



Industria y Comercio

SUPERINTENDENCIA

DELEGATURA PROPIEDAD INDUSTRIAL

SOLICITUD

REGISTRO DE PATENTES

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



No. 11-121346-00000-0000

Fecha: 2011-09-19 10:52:38 Dep. 2020 DIR.NUEVASCR
Tra. 11 PATENTEIYII Eve: 378 FASENACIONALI
Act. 411 PRESENTACION Folios: 121

EXPEDIENTE No _____

Tra: 11 PATENTEIYII Eve: 378 FASENACIONALI
Act. 411 PRESENTACION Folios: 120

TITULO TRANSPORTADOR DE TRAMA Y MÉTODO
DE FABRICACIÓN DE ARTÍCULO ABSORBENTE

CLASIFICACION INTERNACIONAL _____

SOLICITANTE UNICHARM CORPORATION

DOMICILIO Japón

APODERADO DARIO CARDENAS NAVAS

BOGOTA D.C. _____

PETIT



SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



No. 11-121346-00000-0000

Fecha: 2011-09-19 10:52:38 Dep. 2020 DIR.NUEVASCR
Tra. 11 PATENTEIYII Ene: 378 FASENACIONALI
Act. 411 PRESENTACION Folios: 121

Fecha: 2011-09-19 10:52:38 Dep. 2020 DIR.NUEVASCR
Tra. 11 PATENTEIYII Ene: 378 FASENACIONALI
Act. 411 PRESENTACION Folios: 120

**FORMULARIO UNICO 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

Nombre: UNICHARM CORPORATION

Dirección: 182, Shimobun, Kinsai-cho, Shikokuchuo-shi,
Ehime 799-0111 Japón

Nacionalidad o Domicilio: Japón

Lugar de Constitución: Japón

Teléfono: 3137800 Fax: 3122410

E-mail: general@cardenasycardenas.com

IDENTIFICACION

☐

NIT

☐

NIT

☐

Otro

☒

Otro

Cuál
Número

③

REPRESENTANTE
O APODERADO

Nombre: DARIO CARDENAS NAVAS

Dirección: Carrera 7 No 71-52 Torre B Piso 9

Teléfono: 3137800 Fax: 3122410

E-Mail: general@cardenasycardenas.com

IDENTIFICACION

☒

C.C.

☐

NIT

☐

Otro

☐

Otro

Cual
Número 17066629 TP 1.250
BTA C.S.J.

④

INVENTOR(ES)
(72)

Nombre: Hiroki YAMAMOTO

Dirección: c/o Technical Center of UNICHARM CORPORATION, 1531-7,
Wadahama, Toyohama-cho, Kanonji-shi, Kagawa 769-1602 Japón

Nacionalidad o Domicilio: Japón

⑤

PCT (86)

Solicitud Internacional No. PCT/JP2010/053733 Fecha 02.03.2010

Publicación Internacional No. WO 2010/101276 A1 Fecha 10.09.2010

⑥

Título(54): TRANSPORTADOR DE TRAMA Y MÉTODO DE FABRICACIÓN DE
ARTÍCULO ABSORBENTE

⑦

Clasificación Internacional (51):

⑧

Prioridad

(33)País de Origen

(32)Fecha

(31)N° de Solicitud

JP

02.03.2009

2009-048412

SI ☒ NO ☐

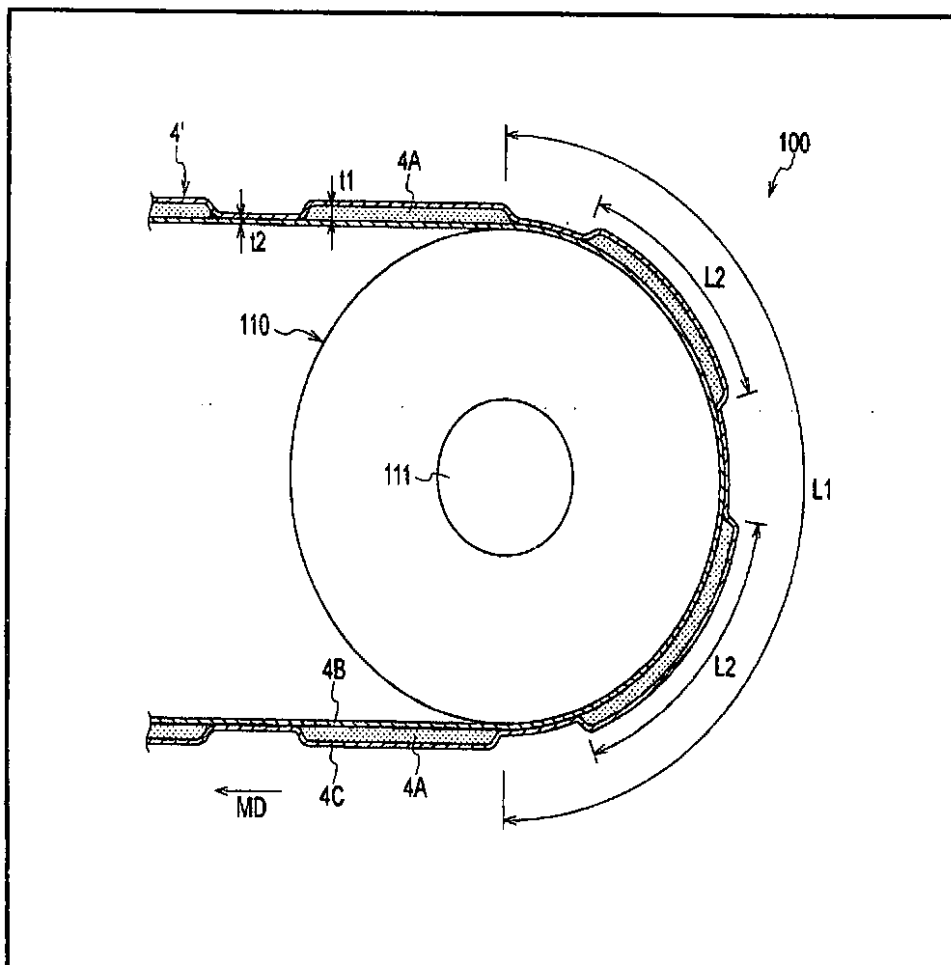
⑨

Comprobante de Pago No.: 11-0090494 Fecha: 14.09.2011

10 ANEXOS

- ☒ Comprobante de pago de la tasa de presentación de la solicitud.
- ☒ Documento que acredita la existencia y representación legal cuando el solicitante sea persona jurídica.
- ☒ Poderes, si fuere el caso. Presentado Exp 11-119943
- ☐ Documento de cesión del inventor al solicitante o a su causante.
- ☒ Traducción de la solicitud internacional al castellano (Resumen, descripción, reivindicaciones, dibujos)
- ☐ Copia del examen preliminar internacional efectuado por la Autoridad Internacional de Examen Preliminar (IPEA)
- ☐ Traducción del examen preliminar internacional efectuado por la IPEA.
- ☐ De ser el caso, copia del contrato de acceso.
- ☐ De ser el caso, documento que acredite la licencia o autorización de uso de conocimientos tradicionales de las comunidades indígenas.
- ☐ De ser el caso, certificado de depósito del material biológico.
- ☒ Arte final 12x12.
- ☐ De ser el caso, información sobre otras solicitudes de patente o títulos obtenidos en el extranjero por el mismo titular o su causante, relacionadas parcial o totalmente con la invención de esta solicitud.
- ☐ De ser el caso, modificaciones efectuadas a la solicitud internacional.
- ☒ Prioridad No.
<http://www.wipo.int/patentscope/search/en/detail.jsf;jsessionid=BA98AF24150C26910ECEA8F102AE70A6.wap.p2?docId=WO2010101276&recNum=1&tab=PCTDocuments&maxRec=&office=&prevFilter=&sortOption=&queryString=>
- ☐ Recibo de reivindicaciones adicionales

11 FIGURA CARACTERISTICA



12

Solicito la Concesión de la patente

NOMBRE **DARIO CARDENAS NAVAS**

FIRMA:

[Handwritten signature]

C.C.

17066629 BTA

TP.

1:250
G.S.J.

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
NIT : 800.176.089-2
- / -

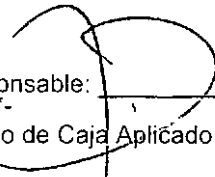
 Industria y Comercio SUPERINTENDENCIA	RECIBO DE CAJA	No. 11 - 0090494
		Bogotá D.C., Septiembre 14 de 2011 - 15:40:44

RECIBIDO DE : CARDENAS & CARDENAS ABOGADOS PI LTDA NI 830.083.491

*** Soporte del Pago ***					
TIPO PAGO	BANCO	CUENTA	No. PAGO	FECHA PAGO	VR. PAGO
CONSIGNACION	BANCO DE BOGOTA	062754387	411763531	14/09/2011	5.559.000.00

*** Conceptos Pagados ***			
CANT. RENTISTICO	CONCEPTO	Vr. UNIDITARIO	Vr. CONCEPTO
1 50005-01-01 SOLICITUDES	1 TRAMITES DE SOL. DE PATENTE DE INVENCIÓN	571.000.00	571.000.00
			<u>\$571.000.00</u>
=====			

SON: **QUINIENTOS SETENTA Y UN MIL PESOS MONEDA CORRIENTE**

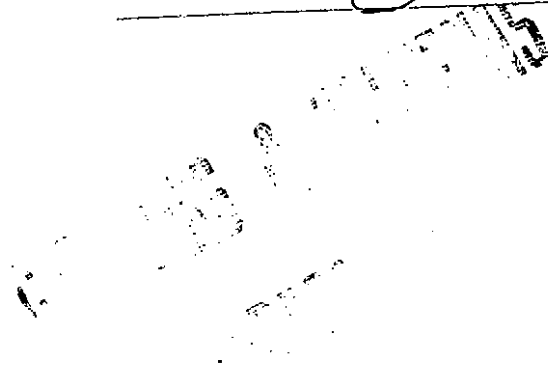
Responsable: 

Recibo de Caja Aplicado al Expediente No. _____

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

No. 11-121346-00000-0000
Fecha: 2011-09-19 10:52:38 Dep. 2020 DIR.NUEVASCR
Tra. 11 PATENTEIYII Eve: 378 FASENACIONALI
Act. 411 PRESENTACION Folios: 121

Fecha: 2011-09-19 10:52:38 Dep. 2020 DIR.NUEVASCR
Tra. 11 PATENTEIYII Eve: 378 FASENACIONALI
Act. 411 PRESENTACION Folios: 120





Industria y Comercio

SUPERINTENDENCIA

(21) N° de solicitud:

(22) Fecha de solicitud:

