

47. The composite material of claim 17, wherein the concentration of macroholes therein is in a range of from about 25 to about 75 per inch^2 .

48. The composite material of claim 21, wherein the macroholes have an average diameter of from about 10 μm to about 50 μm .

49. The composite material of claim 21, wherein the macroholes have an average diameter of from about 15 μm to about 35 μm .

50. The composite material of claim 21, wherein the concentration of macroholes therein is in a range of from about 5 to about 500 per inch^2 .

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51. The composite material of claim 21, wherein the concentration of macroholes therein is in a range of from about 10 to about 100 per inch².

52. The composite material of claim 21, wherein the concentration of macroholes therein is in a range of from about 25 to about 75 per inch².

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ABSTRACT OF THE DISCLOSURE

In one embodiment, a breathable, incrementally stretched elastic composite material comprises an inner elastomeric film extrusion-laminated to an outer nonwoven web at each film surface. The inner elastomeric film has a random pattern of incremental stretch-formed macroholes therein and is substantially free of pore-forming filler. In another embodiment, a breathable, incrementally stretched elastic composite material comprises an elastomeric film extrusion-laminated to a nonwoven web at one or both of the film surfaces. The elastomeric film has a random pattern of incremental stretch-formed macroholes therein and is substantially free of pore-forming filler. Methods of manufacturing the composite materials comprise extrusion laminating and incremental stretching. Garments and disposable articles are formed at least in part from the composite material.

TRANSMITTAL LETTER TO THE
UNITED STATES RECEIVING OFFICE

Date	21/3/2003
International Application No.	To Be Assigned
Attorney Docket No.	2098-114PCT

I. Certification under 37 CFR 1.10 (if applicable)

EV 022346732 US
Express Mail Mailing Number

21/3/2003
Date of Deposit

I hereby certify that the application/correspondence attached hereto is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to: Commissioner for Patents, Washington, D.C. 20231.

Margie Greene
Signature of Person Mailing Correspondence

Margie Greene
Typed or printed name of person mailing correspondence

II. ☒ New International Application

TITLE	Breathable and Elastic Composite Materials and Methods	Earliest priority date (Day/Month/Year)
SCREENING DISCLOSURE INFORMATION: In order to assist in screening the accompanying international application for purposes of determining whether a license for foreign transmittal should and could be granted and for other purposes, the following information is supplied. (Note: check as many boxes as apply):		22/3/2002

- A. ☐ The invention was not made in the United States.
 B. ☐ There is no prior U.S. application relating to this invention.
 C. ☒ The following prior U.S. application(s) contain subject matter which is related to the invention disclosed in the attached international application. 10/104,725 (NOTE: priority to these applications may or may not be claimed on form PCT/RO/101 (Request) and this listing does not constitute a claim for priority.)
 D. ☐ The present international application contains additional subject matter not found in the prior U.S. application(s) identified in paragraph C above. The additional subject matter is found on pages

and ☐ DOES NOT ALTER ☐ MIGHT BE CONSIDERED TO ALTER the general nature of the invention in a manner which would require the U.S. application to have been made available for inspection by the appropriate defense agencies under 35 U.S.C. 181 and 37 CFR 5.1. See 37 CFR 5.15.

III. ☐ A Response to an Invitation from the RO/US. The following document(s) is(are) enclosed.

- A. ☐ A Request for An Extension of Time to File a Response
 B. ☐ A Power of Attorney (General or Regular)
 C. ☐ Replacement pages:

pages		of the request (PCT/RO/101)	pages	of the figures
pages		of the description	pages	of the abstract
pages		of the claims		

D. ☐ Submission of Priority Documents

Priority Document		Priority Document	
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E. ☐ Fees as specified on attached Fee Calculation sheet from PCT/RO/101 annex

IV. ☐ A Request for Rectification under PCT 91 ☐ A Petition ☐ A Sequence Listing Diskette

V. ☐ Other (please specify):

The person signing this form is the:	☐ Applicant ☒ Attorney/Agent (Reg. No.) 30-468 ☐ Common Representative	Holly D. Kozlowski Typed name of signer <i>Holly D. Kozlowski</i> Signature
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PC1

Request

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

International Application No.