(51) Clasificación Internacional :

(71) Solicitante(s) **UNICHARM CORPORATION**

(72) Inventor(es) **Hiroki Yamamoto**

(74) Apoderado: **DARIO CARDENAS NAVAS**

(30) Prioridad	(31) <i>No. Prioridad</i>	32) <i>Fecha</i>	(33) <i>País</i>
	2009-048412	02.03.2009	JP

(85) Fecha inicio fase nacional: 02.10.2011

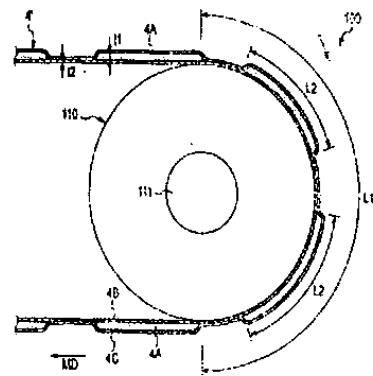
(86) Datos relativos a la presentación de la solicitud PCT

Fecha de presentación de la solicitud: 02.03.2010

No. de solicitud *PCT/JP2010/053733*

(54) Título **TRANSPORTADOR DE TRAMA Y MÉTODO DE FABRICACIÓN DE ARTÍCULO ABSORBENTE**

(21) N° de solicitud:		(22) Fecha de solicitud:	
(51) Clasificación internacional :			
(71) Solicitante(s) UNICHARM CORPORATION			
(72) Inventor(es) Hiroki Yamamoto			
(74) Apoderado: DARIO CARDENAS NAVAS			
(30) Prioridad	(31) No. Prioridad	32) Fecha	(33) Pais
	2009-048412	02.03.2009	JP
(85) Fecha limite inicio fase nacional: 02.10.2011		(87) Publicación internacional:	
(86) Datos relativos a la presentación de la solíc. PCT		Fecha: 10.09.2010	
Fecha de presentación de la solicitud: 02.03.2010		No. Publicación WO2010/101276 A1	
No. de solicitud PCT/JP2010/053733			



(54) Título: **TRANSPORTADOR DE TRAMA Y MÉTODO DE FABRICACIÓN DE ARTÍCULO ABSORBENTE**

(57) Resumen:

El transportador de trama 100 de acuerdo a la presente invención se usa para fabricar un absorbente 4 que incluye un centro absorbente 4A y un elemento de recubrimiento que cubre el centro absorbente 4A, y transporta una trama absorbente 4' que incluye el centro absorbente 4A interpuesto entre un par de tramas 4B y 4C para formar el elemento de recubrimiento. Un espesor (t1) del centro absorbente 4A es mayor que un espesor (t2) del elemento de recubrimiento. El transportador de trama 100 incluye un mecanismo de cambio de dirección (por ejemplo, un rodillo de cambio 110) que cambia una dirección de transporte de la trama absorbente 4' en 90° o más. La distancia de rotación (L1) de la trama absorbente 4, es decir, la longitud de una semicircunferencia del rodillo de cambio 110, es mayor que la longitud (L2) de cada uno de los centros absorbentes 4A en la dirección de transporte MD de la trama absorbente 4'.

4

 Industria y Comercio SUPERINTENDENCIA		SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO DIVISION DE NUEVAS CREACIONES EXTRACTO PARA PUBLICACIÓN SOLICITUD DE PATENTE DE INVENCION	
(21) N° de solicitud:		(51) Int Cl:	
22) Fecha de solicitud:		(71) Solicitante(s) UNICHARM CORPORATION	
(30) Prioridad	(31) No. Priodidad 2009-048412	32) Fecha 02.03.2009	(33) Pais JP
		(72) inventor(es) Hiroki Yamamoto	
		(74) Apoderado: DARIO CARDENAS NAVAS	
(54) Título: TRANSPORTADOR DE TRAMA Y MÉTODO DE FABRICACIÓN DE ARTÍCULO ABSORBENTE			

Resumen:

El transportador de trama 100 de acuerdo a la presente invención se usa para fabricar un absorbente 4 que incluye un centro absorbente 4A y un elemento de recubrimiento que cubre el centro absorbente 4A, y transporta una trama absorbente 4' que incluye el centro absorbente 4A interpuesto entre un par de tramas 4B y 4C para formar el elemento de recubrimiento. Un espesor (t1) del centro absorbente 4A es mayor que un espesor (t2) del elemento de recubrimiento. El transportador de trama 100 incluye un mecanismo de cambio de dirección (por ejemplo, un rodillo de cambio 110) que cambia una dirección de transporte de la trama absorbente 4' en 90° o más. La distancia de rotación (L1) de la trama absorbente 4, es decir, la longitud de una semicircunferencia del rodillo de cambio 110, es mayor que la longitud (L2) de cada uno de los centros absorbentes 4A en la dirección de transporte MD de la trama absorbente 4'.

JUN-082

126.897

TRANSPORTADOR DE TRAMA Y MÉTODO DE FABRICACIÓN DE
ARTÍCULO ABSORBENTE

Campo técnico

La presente revelación se refiere a un transportador de trama para uso en la fabricación de absorbentes, que incluyen un centro absorbente y un elemento de recubrimiento que cubre el centro absorbente, para transportar una trama absorbente que incluye los centros absorbentes interpuestos entre un par de tramas que forman los elementos de recubrimiento. La revelación además se refiere a un método de fabricación artículos absorbentes que usa este transportador de trama.

Arte previo

Un artículo absorbente, como un pañal descartable o una toalla higiénica, incluye un absorbente para absorber los fluidos corporales de una persona que usa el artículo absorbente. En general, el absorbente está constituido por: un centro absorbente hecho de pulpa molida y partículas de polímero superabsorbente (SAP), o similar; y un elemento de recubrimiento, como tisú, que cubre el centro absorbente (consultar el Documento Patentario 1, por ejemplo).

Específicamente, en un proceso de fabricación de absorbentes, en primer lugar, una lámina de pulpa se muele a través de un molino, y obteniéndose pulpa molida. Luego, las partículas de polímero superabsorbente se mezclan en la pulpa molida pasándolas por un ducto de suministro de pulpa, por medio de lo cual se obtiene un polvo mixto.

En adelante, el polvo mixto es reunido por un tambor

de formación y laminación de centros para formar centros absorbentes, y los centros absorbentes así formados son laminados a intervalos predeterminados sobre una trama transportada y que incluye un conjunto de elementos de recubrimiento. Luego, una trama que incluye un continuum de elementos de recubrimiento se lamina sobre la trama sobre la cual los centros absorbentes se laminan, por medio de lo cual se obtiene una trama absorbente que incluye los centros absorbentes interpuestos entre el par de tramas.

A continuación, la trama absorbente se corta a intervalos predeterminados, en una dirección perpendicular a una dirección de transporte de la trama absorbente transportada. De esta forma, se fabrican los absorbentes.

Durante la fabricación de absorbentes, la dirección de transporte de la trama absorbente debe modificarse 90° o más en algunos casos, para ahorrar espacio en la línea de producción. Para este cambio de la dirección de transporte de la trama absorbente en 90° o más, en general se usa un rodillo.

Sin embargo, los inventores han descubierto que cuando la dirección de transporte de la trama absorbente se modifica en 90° o más por acción de un rodillo, la trama puede plegarse debido a que los centros absorbentes son más gruesos y blandos que la trama.

Los inventores han especialmente advertido que cuando la trama absorbente transportada sobre la cara extremo exterior, en una dirección radial, del rodillo se pliega, los centros absorbentes, interpuestos por las tramas que incluyen el continuum de elementos de recubrimiento, no pueden esparcirse de manera uniforme. Esto puede hacer que cada uno de los centros se deforme o

JUN-082

que la trama se rompa. Tales defectos de fabricación deben ser suprimidos cuando se necesita realizar un cambio en la dirección de transporte de la trama absorbente en 90° o más.

Lista de Citas

[Documentos Patentario]

[Documento Patentario 1] Publicación de Solicitud de Patente Japonesa Número Hei 11-320742 (pp. 2 y 3, Figura 4)

Resumen

Con el fin de solucionar el problema antes descripto, la presente invención tiene los siguientes aspectos. Un aspecto de la presente invención provee un transportador de trama usado en la fabricación de un absorbente que incluye un centro absorbente y un elemento de recubrimiento que cubre el centro absorbente, y que transporta una trama absorbente que incluye el centro absorbente interpuesto entre un par de tramas para formar el elemento de recubrimiento, el transportador de trama comprende un mecanismo de cambio de dirección configurado para cambiar una dirección de transporte de la trama absorbente en 90° o más, siendo el espesor (t_1) del centro absorbente mayor que el espesor (t_2) del elemento de recubrimiento, en tanto el mecanismo de cambio de dirección cambia la dirección de transporte de la trama absorbente que pasa por el mecanismo de cambio, de manera que la trama absorbente gire en la dirección de transporte a través de una distancia de rotación (L_1) que es mayor que una longitud (L_2) del centro absorbente cuando la trama absorbente se observa a lo largo de una superficie de la trama absorbente en una dirección transversal perpendicular a la dirección de transporte de la trama absorbente.

El aspecto de la presente invención puede proveer un transportador de trama y un método de fabricación de un artículo absorbente capaces de suprimir con efectividad los defectos de fabricación en los absorbentes incluidos en una trama absorbente de manera continua y que incluye un centro absorbente y un elemento de recubrimiento, en el caso de cambiarse la dirección de transporte de la trama absorbente.

Breve descripción de los dibujos

La Figura 1 es una vista en perspectiva, parcialmente recortada que ilustra un artículo absorbente de acuerdo a una o más realizaciones.

La Figura 2 es un diagrama para explicar una parte relevante de un método de fabricación de artículos absorbentes de acuerdo a una o más realizaciones.

La Figura 3 es un diagrama para explicar una parte relevante de un método de fabricación de absorbentes de acuerdo a una o más realizaciones.

La Figura 4 es una vista en perspectiva que ilustra una región cerca de un rodillo de cambio de un transportador de trama de acuerdo a una o más realizaciones.

La Figura 5 es una vista lateral de la región cerca del rodillo de cambio del transportador de trama de la Figura 4.

La Figura 6 es una vista lateral similar a la Figura 5 y que ilustra el Ejemplo Modificado 1.

La Figura 7 es una vista lateral similar a la Figura 5 y que ilustra el Ejemplo Modificado 2.

Descripción detallada

En adelante, un transportador de trama y un método de

fabricación de un artículo absorbente de acuerdo a una o más realizaciones de la presente invención serán descriptos con referencia a los dibujos que se acompañan. Adviértase que, en la siguiente descripción de los dibujos, las mismas referencias denotan los mismos elementos y porciones. Además, debe advertirse que los dibujos son esquemáticos y no están a escala salvo indicación en contrario. En consecuencia, las dimensiones específicas y similares deben determinarse en consideración a la siguiente descripción. Por otra parte, los dibujos no necesariamente reflejan las relaciones de dimensiones y proporciones de los componentes reales.

En primer lugar, se explicará la configuración de un artículo absorbente 1 de acuerdo a una o más realizaciones con referencia a la Figura 1 que es una vista en perspectiva parcialmente recortada que ilustra el artículo absorbente 1. En esta realización particularmente ilustrada, el artículo absorbente 1 es un pañal descartable tipo bombacha para adultos.

Según se ilustra en la Figura 1, el artículo absorbente 1 fundamentalmente incluye una lámina superior 2, una lámina inferior 3, un absorbente 4 y una lámina impermeable 5.

La lámina superior 2 está adaptada para ponerse en contacto con la piel de una persona que usa el artículo absorbente 1 (en adelante, "usuario"). La lámina superior 2 está hecha de una lámina permeable a los líquidos como una trama no tejida o una película plástica perforada. La lámina inferior 3 se provee fuera de la lámina superior 2 (sobre la cara opuesta al usuario). La lámina inferior 3 está hecha de una trama no tejida o similar.

El absorbente 4 se provee entre la lámina superior 2 y la lámina inferior 3, para absorber las excreciones del

usuario. El absorbente 4 está hecho de una mezcla de pulpa molida y partículas de polímero superabsorbente, o similar. La lámina impermeable 5 se provee entre la lámina inferior 3 y el absorbente 4, para bloquear el paso de las excreciones del usuario hacia el exterior del artículo absorbente 1. La lámina impermeable 5 está hecha de una lámina impermeable a los líquidos.

El artículo absorbente 1 así configurado incluye, en combinación, una porción de línea de cintura anterior 10 que calza en la cintura anterior de un usuario, una porción de línea de cintura posterior 20 que calza en la cintura posterior del usuario, y una porción de entrepierna 30 que calza en la entrepierna del usuario. A propósito, las regiones de las aberturas que circundan las piernas 40 en las cuales se insertan las piernas del usuario se forman sobre ambos lados de la porción de entrepierna 30.

La porción de línea de cintura anterior 10 y la porción de línea de cintura posterior 20 están unidas mediante las porciones de empalme 50, por medio de lo cual se forma una abertura de la línea de cintura que calza alrededor del cuerpo del usuario. Un frunce de cintura 6A hecho de un filamento de goma elástico o similar se provee en un borde periférico de la porción de línea de cintura anterior 10 y la porción de línea de cintura posterior 20.

Por ejemplo, para hacer la porción de línea de cintura anterior 10 y la porción de línea de cintura posterior 20 elásticas en la dirección transversal perpendicular a la dirección anterior a posterior desde la porción de línea de cintura anterior 10 hacia la porción de línea de cintura posterior 20, la porción de línea de cintura anterior 10 y la porción de línea de

cintura posterior 20 pueden estar provistas del frunce de cintura 6A, o pueden en si mismas estar constituidas por láminas elásticas.

La porción de entrepierna 30 se provee entre la porción de línea de cintura anterior 10 y la porción de línea de cintura posterior 20. Los frunces de pierna 6B hechos de hebras elásticas de goma o similar se proveen sobre ambos lados de la porción de entrepierna 30.

Por ejemplo, para hacer la porción de entrepierna 30 elástica en la dirección que circunda las piernas, la porción de entrepierna 30 puede estar provista de los frunces de pierna 6B, o puede en si misma estar hecha de una lámina elástica.

En segundo lugar, un método de fabricación artículo absorbentes, como el artículo absorbente 1 antes mencionado, de acuerdo a una o más realizaciones será explicado con referencia a la Figura 2 que es un diagrama para explicar una parte relevante del método de fabricación de un artículo absorbente.

Según se ilustra en la Figura 2, el método de fabricación de artículo absorbentes incluye al menos una etapa de formación de la línea de cintura S1, un etapa de transferencia de absorbente S2, una etapa de formación de circundado de las piernas S3, una etapa de plegado S4, una etapa de empalme S5 y una etapa de corte S6.

En la etapa de formación de la línea de cintura S1, los frunces (frunce de cinturas 6A y/o frunce de piernas 6B) se colocan entre una trama 7A y una trama 7B, por medio de lo cual se forma una trama 7 a ser procesada en la porción de línea de cintura anterior 10 y la porción de línea de cintura posterior 20.

Adviértase que la trama 7 (tramas 7A, 7B) durante el transporte tiene elasticidad en una dirección transversal

CD (dirección a lo ancho) perpendicular a una dirección de transporte MD (dirección de la máquina) de la trama 7. Además, la trama 7 es asimétrica con respecto a una línea central CL que divide un ancho en la dirección transversal CD de la trama 7 y se extiende en la dirección de transporte MD de la trama 7.

En la etapa de transferencia de absorbente S2, un elemento de porción de entrepierna 30A para formar la porción de entrepierna 30 es transferido sobre la trama 7, más específicamente, entre la porción de línea de cintura anterior 10 y la porción de línea de cintura posterior 20, luego de la etapa de formación de la línea de cintura S1. En este caso, el elemento de porción de entrepierna 30A incluye la lámina inferior 3 y el absorbente 4.

En la etapa de formación de circundado de las piernas S3, la región de aberturas que circundan las piernas 40 (denominados orificios para las piernas) se forma cortando la trama 7 (tramas 7A, 7B) luego de la etapa de transferencia de absorbente S2. En este caso, la formación de la región de aberturas que circundan las piernas 40 no necesariamente comprende el corte de solamente la trama 7A y la trama 7B, sino que además puede comprender el corte, junto con la trama 7A y la trama 7B, de la lámina inferior 3 que constituye el elemento de porción de entrepierna 30A.

Adviértase que la etapa de transferencia de absorbente S2 y la etapa de formación de circundado de las piernas S3 pueden ejecutarse en el orden inverso.

En la etapa de plegado S4, la trama 7 se pliega a la mitad a lo largo una línea de pliegue que se extiende en la dirección de transporte MD de la trama 7, puenteando un borde lateral 10A de la porción de línea de cintura

anterior 10 hacia un borde lateral 20A de la porción de línea de cintura posterior 20, luego de la etapa de formación de circundado de las piernas S3.

Adviértase que, en esta realización particularmente ilustrada, la línea de pliegue es la línea central CL. Sin embargo, la línea de pliegue no es necesariamente la línea central CL, y puede estar desplazada de la línea central CL hacia el primer borde lateral 10A o el segundo borde lateral 20A.

En la etapa de empalme S5, las partes plegadas de la trama 7 se unen en las regiones de empalme 50A a través de un tratamiento ultrasónico o tratamiento por calor luego de la etapa de plegado S4. En este caso, las regiones de empalme 50A están para formar las porciones de empalme 50 del artículo absorbente 1. La región de empalme 50A se extiende en la dirección de transporte MD a través de una línea imaginaria SL que indica una posición a cortar y se extiende en la dirección transversal CD.

En la etapa de corte S6, la trama 7 unida en las regiones de empalme 50A se corta a lo largo de las líneas imaginarias SL luego de la etapa de empalme S5. En consecuencia, se obtiene el artículo absorbente 1.

En tercer lugar, se explicará un método de fabricación absorbentes, como el absorbente 4 mencionado, de acuerdo a una o más realizaciones con referencia a la Figura 3 que es un diagrama para explicar una parte relevante del método de fabricación de absorbentes.

Según se ilustra en la Figura 3, el absorbente 4 está constituido por: un centro absorbente 4A hecho de pulpa molida y partículas de polímero superabsorbente (SAP), o similar; y un elemento de recubrimiento, como tisú, que cubre el centro absorbente 4A. El método de

fabricación del absorbente 4 así configurado incluye al menos una etapa de generación de polvo S13, una etapa formación de núcleos y laminación S23, una etapa de cambio de la dirección de transporte S33 y una etapa de corte de trama S43.

En la etapa de generación de polvo S13, un molino (no se ilustra) prepara la pulpa molida 301 moliendo una lámina de pulpa (no se ilustra). Luego, las partículas de polímero superabsorbente 302 se mezclan en la pulpa molida 301 pasando por un ducto de suministro de pulpa (no se ilustra), por medio de lo cual se obtiene un polvo mixto 4A'.

En la etapa formación de núcleos y laminación S23, un tambor de formación y laminación de centros (no se ilustra) une el polvo mixto 4A' para formar el centro absorbente 4A, y luego lamina el centro absorbente 4A formado sobre una primera trama 4B transportada, a intervalos predeterminados en la dirección de transporte MD de la primera trama 4B. La primera trama 4B está hecha de tisú o similar e incluye un continuum de elementos de recubrimiento para que integre los respectivos centros absorbentes 4A. En adelante, una segunda trama 4C es laminada sobre la primera trama 4B, sobre la cual los múltiples centros absorbentes 4A se laminan, para obtener una trama absorbente 4'. La segunda trama 4C está hecha de tisú o similar e incluye un continuum de elementos de recubrimiento que formarán partes de los respectivos centros absorbentes 4A.

En este caso, el espesor (t_1) del centro absorbente 4A es mayor que el espesor del elemento de recubrimiento, es decir, el espesor (t_2) de la primera o segunda trama 4B, 4C (ver la Figura 5).

Luego de la etapa formación de núcleos y laminación

S23, la trama absorbente 4' es transportada por múltiples rodillos de transmisión (no se ilustran), en un estado en el cual los centros absorbentes 4A quedan interpuestos entre el par de tramas primera y segunda 4B y 4C que forman los elementos de recubrimiento.

En la etapa de cambio de la dirección de transporte S33, la dirección de transporte MD de la trama absorbente 4' es modificada por un rodillo de cambio 110 de un transportador de trama 100 a ser descrito a continuación. El transportador de trama 100 se describirá a continuación en detalle.

En la etapa de corte de trama S43, la trama absorbente 4' así transportada es desplazada adicionalmente mediante la rotación de un tambor rotativo (no se ilustra), y se corta a intervalos predeterminados, en la dirección transversal CD perpendicular a la dirección de transporte MD de la trama absorbente 4' mediante un rodillo cortador (no se ilustra) dispuesto frente a una superficie circunferencial externa del tambor rotativo. En consecuencia, los absorbentes 4 se separan entre sí. A propósito, el absorbente 4 es alargado en la dirección que va desde la porción de línea de cintura anterior 10 a la porción de línea de cintura posterior 20 (ver la Figura 1).

En cuarto lugar, se explicará la configuración del transportador de trama 100 usado en la etapa de cambio de la dirección de transporte S33 antes mencionada con referencia a las Figuras 4-5.