International Filing Date

Name of receiving Office and "PCT International Application"

Box No. I TITLE OF INVENTION		
Breathable and Elastic Composite Materials and Methods		
Box No. II APPLICANT		
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.) Clipay Plastic Products Company, Inc. 8585 Duke Boulevard Mason, Ohio 45040-3101 US	☐ This person is also inventor.	
	Telephone No. (513) 770-4800	
	Facsimile No. (513) 770-3984	
	Teleprinter No.	
State (i.e. country) of nationality: US	State (i.e. country) of residence: US	
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 APPLICANTS AND/OR (FURTHER) INVENTORS		
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.) WU, Pui-Cham 11053 Huntwick Place Cincinnati, Ohio 45241 US	This person is: ☐ applicant only ☒ applicant and inventor ☐ inventor only (If this check-box is marked do not fill in below.)	
	State (i.e. country) of nationality: US	State (i.e. country) of residence: US
	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.) KOZLOWSKI, Holly D. DINSMORE & SHOHL LLP 1900 Chemed Center 255 East Fifth Street Cincinnati, Ohio 45202 US	Telephone No. (513) 977-8568	
	Facsimile No. (513) 977-8141	
	Teleprinter No.	
	☒ Further agents are indicated on a continuation sheet	

Sheet No. 1

Continuation of Box No. III		FURTHER APPLICANTS AND/OR (FURTHER) INVENTORS	
<i>If none of the following sub-boxes is used, this sheet is not to be included in the request.</i>			
Name and address: <i>(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)</i> ROBINSON, Dale Eugene 1712 Morey Avenue Hamilton, Ohio 45011 US		This person is: ☐ applicant only ☒ applicant and inventor ☐ inventor only <i>(If this check-box is marked, do not fill in below.)</i>	
State (i.e. country) of nationality: US		State (i.e. country) of residence: US	
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 Supplemental Box			
Name and address: <i>(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)</i> BRADFORD, Richard Arnold 2223 Mt Zion Road Brooksville, Kentucky 41004 US		This person is: ☐ applicant only ☒ applicant and inventor ☐ inventor only <i>(If this check-box is marked, do not fill in below.)</i>	
State (i.e. country) of nationality: US		State (i.e. country) of residence: US	
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 Supplemental Box			
Name and address: <i>(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)</i> * * *		This person is: ☐ applicant only ☐ applicant and inventor ☐ inventor only <i>(If this check-box is marked, do not fill in below.)</i>	
State (i.e. country) of nationality:		State (i.e. country) of residence:	
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Name and address: <i>(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)</i> * * *		This person is: ☐ applicant only ☐ applicant and inventor ☐ inventor only <i>(If this check-box is marked, do not fill in below.)</i>	
State (i.e. country) of nationality: US		State (i.e. country) of residence: US	
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 Supplemental Box			
Name and address: <i>(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)</i> * * *		This person is: ☐ applicant only ☐ applicant and inventor ☐ inventor only <i>(If this check-box is marked, do not fill in below.)</i>	
State (i.e. country) of nationality: US		State (i.e. country) of residence: US	
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 Supplemental Box			

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The following agents are additionally appointed to act on behalf of applicant(s) before the competent International Authorities:

Snyder, Ronald J., Reg. No. 31,062; Liles, James D., Reg. No. 28,320; Miller, Martin J., Reg. No. 35,953; Harneiver, John V., Reg. No. 41,815; Wentsler, Stephen W., Reg. No. 46,403; White, Ryan O., Reg. No. 45,541; Brown, Charles H. III, Reg. No. 48,866; Schaefer, Jeffrey R., Reg. No. 48,514; Brown, Rebecca A., Reg. No. 47,452; Kuhnell, Clayton L., Reg. No. 48,691; Oberhaus, Geoffrey L., Reg. No. 42,955; Iery, Clare M., Reg. No. 51,833; Robbins, Eric M., Reg. No. 52,170; Lorentz, Joshua A., Reg. No. 52,406; and Everett, Denise M., Reg. No. 47,552, my attorneys, c/o Dinsmore & Shohl LLP, 1900 Chemed Center, 255 East Fifth Street, Cincinnati, Ohio 45202 USA (513) 977-8200 with full power in each of them, of substitution and revocation, to prosecute this application

whose address and telephone and facsimile numbers are the same as those in Box IV.

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)
- ☐ **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)

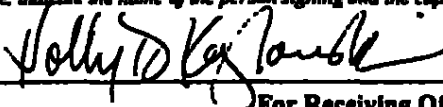
National Patent (if other kind of protection or treatment desired, specify on dotted line):

- | | | |
|--|---|--|
| ☐ AE United Arab Emirates | ☐ GM Gambia | ☐ NZ New Zealand |
| ☐ AG Antigua and Barbuda | ☐ HR Croatia | ☐ OM Oman |
| ☐ AL Albania | ☐ HU Hungary | ☐ PH Philippines |
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| ☐ BA Bosnia and Herzegovina | ☐ JP Japan | |
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| ☐ BG Bulgaria | ☐ KG Kyrgyzstan | ☐ SD Sudan |
| ☐ BR Brazil | ☐ KP Democratic People's Republic of Korea | ☐ SE Sweden |
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| ☐ BZ Belize | ☐ KZ Kazakhstan | ☐ SK Slovakia |
| ☐ CA Canada | ☐ LC Saint Lucia | ☐ SL Sierra Leone |
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| ☐ GH Ghana | | ☐ ZW Zimbabwe |

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

- ☐ NA 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		☐ Further priority claims are indicated in the Supplemental Box.		
Filing Date of earlier application (day/month/year)	Number of earlier application	Where earlier application is:		
		National application: Country	regional application:* regional office	international application: receiving office
Item (1) 22/3/2002	10/104.725	US		
Item (2)				
Item (3)				
☒ 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 the present international application is the receiving Office) identified above as item(s): (1)				
<i>* Where the earlier application is an ARIPO application, it is mandatory to indicate in the Supplemental Box at least one country party to the Paris Convention for the Protection of Industrial Property for which that earlier application was filed (Rule 4.10(b)(ii)). See Supplemental Box.</i>				
Box No. VII INTERNATIONAL SEARCHING AUTHORITY				
Choice of International Searching Authority (ISA) <i>(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):</i> ISA/ EP		Request to use results of earlier search; reference to that search (if an earlier search has been carried out by or requested from the International Searching Authority) Date: (day/month/year) Number Country (or regional office)		
Box No. VIII CHECK LIST; LANGUAGE OF FILING				
This international application contains the following number of sheets: request : description (excluding sequence listing part) : 18 claims : 6 abstract : 1 drawing : 4 sequence listing part of description : total number of sheets : 29		This international application is accompanied by the item(s) marked below: 1. ☒ fee calculation sheet 2. ☐ separate signed power of attorney 3. ☒ copy of general power of attorney; reference number, if any: 4. ☐ statement explaining lack of signature 5. ☐ priority document(s) identified in Box No. VI as item(s): 6. ☐ translation of international application into (language): 7. ☐ separate indications concerning deposited microorganism or other biological material 8. ☐ nucleotide and/or amino acid sequence listing in computer readable form 9. ☒ other (specific): Transmittal Letter to the United States Receiving Office; Return Receipt Postcard: Check in the amount of \$2,045.00		
Figure of the drawings which should accompany the abstract: Fig. 1B		Language of filing of the international application: English		
Box No. IX SIGNATURE OF APPLICANT OR AGENT				
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). Holly D. Kaszowski 				

For Receiving Office Use Only

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

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JUN 17 '04 122

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

Kozlowski, Holly D.
DINSMORE & SHOHL LLP
1900 Chemed Center
255 East Fifth Street
Cincinnati, Ohio 45202
ETATS-UNIS D'AMERIQUE

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL PRELIMINARY EXAMINATION REPORT (PCT Rule 71.1)

Date of mailing
(day/month/year) 09.06.2004

Applicant's or agent's file reference
2098-114PCT

IMPORTANT NOTIFICATION

International application No.
PCT/US 03/08922

International filing date (day/month/year)
21.03.2003

Priority date (day/month/year)
22.03.2002

Applicant
CLOPAY PLASTIC PRODUCTS COMPANY, INC.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed inventions is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

Name and mailing address of the international
preliminary examining authority:



European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0 Tx: 523658 eptm:d
Fax: +49 89 2399 - 4465

Authorized Officer

Fernández Gomez, L
Tel. +49 89 2399-7449



PATENT COOPERATION TREATY

PCT

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

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Applicant's or agent's file reference 2098-114PCT	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/US 03/08922	International filing date (day/month/year) 21.03.2003	Priority date (day/month/year) 22.03.2002
International Patent Classification (IPC) or both national classification and IPC B32B27/12, B32B27/12		
Applicant CLOPAY PLASTIC PRODUCTS COMPANY, INC.		
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 607 of the Administrative Instructions under the PCT). These annexes consist of a total of 9 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 68.2(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 20.10.2003	Date of completion of this report 09.06.2004	
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4485	Authorized Officer Seiberlich, P Telephone No. +49 89 2399-6883 	

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**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. **PCT/US 03/08922**

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

1-18 as originally filed

Claims, Numbers

1-52 filed with telefax on 05.05.2004

Drawings, Sheets

14-44 as originally filed

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:

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**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. **PCT/US 03/08922**

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	1-52
	No: Claims	
Inventive step (IS)	Yes: Claims	1-52
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-52
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item V

Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following document/s/:

D1: US-A-5861074
D2: WO-A-0151548
D3: WO-A-0119582
D4: WO-A-0179343

1. Claims 1-8, 11-25, 27-29, 31, 32 and 34-52

1.1 None of the available documents discloses or suggests composite materials obtained by incrementally stretching a laminate comprising an (inner) elastomeric film having nonwoven fibrous webs laminated on to the surface(s) thereof, wherein
(i) the polymeric materials used for the film layer are free of pore-forming fillers and
(ii) the films have a specific void structure, i.e. they comprise macroholes of an average diameter of 10 to 100 μ m (claims 1, 17, 21, 25 and 37 as amended).