El transportador de trama 100 transporta la trama absorbente que incluye el centro absorbente interpuesto entre un par de tramas para formar el elemento de recubrimiento. El transportador de trama 100 comprende un mecanismo de cambio de dirección configurado para cambiar

una dirección de transporte de la trama absorbente en 90° o más, en tanto el espesor (t_1) del centro absorbente es mayor que el espesor (t_2) del elemento de recubrimiento, en tanto el mecanismo de cambio de dirección cambia la dirección de transporte de la trama absorbente que pasa por el mecanismo de cambio, de manera que la trama absorbente rote en la dirección de transporte a través de una distancia de rotación (L_1) que es mayor que una longitud (L_2) del centro absorbente cuando la trama absorbente es vista a lo largo de una superficie de la trama absorbente en una dirección transversal perpendicular a la dirección de transporte de la trama absorbente.

La Figura 4 es una vista en perspectiva que ilustra una región cerca del rodillo de cambio 110 del transportador de trama 100 de acuerdo a una o más realizaciones. La Figura 5 es una vista lateral de la región cerca del rodillo de cambio 110 del transportador de trama 100 vista en la dirección del eje del rodillo de cambio 110.

Según se ilustra en las Figuras 4 y 5, el transportador de trama 100 incluye un mecanismo de cambio de dirección configurado para cambiar la dirección de transporte MD de la trama absorbente 4' en 90° o más, la trama absorbente 4' que incluye los absorbentes antes mencionados 4. En esta realización particularmente ilustrada, el mecanismo de cambio de dirección cambia la dirección de transporte MD de la trama absorbente 4' en 180° .

El mecanismo de cambio de dirección incluye el rodillo de cambio 110. Cuando la dirección de transporte MD de la trama absorbente 4' no necesita cambiarse, el transportador de trama 100 transporta la trama absorbente

4' accionando los múltiples rodillos (no se ilustran).

El rodillo de cambio 110 gira sobre un centro de eje 111 que define un eje rotacional sobre el cual la trama absorbente 4' ha de rotar para cambiar la dirección de transporte. El rodillo de cambio 110 cambia la dirección de transporte MD de la trama absorbente 4' mientras soporta la trama absorbente 4'.

Tal como mejor se observa en la Figura 5, cuando la trama absorbente 4' es vista a lo largo del eje rotacional, es decir, en la dirección del eje del rodillo de cambio 110, la distancia de rotación (L1) de la trama absorbente 4', es decir, la distancia sobre la cual la trama absorbente 4' se desplaza en un movimiento rotacional sobre el eje rotacional, es mayor que una longitud (L2) de cada uno de los centros absorbentes 4A en la dirección de transporte MD de la trama absorbente 4'. En la realización ilustrada particularmente cuando el rodillo de cambio 110 cambia la dirección de transporte MD de la trama absorbente 4' en 180° , la distancia de rotación (L1) de la trama absorbente 4' es la longitud de una semicircunferencia del rodillo de cambio 110.

En este caso, ver la trama absorbente 4' a lo largo del eje rotacional, es decir, en la dirección del eje del rodillo de cambio 110, significa ver la trama absorbente 4' a lo largo una superficie de la trama absorbente 4' en la dirección transversal CD perpendicular a la dirección de transporte MD de la trama absorbente 4'.

Es especialmente preferible que la distancia de rotación (L1) de la trama absorbente 4' sea al menos dos veces la longitud (L2) del centro absorbente 4A en la dirección de transporte MD de la trama absorbente 4' cuando la trama absorbente 4' es vista en la dirección del eje del rodillo de cambio 110.

El rodillo de cambio 110 soporta dos centros absorbentes 4A a la vez. Específicamente, mientras gira, el rodillo de cambio 110 siempre tiene dos centros absorbentes 4A de la trama absorbente 4' transportada, sobre su semicírculo (es decir, L1 en la Figura 5).

La longitud (L2) del centro absorbente 4A en la dirección de transporte MD de la trama absorbente 4' corresponde a la longitud del absorbente 4 en la dirección longitudinal (es decir, la dirección transversal CD que se ilustra en la Figura 2). En otras palabras, el rodillo de cambio 110 cambia la dirección de transporte MD de la trama absorbente 4' transportada por un método de transporte longitudinal.

En la realización antes descripta, cuando el espesor(t1) del centro absorbente 4A es mayor que el espesor(t2) del elemento de recubrimiento, es decir, el espesor de la primera y la segunda trama 4B, 4C, la distancia de rotación (L1) de la trama absorbente 4' cuando la trama absorbente 4' es vista en la dirección del eje del rodillo de cambio 110, es decir, la longitud de la semicircunferencia del rodillo de cambio 110, es mayor que la longitud (L2) del centro absorbente 4A en la dirección de transporte MD de la trama absorbente 4'. Con esta configuración, la diferencia en diámetro entre la primera trama 4B transportada en contacto con el rodillo de cambio 110 y la segunda trama 4C transportada sobre la cara extremo exterior, en una dirección radial, del rodillo de cambio 110 es menor, y en consecuencia la segunda trama 4C es menos proclive a estirarse, que en el caso donde la distancia de rotación (L1) de la trama absorbente 4' es más corta que la longitud (L2) del centro absorbente 4A. Esto reduce el innecesario esfuerzo aplicado a la segunda trama 4C, y suprime de una

mejor manera el plegado o rasgado de la segunda trama 4C. Además, dado que la segunda trama 4C es menos proclive a plegarse, el centro absorbente 4A se estira de una manera uniforme, y en consecuencia se evita que se deforme de un modo no uniforme. De esta forma, es posible suprimir mejor los defectos de fabricación en los absorbentes 4.

Sin embargo, si el espesor (t_1) del centro absorbente 4A es menor que el espesor (t_2) de la primera o segunda trama 4B, 4C, la diferencia en diámetro entre la primera trama 4B transportada en contacto con el rodillo de cambio 110 y la segunda trama 4C transportada sobre la cara extremo exterior, en la dirección radial, del rodillo de cambio 110 ya es pequeña. En tal caso, la segunda trama 4C es menos proclive a plegarse o romperse, y por lo tanto, la distancia de rotación (L_1) de la trama absorbente 4' no debe ser mayor (aunque ello podría aún resultar preferido) que la longitud (L_2) del centro absorbente 4A en la dirección de transporte MD de la trama absorbente 4'.

En esta realización particularmente ilustrada, es preferible que la distancia de rotación (L_1) de la trama absorbente 4' sea al menos dos veces la longitud (L_2) del centro absorbente 4A en la dirección de transporte MD de la trama absorbente 4'. Por otra parte, el rodillo de cambio 110 soporta dos centros absorbentes 4A a la vez. Con esta configuración, la diferencia en diámetro entre la primera trama 4B y la segunda trama 4C se torna aún menor, y la segunda trama 4C es ciertamente menos proclive al estiramiento, que en un caso donde la distancia de rotación (L_1) de la trama absorbente 4' es más corta que la longitud (L_2) del centro absorbente 4A. Esto reduce adicionalmente el esfuerzo innecesario aplicado a la segunda trama 4C, y además suprime de un

modo adecuado el plegado o rasgado de la segunda trama 4C.

Especialmente cuando el rodillo de cambio 110 cambia la dirección de transporte MD de la trama absorbente 4', las realizaciones reveladas pueden suprimir adecuadamente el plegado o rasgado de la segunda trama 4C, resultando eficaces.

Evaluación comparativa

A continuación, se describirá una evaluación comparativa ejecutada usando los rodillos de cambio de acuerdo a los siguientes Ejemplos Comparativos y Ejemplos con el fin de aclarar los efectos revelados en la presente. Adviértase que la presente invención no se limita a los ejemplos.

Las configuraciones y resultados de la evaluación de los rodillos de cambio de acuerdo a los Ejemplos Comparativos y Ejemplos se expondrán con referencia a la Tabla 1.

Tabla 1

	Ejemplo Comparativo 1	Ejemplo Comparativo 2	Ejemplo 1	Ejemplo 2
Distancia de rotación (L1) de la trama absorbente	95 mm	315 mm	285 mm	700 mm
Longitud (L2) del centro absorbente	190 mm	350 mm	190 mm	350 mm
L1:L2 (relación)	0.5:1	0.9:1	1.5:1	2:1
Espesor (t1) del centro absorbente	5 mm	9 mm	5 mm	6 mm
Espesor (t2) del elemento de recubrimiento	0.1 mm	0.1 mm	0.1 mm	0.1 mm
Plegado o no	Sí	Sí	No	No

Los siguientes hechos surgen de la Tabla 1. Cuando la trama absorbente 4' es dada vuelta por el rodillo de cambio de acuerdo a uno de los Ejemplos Comparativos 1 y 2, la segunda trama 4C transportada sobre la cara extremo exterior, en la dirección radial, del rodillo de cambio se pliega dado que la distancia de rotación (L1) de la trama absorbente 4' es menor que la longitud (L2) del centro absorbente 4A.

Cuando la trama absorbente 4' es dada vuelta por el rodillo de cambio 110 de uno de los Ejemplos 1 y 2, por otra parte, la segunda trama 4C transportada sobre la cara extremo exterior, en la dirección radial, del rodillo de cambio 110 no se pliega dado que la distancia de rotación (L1) de la trama absorbente 4' es mayor que la longitud (L2) del centro absorbente 4A.

Ejemplo Modificados

El mecanismo de cambio de dirección de acuerdo a la descripción precedente está compuesto únicamente por el rodillo de cambio 110. Alternativamente, los mecanismos de cambio de dirección de acuerdo a los ejemplos modificados pueden incluir las siguientes modificaciones.

En este caso, la explicación hará referencia fundamentalmente a las diferencias respecto de la descripción precedente, usándose las mismas referencias numéricas para los mismos elementos.

Ejemplo Modificado 1

En primer lugar, se explicará una configuración de a mecanismo de cambio de dirección de acuerdo al Ejemplo Modificado 1 con referencia a la Figura 6 que es una vista lateral similar a la Figura 5 y que ilustra el Ejemplo Modificado 1.

Según se ilustra en la Figura 6, el mecanismo de cambio de dirección incluye múltiples rodillos de cambio 110A que están dispuestos sobre un eje rotacional similar al definido por el eje 111 en la Figura 5, y giran sobre ejes paralelos al eje rotacional. En este caso además, los múltiples rodillos de cambio 110A cambian la dirección del transportador MD de la trama absorbente 4' que pasa por los múltiples rodillo de cambios 110A, de manera que la trama absorbente 4' gire, mientras es soportada por los rodillos de cambio 110A, sobre el eje rotacional en la dirección de transporte MD a través de la distancia de rotación (L1) que es mayor que la longitud (L2) del centro absorbente 4A cuando se observa en la dirección del eje del rodillo de cambios 110A, es decir, a lo largo del eje rotacional.

Ejemplo Modificado 2

En segundo lugar, se explicará una configuración de un mecanismo de cambio de dirección de acuerdo al Ejemplo Modificado 2 con referencia a la Figura 7 que es una vista lateral similar a la Figura 5 y que ilustra el Ejemplo Modificado 2.

Según se ilustra en la Figura 7, el mecanismo de cambio de dirección incluye el sistema transportador 120.

El sistema transportador 120 incluye: múltiples rodillos 121 (se ilustra sólo un rodillo 121) que giran sobre un eje rotacional similar al definido por el eje 111 en la Figura 5; una correa sin fin 122 configurada para girar sobre los múltiples rodillos 121 y transportar la trama absorbente 4'; y una unidad de vacío 123 configurada para chupar la trama absorbente 4' sobre la cinta 122. En este caso, se forman múltiples orificios de vacío (no se ilustran) para absorber la trama absorbente 4' en la cinta 122.

En este caso también, cuando se observa en la dirección del eje de los rodillos 121, el sistema transportador 120 cambia la dirección del transportador MD de la trama absorbente 4' que pasa por la cinta 122, de manera que la trama absorbente 4' gire sobre el eje rotacional en la dirección de transporte MD a través de la distancia de rotación (L1) que es mayor que la longitud (L2) del centro absorbente 4A.

Adviértase que el sistema transportador 120 no necesariamente incluye la unidad de vacío 123, en la medida en que incluya al menos un rodillo 121 y la cinta 122.

Otras realizaciones

Según se ha descripto, los detalles de varias realizaciones han sido revelados a título ilustrativo. Sin embargo, debe entenderse que la descripción y los dibujos que integran esta revelación no limitan la presente invención. En base a lo revelado, los expertos en el arte podrán concebir con facilidad varias realizaciones, ejemplos y técnicas de operación alternativas.

Por ejemplo, es posible contemplar las siguientes realizaciones adicionales. Específicamente, el artículo

absorbente 1 descripto posee la porción de línea de cintura anterior 10, la porción de línea de cintura posterior 20 y la porción de entrepierna 30. Sin embargo, el artículo absorbente 1 no se limita a esta configuración, sino que puede estar formado por completo por una sola pieza. En este caso, obviamente, se emplea un método de fabricación distinto de este artículo absorbente.

Adicionalmente, se ha provisto una descripción para el transportador de trama usado para transportar los absorbentes 4 para los artículos absorbentes 1 (denominados pañales). Sin embargo, el transportador de trama no se limita a este uso. Por ejemplo, el transportador de trama puede usarse para transportar absorbentes 4 para toallas higiénicas, protectores higiénicos o similares.

Por otra parte, se ha descripto la región de aberturas que circundan las piernas 40 que se forman cortando la trama 7A y la trama 7B. Sin embargo, la formación de la región de aberturas que circundan las piernas 40 no se limita a esta disposición. La región de aberturas que circundan las piernas 40 puede formarse cortando, junto con la trama 7A y la trama 7B, la lámina inferior 3 que constituye el elemento de porción de entrepierna 30A.

Además, se ha descripto el transportador de trama configurado para transportar la trama absorbente 4' que incluye los centros absorbentes 4A interpuestos entre las tramas 4A y 4B. Sin embargo, el transportador de trama no se limita a esta configuración. Por ejemplo, el transportador de trama puede transportar la lámina inferior 3 sobre la cual se laminan los absorbentes 4, en la medida en que el transportador traslade una lámina que

incluya al menos los absorbentes 4.

Además, se ha descripto el rodillo de cambio 110 que cambia la dirección del transportador MD de la trama absorbente 4'. Sin embargo, el rodillo de cambio 110 no se limita a este ángulo de giro en particular. Por ejemplo, el rodillo de cambio 110 puede cambiar la dirección de transporte MD de la trama absorbente 4' en cualquier ángulo de 90° o más.

Además, se ha descripto el rodillo de cambio 110 que soporta dos centros absorbentes 4A a la vez. Sin embargo, el rodillo de cambio 110 no se limita a esta disposición. El rodillo de cambio 110 puede soportar tres o más centros absorbentes 4A a la vez. En otras palabras, lo que se necesita es que la distancia de rotación (L1) de la trama absorbente 4' sea más larga que la longitud (L2) del centro absorbente 4A en la dirección de transporte MD de la trama absorbente 4'.

Además, la longitud (L2) del centro absorbente 4A en la dirección de transporte MD de la trama absorbente 4' ha sido descripta como correspondiente a la longitud del absorbente 4 en la dirección longitudinal. Sin embargo, la longitud (L2) no se limita a esta longitud, y puede corresponder al ancho del centro absorbente 4A. En otras palabras, el rodillo de cambio 110 puede cambiar la dirección de transporte de la trama absorbente 4' transportada por un método de transporte transversal.

Según se ha descripto, la presente invención naturalmente incluye varias realizaciones que no están descriptas. En consecuencia, el alcance técnico de la presente invención debe determinarse solamente a través de las reivindicaciones que se acompañan basadas en la descripción precedente.

Que incorporada por completo como referencia la Solicitud de Patente Japonesa 2009-048412 (presentada en 2 de Marzo de 2009).

Aplicabilidad industrial

En consecuencia, dado que el transportador de trama y método de fabricación de artículos absorbentes de la presente invención proveen una más eficaz supresión de los defectos de fabricación en los absorbentes incluidos en una trama absorbente de manera continua y que cada uno incluye un centro absorbente y un elemento de recubrimiento, en el caso de cambiar la dirección de transporte de la trama absorbente en 90° o más, resultan de utilidad en la tecnología de fabricación de artículo absorbentes.

Listado de referencias

- 1 artículo absorbente
- 2 lámina superior
- 3 lámina inferior
- 4 absorbente
- 4' trama de absorbente
- 4A centro absorbente
- 4A' polvo mixto
- 4B primera trama
- 4C segunda trama
- 5 lámina impermeable
- 6A frunce de cintura
- 6B frunce de pierna
- 7, 7A, 7B trama
- 10 porción de línea de cintura anterior
- 10A borde lateral
- 20 porción de línea de cintura posterior
- 20A borde lateral

JUN-082

- 30 porción de entrepierna
- 40 aberturas que circundan las piernas
- 50 porción de empalme
- 50A región de empalme
- 60 aberturas de cintura
- 100 transportador de trama
- 110 rodillo de cambio
- 110A múltiples rodillos de cambio
- 111 centro de eje
- 120 sistema transportador
- 121 rodillo
- 122 correa
- 123 unidad de vacío

Reivindicaciones

1. Un transportador de trama usado en la fabricación de un absorbente que incluye un centro absorbente y un elemento de recubrimiento que cubre el centro absorbente, y que transporta una trama absorbente que incluye el centro absorbente interpuesto entre un par de tramas para formar el elemento de recubrimiento, caracterizado porque comprende un mecanismo de cambio de dirección configurado para cambiar una dirección de transporte de la trama absorbente en 90° o más,

el espesor (t1) del centro absorbente es mayor que a espesor (t2) del elemento de recubrimiento, en tanto

el mecanismo de cambio de dirección cambia la dirección de transporte de la trama absorbente que pasa por el mecanismo de cambio, de manera que la trama absorbente gire en la dirección de transporte a través de una distancia de rotación (L1) que es mayor que una longitud (L2) del centro absorbente cuando la trama absorbente es vista a lo largo una superficie de la trama absorbente en una dirección transversal perpendicular a la dirección de transporte de la trama absorbente.

2. El transportador de trama de acuerdo a la Reivindicación 1, caracterizado porque

el mecanismo de cambio de dirección incluye un rodillo, y

la distancia de rotación (L1) de la trama absorbente es una longitud de una semi-circunferencia del rodillo.

3. El transportador de trama de acuerdo a la Reivindicación 1, caracterizado porque el mecanismo de cambio de dirección incluye una pluralidad de rodillos.

4. El transportador de trama de acuerdo a la Reivindicación 1, caracterizado porque el mecanismo de cambio de dirección incluye:

una pluralidad de rodillos; y

una correa sin fin configurada para transportar la trama absorbente y rotar sobre la pluralidad de rodillos.

5. El transportador de trama de acuerdo a cualquiera de las Reivindicaciones 1 a 4, caracterizado porque la distancia de rotación (L1) de la trama absorbente es al menos dos veces la longitud (L2) del centro absorbente en la dirección de transporte de la trama absorbente.

6. El transportador de trama de acuerdo a la Reivindicación 5, caracterizado porque el mecanismo de cambio de dirección soporta los dos centros absorbentes a la vez.

7. El transportador de trama de acuerdo a cualquiera de las Reivindicaciones 1 a 6, caracterizado porque los centros absorbentes están dispuestos sobre un conjunto de los elementos de recubrimiento a intervalos predeterminados.

8. Un método de trabajo usado durante la fabricación de un absorbente que posee un centro absorbente y un elemento de recubrimiento que cubre el centro absorbente, caracterizado porque comprende los pasos de:

transportar una trama absorbente que incluye el centro absorbente interpuesto entre un par de tramas para formar el elemento de recubrimiento; y

cambiar una dirección de transporte de la trama absorbente en 90° o más mediante un mecanismo de cambio

JUN-082

de dirección de un transportador de trama, en tanto

un espesor (t_1) del centro absorbente es mayor que un espesor (t_2) del elemento de recubrimiento, donde

el mecanismo de cambio de dirección cambia la dirección de transporte de la trama absorbente que pasa por el mecanismo de cambio, de manera que la trama absorbente gire en la dirección de transporte a través de una distancia de rotación (L_1) que es mayor que una longitud (L_2) del centro absorbente cuando la trama absorbente es vista a lo largo una superficie de la trama absorbente en una dirección transversal perpendicular a la dirección de transporte de la trama absorbente.

Resumen de la invención

El transportador de trama 100 de acuerdo a la presente invención se usa para fabricar un absorbente 4 que incluye un centro absorbente 4A y un elemento de recubrimiento que cubre el centro absorbente 4A, y transporta una trama absorbente 4' que incluye el centro absorbente 4A interpuesto entre un par de tramas 4B y 4C para formar el elemento de recubrimiento. Un espesor (t_1) del centro absorbente 4A es mayor que un espesor (t_2) del elemento de recubrimiento. El transportador de trama 100 incluye un mecanismo de cambio de dirección (por ejemplo, un rodillo de cambio 110) que cambia una dirección de transporte de la trama absorbente 4' en 90° o más. La distancia de rotación (L_1) de la trama absorbente 4, es decir, la longitud de una semicircunferencia del rodillo de cambio 110, es mayor que la longitud (L_2) de cada uno de los centros absorbentes 4A en la dirección de transporte MD de la trama absorbente 4'.