The claimed subject-matter (claims as amended) therefore appears to meet the requirements of Article 33(2) PCT.

1.2 Document D2, which is considered to represent the most relevant state of the art to the subject-matter of the present application, discloses breathable incrementally stretched elastic composite materials preferably comprising incrementally stretched microporous films having a nonwoven fibrous web laminated onto the surface thereof (see the passages cited in the Search Report, in particular claims 21-32 and pp 8/9). D2 discloses the extrusion of films (i.a. with lamination) where in the formulations were fed from an extruder through a slot die (to form the extrudate) into the nip of a rubber roll and a metal roll with an air knife. For extrusion lamination, an incoming web strip of fibrous material from a roller is also introduced into the nip of the rubber roll and the metal roll (cf. D2, pp 27/28 and Fig. 1).

The compressive force at the nip and the air knife are controlled such that the film is made without pin holing. Stretching conditions (such as temperature controlled rollers before the CD and MD incremental stretching rollers, temperatures and the depths of

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engagements, web temperature during stretching) are controlled in order to obtain desired properties such as web stability or moisture vapour transmission properties (cf. D2, p 28 and pp 31/32).

The films according to D2 have an air permeability of e.g. 102-280 cc/cm²/min (at 90 psi/non-embossed microporous film, cf. e.g. Table 3, examples no. 13-16/p 34).

It is clear from the disclosure in D2, that the porous structure of the film may be achieved either by means of a dispersed pore-forming filler (see e.g. claim 1) or by means of a specific polymer blend, which renders it *"unnecessary to use pore-forming fillers to provide microporosity upon incremental stretching"* (cf. D2, p 17/1 20-22).

The subject-matter of independent claims 1, 17, 21, 25 and 37 (as amended) differs from the disclosure in D2 in

- (i) the selection of a specific polymer blend avoiding the incorporation of a pore-forming filler and
- (ii) the specific pore-sizes, i.e. the presence of macroholes of an average diameter of 10 to 100µm.

None of the available documents appears to disclose or suggest the use of a film material having macroholes of the specific diameter for producing extrusion laminated composites based on webs and/or films.

Thus, the subject-matter of present claims 1-8, 11-25, 27-29, 31, 32 and 34-52 appears to meet the requirements of Article 33(2) and 33(3) PCT.

2. Claims 9, 10, 26, 30 and 33

None of the available documents appears to disclose or suggest a film having a plurality of layers which is extrusion laminated between two webs (amended claims 9 and 33). The documents also appear to be silent about the specific nip pressure or the elastic properties (stretchability of 200% and permanent set of no more than 25%) defined in present claims 26 or 30.

The claimed subject-matter (claims as amended) therefore also appears to be novel and founded on an inventive step (Art. 33(2) and (3) PCT).

WHAT IS CLAIMED IS:

1. A breathable, incrementally stretched elastic composite material comprising an inner elastomeric film extrusion-laminated to an outer nonwoven web at each film surface, wherein the inner elastomeric film has a random pattern of incremental stretch-formed macroholes having an average diameter of from about 10 μm to about 100 μm therein and is substantially free of pore-forming filler.
2. The composite material of claim 1, having an air permeability of at least about 10 cc/min/cm² when a pressure of about 60 psi is applied thereto.
3. The composite material of claim 1, having a stretchability of at least about 200% with a permanent set of no more than about 25%.
4. The composite material of claim 1, wherein the inner elastomeric film comprises elastomeric block copolymer, elastomeric metallocene olefin polymer or copolymer, elastomeric polyurethane, elastomeric polysiloxane, or mixtures thereof.
5. The composite material of claim 4, wherein the inner elastomeric film comprises an elastomeric styrenic block copolymer.
6. The composite material of claim 5, wherein the inner elastomeric film comprises poly(styrene-butadiene-styrene), poly(styrene-isoprene-styrene), poly(styrene-ethylene-butylene-styrene), or combinations thereof.

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7. The composite material of claim 5, wherein the inner elastomeric film comprises a blend of an elastomeric styrenic block copolymer and an elastomeric metallocene polyethylene copolymer.

8. The composite material of claim 1, wherein the inner elastomeric film is a monolayer film.

9. A breathable, incrementally stretched elastic composite material comprising an inner elastomeric film extrusion-laminated to an outer nonwoven web at each film surface, wherein the inner elastomeric film has a random pattern of incremental stretch-formed macroholes therein and is substantially free of pore-forming filler, and wherein the inner elastomeric film comprises a multilayer film.

10. The composite material of claim 9, wherein the inner elastomeric film comprises a core layer including an elastomeric styrene block copolymer, coextruded at each surface with a polyolefin cap layer.