FIG. 2

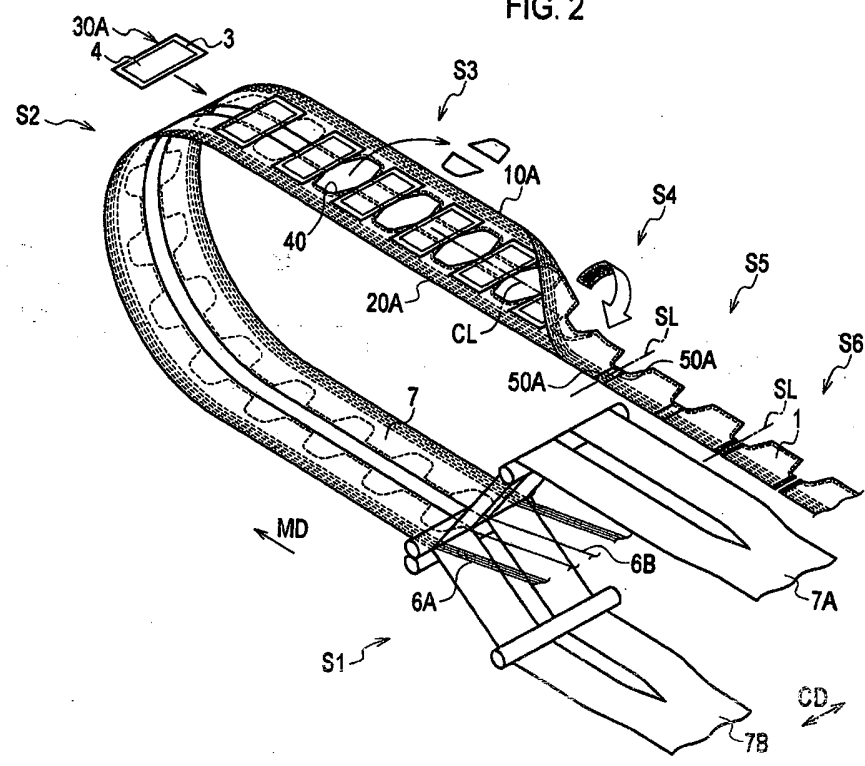


FIG. 3

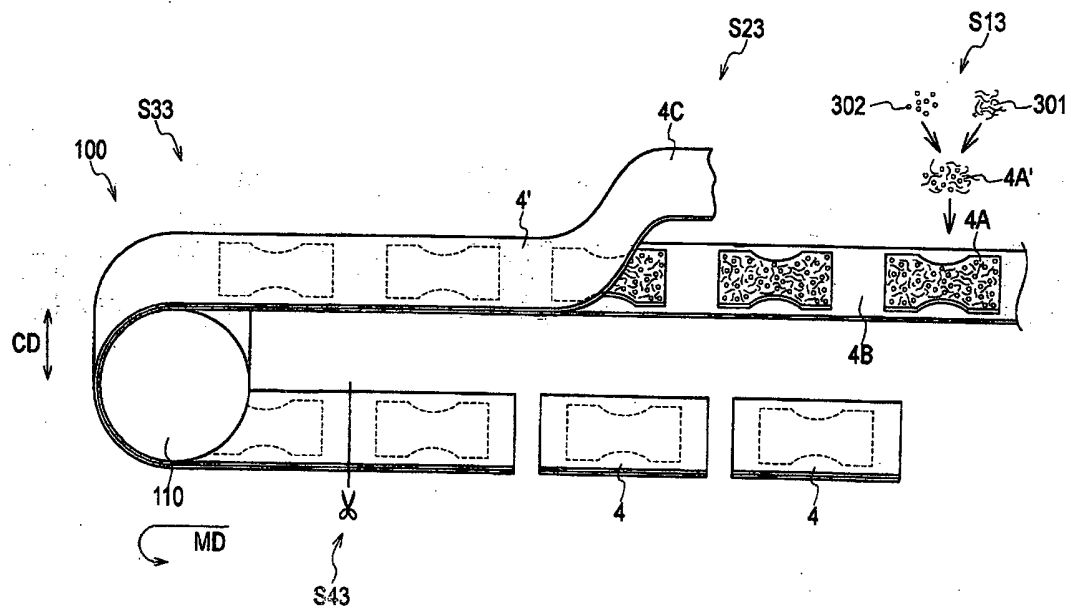


FIG. 4

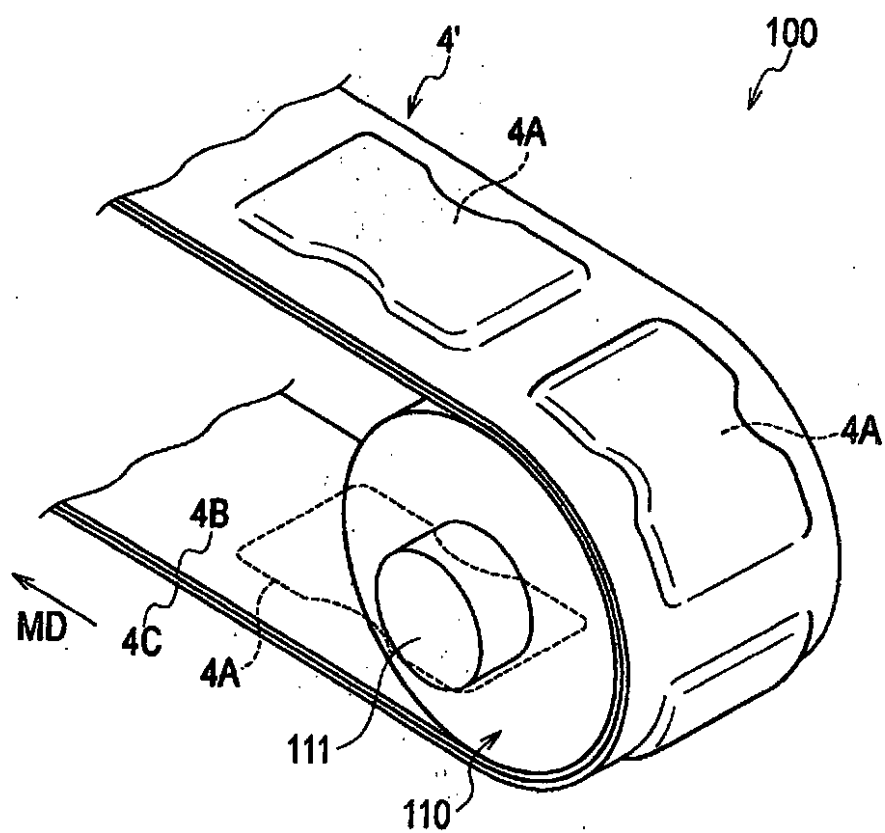


FIG. 5

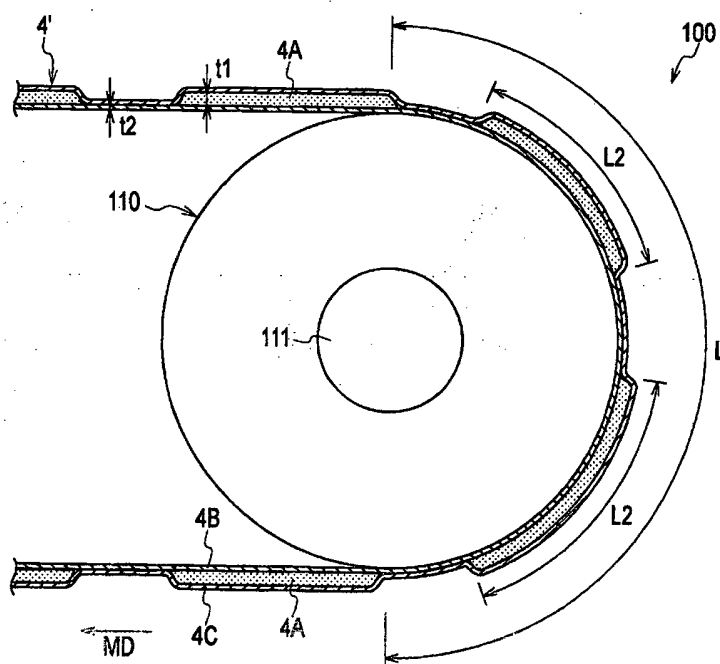


FIG. 6

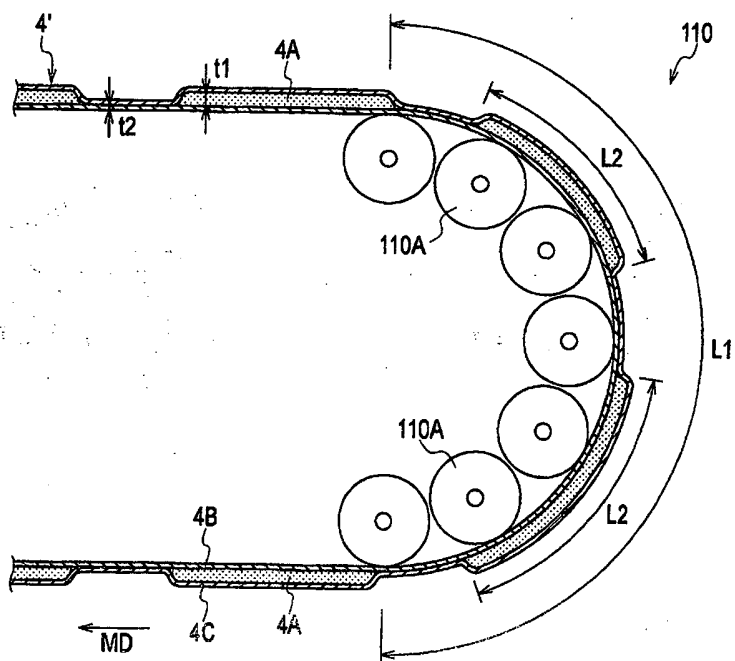
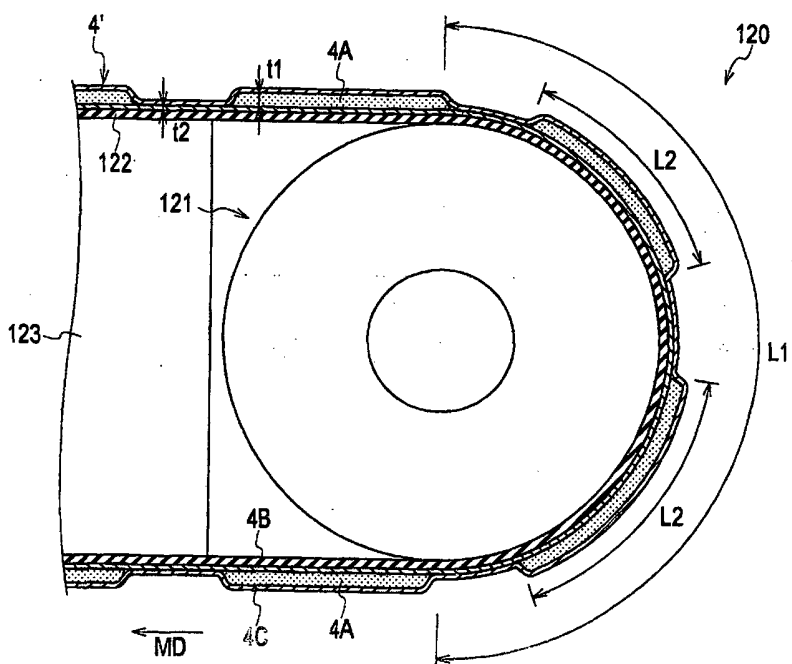


FIG. 7



DESCRIPTIONTitle of Invention

WEB CONVEYOR AND METHOD OF MANUFACTURING ABSORBENT

5 ARTICLE

Technical Field

The present disclosure relates to a web conveyor for use in manufacturing absorbers, each including an absorber core and a covering member covering the absorber core, to convey an absorber web including the absorber cores sandwiched between a pair of webs forming the covering members. The disclosure also relates to a method of manufacturing absorbent articles using such a web conveyor.