11. The composite material of claim 1, wherein the nonwoven webs individually comprise spun bonded polyolefin.

12. The composite material of claim 1, wherein each nonwoven web has a weight of less than about 40 g/m².

13. The composite material of claim 1, wherein, each nonwoven web has a weight of about 12 g/m².

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14. A garment formed at least in part from the composite material of claim 1.
15. A disposable article formed at least in part from the composite material of claim 1.
16. The disposable article of claim 15, comprising a diaper.
17. A breathable, incrementally stretched elastic composite material comprising an inner elastomeric film including a blend of an elastomeric styrenic block copolymer and an elastomeric metallocene polyethylene copolymer extrusion-laminated to an outer nonwoven spun bonded polyolefin web at each film surface, wherein the inner elastomeric film has a random pattern of incremental-stretch formed macroholes having an average diameter of from about 10 μm to about 100 μm therein and is substantially free of pore-forming filler.
18. A garment formed at least in part from the composite material of claim 17.
19. A disposable article formed at least in part from the composite material of claim 17.
20. The disposable article of claim 19, comprising a diaper.
21. A breathable, incrementally stretched elastic composite material, comprising an elastomeric film extrusion-laminated to a nonwoven web at one or both of the film

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surfaces, wherein the elastomeric film has a random pattern of incremental stretch-formed macroholes having an average diameter of from about 10 μm to about 100 μm therein and is substantially free of pore-forming filler.

22. A garment formed at least in part from the composite material of claim 21.

23. A disposable article formed at least in part from the composite material of claim 21.

24. The disposable article of claim 23, comprising a diaper.

25. A method of manufacturing a breathable elastomeric composite material, comprising

extrusion laminating an inner elastomeric film to an outer nonwoven web at each film surface to tightly bond the nonwoven webs thereto; and

incrementally stretching the resulting laminate to form a random pattern of macroholes having an average diameter of from about 10 μm to about 100 μm in the inner elastomeric film,

wherein the inner elastomeric film is substantially free of pore-forming filler.

26. A method of manufacturing a breathable elastomeric composite material, comprising

extrusion laminating an inner elastomeric film to an outer nonwoven web at each film surface at a nip pressure of greater than about 50 pounds per linear inch to tightly bond the nonwoven webs thereto; and

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incrementally stretching the resulting laminate to form a random pattern of macroholes in the inner elastomeric film,
wherein the inner elastomeric film is substantially free of pore-forming filler.

27. The method of claim 25, wherein the incremental stretching comprises cross direction (CD) intermesh stretching.

28. The method of claim 27, wherein the CD intermesh stretching employs an intermeshing roll engagement of at least about 0.12 inch.

29. The method of claim 25, wherein the composite material has an air permeability of at least about 10 cc/min/cm² when a pressure of about 60 psi is applied thereto.

30. A method of manufacturing a breathable elastomeric composite material, comprising
extrusion laminating an inner elastomeric film to an outer nonwoven web at each film surface to tightly bond the nonwoven webs thereto; and
incrementally stretching the resulting laminate to form a random pattern of macroholes in the inner elastomeric film,
wherein the inner elastomeric film is substantially free of pore-forming filler and
wherein the composite material has a stretchability of at least about 200% with a permanent set of no more than about 25%.

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31. The method of claim 25, wherein the inner elastomeric film comprises an elastomeric styrenic block copolymer.

32. The method of claim 25, wherein the inner elastomeric film comprises a blend of an elastomeric styrenic block copolymer and an elastomeric metallocene polyethylene copolymer.

33. A method of manufacturing a breathable elastomeric composite material, comprising

extrusion laminating an inner elastomeric film to an outer nonwoven web at each film surface to tightly bond the nonwoven webs thereto; and

incrementally stretching the resulting laminate to form a random pattern of macroholes in the inner elastomeric film,

wherein the inner elastomeric film is substantially free of pore-forming filler and wherein the inner elastomeric film comprises a core layer including an elastomeric styrene block copolymer, coextruded at each surface with a polyolefin cap layer.

34. The method of claim 25, wherein the nonwoven webs individually comprise spun bonded polyolefin.

35. The method of claim 25, wherein each nonwoven web has a weight of less than about 40 g/m².

36. The method of claim 25, wherein, each nonwoven web has a weight of about 12 g/m².

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37. A method of manufacturing a breathable elastomeric composite material, comprising

extrusion laminating an elastomeric film to an outer nonwoven web at one or both of the film surfaces to tightly bond the nonwoven web thereto; and

incrementally stretching the resulting laminate to form a random pattern of macroholes having an average diameter of from about 10 μm to about 100 μm in the elastomeric film,

wherein the elastomeric film is substantially free of pore-forming filler.

38. The composite material of claim 1, wherein the macroholes have an average diameter of from about 10 μm to about 50 μm .

39. The composite material of claim 1, wherein the macroholes have an average diameter of from about 15 μm to about 35 μm .

40. The composite material of claim 1, wherein the concentration of macroholes therein is in a range of from about 5 to about 500 per inch^2 .

41. The composite material of claim 1, wherein the concentration of macroholes therein is in a range of from about 10 to about 100 per inch^2 .

42. The composite material of claim 1, wherein the concentration of macroholes therein is in a range of from about 25 to about 75 per inch^2 .

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43. The composite material of claim 17, wherein the macroholes have an average diameter of from about 10 μm to about 50 μm .

44. The composite material of claim 17, wherein the macroholes have an average diameter of from about 15 μm to about 35 μm .

45. The composite material of claim 17, wherein the concentration of macroholes therein is in a range of from about 5 to about 500 per inch^2 .

46. The composite material of claim 17, wherein the concentration of macroholes therein is in a range of from about 10 to about 100 per inch^2 .

47. The composite material of claim 17, wherein the concentration of macroholes therein is in a range of from about 25 to about 75 per inch^2 .

48. The composite material of claim 21, wherein the macroholes have an average diameter of from about 10 μm to about 50 μm .

49. The composite material of claim 21, wherein the macroholes have an average diameter of from about 15 μm to about 35 μm .

50. The composite material of claim 21, wherein the concentration of macroholes therein is in a range of from about 5 to about 500 per inch^2 .

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51. The composite material of claim 21, wherein the concentration of macroholes therein is in a range of from about 10 to about 100 per inch².

52. The composite material of claim 21, wherein the concentration of macroholes therein is in a range of from about 25 to about 75 per inch².

HOJAS CORREGIDAS**REIVINDICACIONES**

1. Un material de compuesto elástico respirable, incrementalmente extendido que comprende una extrusión de película elastomérica interior laminada en una red no tejida exterior en cada superficie de película, en donde la película elastomérica interior tiene un patrón aleatorio de macro huecos que tienen un diámetro promedio desde aproximadamente 10 μm a aproximadamente 100 μm allí y está sustancialmente libre de llenador formador de poro.

2. Un material de compuesto de la reivindicación 1, que tiene una permeabilidad al aire de al menos aproximadamente 10 cc/min/cm² cuando se aplica una presión de aproximadamente 60 psi a esta.

3. El material de compuesto de la reivindicación 1, que tiene una extendibilidad de al menos aproximadamente 200% con una consolidación permanente de no más de aproximadamente 25%.

4. El material de compuesto de la reivindicación 1, en donde la película elastomérica interior comprende copolímero de bloque elastomérico, polímero o copolímero de olefina de metalloceno elastomérico, poliuretano elastomérico, polisiloxano elastomérico, o mezclas de estos.

5. El material de compuesto de la reivindicación 4, en donde la película elastomérica interior comprende un copolímero de bloque estirénico elastomérico.

6. El material de compuesto de la reivindicación 5, en donde la película elastomérica interior comprende poli(estireno-butadieno-estireno), poli(estireno-isopreno-estireno), poli(estireno-etileno-butileno-estireno), o combinaciones de estos.

7. El material de compuesto de la reivindicación 5, en donde la película elastomérica interior comprende una mezcla de un copolímero de bloque estirénico elastomérico y un copolímero de polietileno metalloceno elastomérico.

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8. El material de compuesto de la reivindicación 1, en donde la película elastomérica interior es una película monocapa.

9. Un material de compuesto elástico respirable, incrementalmente extendido que comprende una extrusión de película elastomérica interior laminada en una red no tejida exterior en cada superficie de película, en donde la película elastomérica interior tiene un patrón aleatorio de macro huecos formados con extensión en incremento allí y es sustancialmente libre de llenador formador de poro, y en donde la película elastomérica interior comprende una película multicapa.

10. El material de compuesto de la reivindicación 9, en donde la película elastomérica interior comprende una capa de núcleo que incluye un copolímero de bloque de estireno elastomérico, coextruido en cada superficie con una capa de tapa de poliolefina.

11. El material de compuesto de la reivindicación 1, en donde las redes no tejidas individualmente comprenden poliolefina unido por hilado.

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12. El material de compuesto de la reivindicación 1, en donde cada red no tejida tiene un peso de menos de aproximadamente 40 g/m².

13. El material de compuesto de la reivindicación 1, en donde, cada red no tejida tiene un peso de aproximadamente 12 g/m².