Background Art

An absorbent article, such as a disposable diaper or a sanitary napkin, includes an absorber for absorbing body fluid of a person to wear the absorbent article. In general, the absorber is formed of: an absorber core made of ground pulp and superabsorbent polymer particles (SAP), or the like; and a covering member, such as tissue, covering the absorber core (see Patent Literature 1, for example).

Specifically, in an absorber manufacturing process, firstly, a pulp sheet is ground by a grinder, and thereby ground pulp is prepared. Then, superabsorbent polymer particles are mixed into the ground pulp passing a pulp

supply duct, thereby obtaining mixed powder.

Thereafter, the mixed powder is gathered by a core forming and laminating drum to form absorber cores, and the absorber cores thus formed are laminated at
5 predetermined intervals on a web being conveyed and including a continuum of covering members. Then, a web including a continuum of covering members is further laminated on the web on which the absorber cores are laminated, thereby obtaining an absorber web which
10 includes the absorber cores sandwiched between the pair of webs.

Subsequently, the absorber web is cut at predetermined intervals, in a direction perpendicular to a conveyance direction of the absorber web being
15 conveyed. In this way, absorbers are manufactured.

During manufacture of absorbers, the conveyance direction of the absorber web needs to be changed by 90° or more in some cases, to save some space in the production line. For such changing of the conveyance direction of
20 the absorber web by 90° or more, a roller is used in general.

However, the inventors have discovered that when the conveyance direction of the absorber web is changed by 90° or more by a roller, the web may be creased due
25 to the absorber cores which are thicker and softer than the web.

The inventors have especially noted that when the absorber web conveyed on the outermost side, in a radial direction, of the roller is creased, the absorber cores,

sandwiched by the webs including the continuum of covering members, cannot be spread out uniformly. This may cause each of the absorber cores to be non-uniformly deformed or the web to get ripped. Such manufacturing defects need to be reliably suppressed when a change in the conveyance direction of the absorber web by 90° or more is required.

Citation List

10

~~{Patent Literature}~~

~~——{Patent Literature}PTL 1——~~: Japanese Patent Application Publication No. Hei 11-320742 (pp. 2 and 3, Fig. 4)

15

SUMMARY

20

~~——~~Summary

To solve the above-described problem, the present invention has the following aspects. A aspect of the present invention provides a web conveyor used in manufacturing an absorber including an absorber core and a covering member covering the absorber core, and which conveys an absorber web including the absorber core sandwiched by a pair of webs to form the covering member, the web conveyor comprising a direction changing mechanism configured to change a conveyance direction

of the absorber web by 90° or more, a thickness (t1) of the absorber core is larger than a thickness (t2) of the covering member, wherein the direction changing mechanism changes the conveyance direction of the absorber web passing the changing mechanism, in such a way that the absorber web is rotated in the conveyance direction by a rotation distance (L1) which is larger than a length (L2) of the absorber core when the absorber web is seen along a surface of the absorber web in a cross direction perpendicular to the conveyance direction of the absorber web.

The aspect of the present invention can provide a web conveyor and a method of manufacturing an absorbent article which are capable of more reliably suppressing manufacturing defects in absorbers included in an absorber web in a continuous manner and each including an absorber core and a covering member, in the case of changing a conveyance direction of the absorber web.

20 | **Brief Description of THE Drawings**

| [Fig. 1] Fig. 1 is a partially cutaway, perspective view showing an absorbent article according to one or more embodiments.

| [Fig. 2] Fig. 2 is a diagram for explaining a relevant part of a method of manufacturing absorbent articles according to one or more embodiments.

| [Fig. 3] Fig. 3 is a diagram for explaining a relevant part of a method of manufacturing absorbers according to one or more embodiments.

[Fig. 4] Fig. 4 is a perspective view showing a region near a changing roller of a web conveyor according to one or more embodiments.

5 [Fig. 5] Fig. 5 is a side view of the region near the changing roller of the web conveyor of FIG. 4.

[Fig. 6] Fig. 6 is a side view similar to FIG.5 and showing Modified Example 1.

[Fig. 7] Fig. 7 is a side view similar to FIG.5 and showing Modified Example 2.

10

Detailed Description

Hereinafter, a web conveyor and a method of manufacturing an absorbent article according to one or more embodiments of the present invention will be described with reference to the accompanying drawings. Note that, in the following description and in the drawings, the same or similar numerals denote the same or similar elements. In addition, it should be noted that the drawings are schematic and are not to scale unless otherwise specified. Therefore, specific dimensions and the like should be determined in consideration of the following description. Moreover, the drawings do not necessarily reflect the real-life dimensional relationships and ratios of components.

25 Firstly, a configuration of an absorbent article 1 according to one or more embodiments will be explained with reference to Fig. 1 which is a partially cutaway perspective view showing the absorbent article 1. In this particularly illustrated embodiment, the absorbent

article 1 is a disposable pants-type diaper for adults.

As shown in Fig. 1, the absorbent article 1 mainly includes a top sheet 2, a back sheet 3, an absorber 4 and a waterproof sheet 5.

5 The top sheet 2 is adapted to come into contact with the skin of a person to wear the absorbent article 1 (hereinafter, "wearer"). The top sheet 2 is made of a liquid permeable sheet such as a nonwoven fabric or an apertured plastic film. The back sheet 3 is provided
10 outside the top sheet 2 (on the side facing away from the wearer). The back sheet 3 is made of a nonwoven fabric or the like.

 The absorber 4 is provided between the top sheet 2 and the back sheet 3, for absorbing excretion discharged
15 from the wearer. The absorber 4 is made of a mixture of ground pulp and superabsorbent polymer particles, or the like. The waterproof sheet 5 is provided between the back sheet 3 and the absorber 4, for blocking the permeation of the excretion from the wearer to the outside
20 of the absorbent article 1. The waterproof sheet 5 is made of a liquid impermeable sheet.

 The absorbent article 1 thus configured includes, in combination, a front waistline portion 10 to be fitted to the front waist of a wearer, a back waistline portion
25 20 to be fitted to the back waist of the wearer, and a crotch portion 30 to be fitted to the crotch of the wearer. Incidentally, leg-surrounding opening regions 40 into which the legs of the wearer are inserted are formed on both sides of the crotch portion 30.

The front waistline portion 10 and the back waistline portion 20 are joined together by joint portions 50, and thereby form a waistline opening to be fit around the body of the wearer. A waist gather 6A made of an elastic rubber strand or the like is provided to a peripheral edge of the front waistline portion 10 and the back waistline portion 20.

For example, to make the front waistline portion 10 and the back waistline portion 20 elastic in the cross direction perpendicular to the front-to-back direction from the front waistline portion 10 toward the back waistline portion 20, the front waistline portion 10 and the back waistline portion 20 may be provided with the waist gather 6A, or may themselves be made of elastic sheets.

The crotch portion 30 is provided between the front waistline portion 10 and the back waistline portion 20. Leg gathers 6B made of elastic rubber strands or the like are provided on both sides of the crotch portion 30.

For example, to make the crotch portion 30 elastic in the leg-encircling direction, the crotch portion 30 may be provided with the leg gathers 6B, or may itself be made of an elastic sheet.

Secondly, a method of manufacturing absorbent articles, such as the aforementioned absorbent article 1, according to one or more embodiments will be explained with reference to Fig. 2 which is a diagram for explaining a relevant part of the absorbent article manufacturing method.

As shown in Fig. 2, the method of manufacturing absorbent articles includes at least a waistline forming step S1, an absorber transferring step S2, a leg-surrounding forming step S3, a folding step S4, a joining step S5 and a cutting step S6.

In the waistline forming step S1, gathers (waist gathers 6A and/or leg gathers 6B) are placed between a web 7A and a web 7B, and thereby a web 7 to be processed into the front waistline portion 10 and the back waistline portion 20 is formed.

Note that the web 7 (webs 7A, 7B) during conveyance has elasticity in a cross direction CD (width direction) perpendicular to a conveyance direction MD (machine direction) of the web 7. In addition, the web 7 is asymmetrical with respect to a center line CL that bisects a width in the cross direction CD of the web 7 and extends in the conveyance direction MD of the web 7.

In the absorber transferring step S2, a crotch portion member 30A to form the crotch portion 30 is transferred onto the web 7, more specifically, between the front waistline portion 10 and the back waistline portion 20, after the waistline forming step S1. Here, the crotch portion member 30A includes the back sheet 3 and the absorber 4.

In the leg-surrounding forming step S3, the leg-surrounding opening regions 40 (so-called leg holes) are formed by cutting the web 7 (webs 7A, 7B) after the absorber transferring step S2. Here, the formation of the leg-surrounding opening region 40 does not

necessarily involve cutting only the web 7A and the web 7B, but may involve cutting, together with the web 7A and the web 7B, the back sheet 3 constituting the crotch portion member 30A.

- 5 Note that the absorber transferring step S2 and the leg-surrounding forming step S3 may be performed in the reverse order.

 In the folding step S4, the web 7 is folded in half along a folding line extending in the conveyance
10 direction MD of the web 7, by bringing a side edge 10A of the front waistline portion 10 toward a side edge 20A of the back waistline portion 20, after the leg-surrounding forming step S3.