14. Una prenda formada al menos en parte del material de compuesto de la reivindicación 1.

15. Un artículo desechable formado al menos en parte del material de compuesto de la reivindicación 1.

16. El artículo desechable de la reivindicación 15, que comprende un pañal.

17. Un material de compuesto elástico respirable, incrementalmente extendido que comprende una película elastomérica interior que incluye una mezcla de un copolímero de bloque estirénico elastomérico y una extrusión de copolímero de polietileno metaloceno elastomérico laminado en una red de poliolefina unida por hilado no tejida exterior en cada superficie de película,

en donde la película elastomérica interior tiene un patrón aleatorio de macro huecos que tienen un diámetro promedio desde aproximadamente 10 μm a aproximadamente 100 μm allí y es sustancialmente libre de llenador formador de poro.

18. Una prenda formada al menos en parte del material compuesto de la reivindicación 17.

19. Un artículo desechable formado al menos en parte del material compuesto de la reivindicación 17.

20. El artículo deseable de la reivindicación 19, que comprende un pañal.

21. Un material de compuesto elástico respirable, incrementalmente extendido que comprende una extrusión de película elastomérica laminada a una red de no tejido en una o ambas de la superficie de la película, en donde la película elastomérica tiene un patrón aleatorio de macro huecos que tiene un diámetro promedio desde aproximadamente 10 μm a aproximadamente 100 μm allí y es sustancialmente libre de llenador formador de poro.

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22. Una prenda formada al menos en parte del material compuesto de la reivindicación 21.

23. Un artículo desechable formado al menos en parte del material de compuesto de la reivindicación 21.

24. El artículo desechable de la reivindicación 23, que comprende un pañal.

25. Un método para elaborar un material de compuesto elastomérico respirable, que comprende

Laminar con extrusión una película elastomérica interior a una red no tejida exterior en cada superficie de película para unir estrechamente las redes no tejidas a esta;

Extender incrementalmente la lamina resultante para formar un patrón aleatorio de macro huecos, que tiene un diámetro promedio desde aproximadamente 10 μm a aproximadamente 100 μm allí y es sustancialmente libre de llenador formador de poro.

En donde la película elastomérica interior esta sustancialmente libre de llenador formador de poro.

26. Un método para elaborar un material compuesto elastomérico respirable, que comprende

laminar por extrusión una película elastomérica interior en una red no tejida exterior en cada superficie de la película en una presión de línea de contacto mayor de aproximadamente 50 libras por pulgada lineal para unir estrechamente las redes no tejidas a esta; y

extender incrementalmente la lámina resultante para formar un patrón aleatorio de macro huecos que tiene un diámetro promedio desde aproximadamente 10 μm a aproximadamente 100 μm en la película elastomérica interior;

en donde la película elastomérica interior está sustancialmente libre del llenador formador de poro.

27. El método de la reivindicación 25, en donde entendimiento en incremento comprende extendimiento interengranado (CD) en dirección transversal.

28. El método de la reivindicación 27, en donde el entendimiento interengranado CD emplea un acoplamiento de rodillo interengranante de al menos aproximadamente 0,12 pulgadas.

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29. El método de la reivindicación 25, en donde el material de compuesto tiene una permeabilidad al aire de al menos aproximadamente 10 cc/min/cm² cuando se aplica una presión de al menos aproximadamente 60 psi a esta.

30. Un método de fabricación de un material de compuesto elastomérico respirable que comprende

laminar por extrusión una película elastomérica interior a una red no tejida exterior en cada superficie de la película para unir estrechamente las redes no tejidas a esta; y

extender incrementalmente la lámina resultante para formar un patrón aleatorio de macro huecos en la película elastomérica interior,

en donde la película elastomérica interior,

en donde la película elastomérica interior es sustancialmente libre de llenador formador de poro y en donde el material de compuesto tiene una extendibilidad de al menos aproximadamente 200% con una consolidación permanente de no más de aproximadamente 25%.

31. El método de la reivindicación 25, en donde la película elastomérica interior comprende un copolímero de bloque estirénico elastomérico.

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32. El método de la reivindicación 25, en donde la película elastomérica interior comprende una mezcla de un copolímero de bloque estirénico elastomérico y un copolímero de polietileno metaloceno elastomérico.

33. Un método para elaborar un material de compuesto elastomérico respirable que comprende

laminar por extrusión una película elastomérica interior en una red no tejida exterior en cada superficie de película para unir estrechamente las redes no tejidas a esta; y

extender incrementalmente la lámina resultante para formar un patrón aleatorio de macro huecos en la película elastomérica interior,

en donde la película elastomérica interior es sustancialmente libre de llenador formador de poro y en donde la película elastomérica interior comprende una capa de núcleo que incluye un copolímero de bloque de estireno elastomérico coextruido en cada superficie con una capa de tapa de poliolefina.

34. El método de la reivindicación 25, en donde las redes no tejidas individualmente comprenden poliolefina unida por hilado.

35. El método de la reivindicación 25, en donde cada red no tejida tiene un peso de menos de aproximadamente 40 g/m².

36. El método de la reivindicación 25, en donde, cada red no tejida tiene un peso de aproximadamente 12 g/m².

37. Un método de elaboración de material de compuesto elastomérico respirable que comprende

Laminar por extrusión una película elastomérica

A una red no tejida exterior en una o ambas de la superficie de película para unir estrechamente la red no tejida a esta; y

Extender incrementalmente la lamina resultante para formar un patrón aleatorio de macro huecos que tiene un diámetro promedio desde aproximadamente 10 µm a aproximadamente 100 µm en la película elastomérica

En donde la película elastomérica está sustancialmente libre de llenador formador de poro.

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38. El material de compuesto de la reivindicación 1, en donde los macro huecos tienen un diámetro promedio desde aproximadamente 10 μm a aproximadamente 50 μm .

39. El material de compuesto de la reivindicación 1, en donde los macro huecos tienen un diámetro promedio desde aproximadamente 15 μm a aproximadamente 35 μm .

40. El material de compuesto de la reivindicación 1, en donde la concentración de macro huecos allí están en el rango desde aproximadamente 5 a aproximadamente 500 por pulgada².

41. El material de compuesto de la reivindicación 1, en donde la concentración de macro huecos allí está en el rango desde aproximadamente 10 a aproximadamente 100 por pulgada².

42. El material de compuesto de la reivindicación 1, en donde la concentración de macro huecos allí está en el rango desde aproximadamente 25 a aproximadamente 75 por pulgada².

43. El material de compuesto de la reivindicación 17, en donde los macro huecos tienen un diámetro promedio desde aproximadamente 10 μm a aproximadamente 50 μm .

44. El material de compuesto de la reivindicación 17, en donde los macro huecos tienen un diámetro promedio desde aproximadamente 15 μm a aproximadamente 35 μm .

45. El material de compuesto de la reivindicación 17, en donde la concentración de macro huecos allí está en el rango desde aproximadamente 5 a aproximadamente 500 por pulgada².

46. El material de compuesto de la reivindicación 17, en donde la concentración de macro huecos allí está en el rango desde aproximadamente 10 a aproximadamente 100 por pulgada².

47. El material de compuesto de la reivindicación 17, en donde la concentración de macro huecos allí está en el rango desde aproximadamente 25 a aproximadamente 75 por pulgada².

48. El material de compuesto de la reivindicación 21, en donde los macro huecos tienen un diámetro promedio desde aproximadamente 10 μm a aproximadamente 50 μm .

49. El material de compuesto de la reivindicación 21, en donde los macro huecos tienen un diámetro promedio desde aproximadamente 15 μm a aproximadamente 35 μm .

50. El material de compuesto de la reivindicación 21, en donde la concentración de macro huecos allí está en el rango desde aproximadamente 5 a aproximadamente 500 por pulgada².

51. El material de compuesto de la reivindicación 21, en donde la concentración de macro huecos allí está en el rango desde aproximadamente 10 a aproximadamente 100 por pulgada².

52. El material de compuesto de la reivindicación 21, en donde la concentración de macro huecos allí está en el rango desde aproximadamente 25 a aproximadamente 75 por pulgada².

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SUPERINDUSTRIA Y COMERCIO
Radicalcion : 04106322 00000000
Fecha (HND) : 2004-10-22 16:21:09
Tramite : 011 PCT-PATENT 379 FASE NACI 411 PRESENTAC
Dependencia: 2020 DIVISION DE NUEVAS CREACIONES

Folios: 148

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: Claudia M Neiva

Fecha:

2020
Bogotá, D.C.,

Doctora:
DILIA MARIA RODRIGUEZ D'ALEMAN
Apoderada
CLOPAY PLSTIC PRODUCTS COMPANY, INC.

Oficio N° 10500

ASUNTO:	Radicación N°	04-106322
	Solicitud internacional	PCT/US03/08922
	Fecha inicio fase nacional	22/10/2004
	Trámite	011
	Evento	379
	Actuación	416
	Folios	001

Como resultado del examen de forma, realizado con fundamento en el artículo 38 de la Decisión 486 de la Comisión de la Comunidad Andina, artículo 27 del Tratado de Cooperación en Materia de Patentes (PCT), regla 51 bis del Reglamento y Circular Única de la Superintendencia de Industria y Comercio, se le comunica que:

- La solicitud no contiene la copia del documento en que consta la cesión del derecho a la patente del inventor al solicitante o a su causante. (Art. 26-k) Decisión 486).

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

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


ALIX CARMENZA CESPEDES DE VERGEL
Jefe de la División de Nuevas Creaciones.

El anterior requerimiento fue notificado por fijación en lista de fecha, 312 NOV-2004