- Note that, in this particularly illustrated
15 embodiment, the folding line is the center line CL. However, the folding line is not necessarily the center line CL, and may be shifted from the center line CL toward either the first side edge 10A or the second side edge 20A.

- 20 In the joining step S5, the folded parts of the web 7 are joined together in joint regions 50A through ultrasonic treatment or heat treatment after the folding step S4. Here, the joint regions 50A are to form the joint portions 50 of the absorbent article 1. The joint region
25 50A extends in the conveyance direction MD across an imaginary line SL which indicates a to-be-cut position and extends in the cross direction CD.

 In the cutting step S6, the web 7 joined in the joint regions 50A is cut along the imaginary lines SL after

the joining step S5. Thereby, the absorbent article 1 is manufactured.

Thirdly, a method of manufacturing absorbers, such as the aforementioned absorber 4, in accordance with one or more embodiments will be explained with reference to Fig. 3 which is a diagram for explaining a relevant part of the absorber manufacturing method.

As shown in Fig. 3, the absorber 4 is formed of: an absorber core 4A made of ground pulp and superabsorbent polymer particles (SAP), or the like; and a covering member, such as tissue, covering the absorber core 4A. The method of manufacturing thus configured absorber 4 includes at least a powder generating step S13, a core forming and laminating step S23, a conveyance direction changing step S33 and a web cutting step S43.

In the powder generating step S13, a grinder (not shown) prepares ground pulp 301 by grinding a pulp sheet (not shown). Then, superabsorbent polymer particles 302 are mixed into the ground pulp 301 passing a pulp supply duct (not shown), thereby obtaining mixed powder 4A'.

In the core forming and laminating step S23, a core forming and laminating drum (not shown) gathers the mixed powder 4A' to form the absorber core 4A, and then laminates the thus formed absorber core 4A on a first web 4B being conveyed, at predetermined intervals in the conveyance direction MD of the first web 4B. The first web 4B is made of tissue or the like and including a continuum of covering members to be parts of the respective absorber cores 4A. Thereafter, a second web

4C is laminated on the first web 4B, on which the multiple absorber cores 4A are laminated, to obtain an absorber web 4'. The second web 4C is made of tissue or the like and including a continuum of covering members to be parts
5 of the respective absorber cores 4A.

Here, a thickness (t1) of the absorber core 4A is larger than the thickness of the covering member, i.e., a thickness (t2) of the first or second web 4B, 4C (see Fig. 5).

10 After the core forming and laminating step S23, the absorber web 4' is conveyed by driving multiple rollers (not illustrated), in a state where the absorber cores 4A are sandwiched by the pair of the first and second webs 4B and 4C forming the covering members.

15 In the conveyance direction changing step S33, the conveyance direction MD of the absorber web 4' is changed by a changing roller 110 of a web conveyor 100 to be described later. The web conveyor 100 will be described later in detail.

20 In the web cutting step S43, the thus conveyed absorber web 4' is further conveyed by rotation of a rotating drum (not shown), and is cut at predetermined intervals, in the cross direction CD perpendicular to the conveyance direction MD of the absorber web 4' by
25 a cutter roller (not shown) disposed to face an outer circumferential surface of the rotating drum. Thereby, absorbers 4 are separated from each other. Incidentally, the absorber 4 is elongated in the direction from the front waistline portion 10 to the back waistline portion

20 (see Fig. 1).

Fourthly, a configuration of the web conveyor 100 used in the aforementioned conveyance direction changing step S33 will be explained with reference to Figs. 4-5.

5 The web conveyor 100 conveys the absorber web including the absorber core sandwiched by a pair of webs to form the covering member. The web conveyor 100 comprises a direction changing mechanism configured to change a conveyance direction of the absorber web by 90°
10 or more, wherein the thickness (t1) of the absorber core is larger than The thickness (t2) of the covering member, and wherein the direction changing mechanism changes the conveyance direction of the absorber web passing the changing mechanism, in such a way that the absorber web
15 is rotated in the conveyance direction by a rotation distance (L1) which is larger than a length (L2) of the absorber core when the absorber web is seen along a surface of the absorber web in a cross direction perpendicular to the conveyance direction of the absorber
20 web.

Fig. 4 is a perspective view showing a region near the changing roller 110 of the web conveyor 100 according to one or more embodiments. Fig. 5 is a side view of the region near the changing roller 110 of the web conveyor
25 100 as seen in a shaft direction of the changing roller 110.

As shown in Figs. 4 and 5, the web conveyor 100 includes a direction changing mechanism configured to change the conveyance direction MD of the absorber web

4' by 90° or more, the absorber web 4' including the
aforementioned absorbers 4. In this particularly
illustrated embodiment, the direction changing mechanism
turns the conveyance direction MD of the absorber web
5 4' around (i.e., by 180°).

The direction changing mechanism includes the
changing roller 110. When the conveyance direction MD
of the absorber web 4' is not required to be changed,
the web conveyor 100 conveys the absorber web 4' by
10 driving the multiple rollers (not illustrated).

The changing roller 110 rotates about a shaft core
111 which defines a rotational axis about which the
absorber web 4' is to be rotated to change the conveyance
direction. The changing roller 110 turns the conveyance
15 direction MD of the absorber web 4' around while
supporting the absorber web 4'.

As best seen in FIG. 5, when the absorber web 4'
is seen along the rotational axis, i.e., in the shaft
direction of the changing roller 110, a rotation distance
20 (L1) of the absorber web 4', that is, the distance over
which the absorber web 4' travels in a rotational movement
about the rotational axis, is longer than a length (L2)
of each of the absorber cores 4A in the conveyance
direction MD of the absorber web 4'. In the particularly
25 illustrated embodiment when the changing roller 110 turns
the conveyance direction MD of the absorber web 4' around
(i.e., by 180°), the rotation distance $(L1 \rightarrow \frac{1}{2}C)$ of the
absorber web 4' is the length of a semi-circumference
of the changing roller 110.

Here, seeing the absorber web 4' along the rotational axis, i.e., in shaft the direction of the changing roller 110, means seeing the absorber web 4' along a surface of the absorber web 4' in the cross
5 direction CD perpendicular to the conveyance direction MD of the absorber web 4'.

It is especially preferable that the rotation distance (L1) of the absorber web 4' be at least twice as large as the length (L2) of the absorber core 4A in
10 the conveyance direction MD of the absorber web 4' when the absorber web 4' is seen in the shaft direction of the changing roller 110.

The changing roller 110 supports two absorber cores 4A at once. Specifically, while rotating, the changing
15 roller 110 always has two absorber cores 4A of the absorber web 4' being conveyed, on its semi-circle (i.e., L1 in FIG. 5).

The length (L2) of the absorber core 4A in the conveyance direction MD of the absorber web 4'
20 corresponds to the length of the absorber 4 in the longitudinal direction (that is, the cross direction CD shown in Fig. 2). In other words, the changing roller 110 changes the conveyance direction MD of the absorber web 4' conveyed by a lengthwise conveying method.

25 In the above-described embodiment, when the thickness (t1) of the absorber core 4A is larger than the thickness (t2) of the covering member, that is, the thickness of the first and second web 4B, 4C, the rotation distance (L1) of the absorber web 4' when the absorber

web 4' is seen in the shaft direction of the changing roller 110, that is, the length of the semi-circumference of the changing roller 110, is larger than the length (L2) of the absorber core 4A in the conveyance direction MD of the absorber web 4'. With this configuration, the difference in diameter between the first web 4B conveyed in contact with the changing roller 110 and the second web 4C conveyed on the outermost side, in a radial direction, of the changing roller 110 is smaller, and hence the second web 4C is less likely to stretch, than in a case where the rotation distance (L1) of the absorber web 4' is shorter than the length (L2) of the absorber core 4A. This reduces unnecessary stress applied to the second web 4C, and more reliably suppresses creasing or ripping of the second web 4C. In addition, since the second web 4C is less likely to be creased, the absorber core 4A is stretched out uniformly, and is hence prevented from being deformed non-uniformly. In this way, manufacturing defects in the absorbers 4 can be suppressed more reliably.

However, if the thickness (t1) of the absorber core 4A is smaller than the thickness (t2) of the first or second web 4B, 4C, the difference in diameter between the first web 4B conveyed in contact with the changing roller 110 and the second web 4C conveyed on the outermost side, in the radial direction, of the changing roller 110 is already small. In such a case, the second web 4C is less likely to be creased or ripped, and therefore, the rotation distance (L1) of the absorber web 4' is not

required (even though it might be still preferred) to be larger than the length (L2) of the absorber core 4A in the conveyance direction MD of the absorber web 4'.

In this particularly illustrated embodiment, it is preferable that the rotation distance (L1) of the absorber web 4' be at least twice as large as the length (L2) of the absorber core 4A in the conveyance direction MD of the absorber web 4'. Moreover, the changing roller 110 supports two absorber cores 4A at once. With this configuration, the difference in diameter between the first web 4B and the second web 4C becomes even smaller, and the second web 4C is certainly less likely to stretch, than in a case where the rotation distance (L1) of the absorber web 4' is shorter than the length (L2) of the absorber core 4A. This further reduces unnecessary stress applied to the second web 4C, and further reliably suppresses creasing or ripping of the second web 4C.

Especially when the changing roller 110 turns the conveyance direction MD of the absorber web 4' around, the disclosed embodiments can reliably suppress creasing or ripping of the second web 4C, and is hence effective.

Comparative Evaluation.

Next, comparative evaluation performed by using changing rollers according to the following Comparative Examples and Examples will be described to make the effects disclosed herein clearer. Note that the present invention is not intended to be limited by the examples.

Configurations and evaluation results of the changing rollers according to the Comparative Examples

and Examples will be described with reference to Table
1.

[Table 1]

	Comparativ e Example 1	Comparativ e Example 2	Exempl e 1	Exempl e 2
Rotation distance (L1) of absorber web	95 mm	315 mm	285 mm	700 mm
Length (L2) of absorber core	190 mm	350 mm	190 mm	350 mm
L1:L2 (ratio)	0.5:1	0.9:1	1.5:1	2:1
Thicknes s (t1) of absorber core	5 mm	9 mm	5 mm	6 mm
Thicknes s (t2) of covering member	0.1 mm	0.1 mm	0.1 mm	0.1 mm
Creased or not	Yes	Yes	No	No

The following facts were revealed as shown in Table

5 1. When the absorber web 4' is turned around by the
changing roller according to one of Comparative Examples

1 and 2, the second web 4C conveyed on the outermost side, in the radial direction, of the changing roller is creased because the rotation distance (L1) of the absorber web 4' is smaller than the length (L2) of the absorber core 4A.

When the absorber web 4' is turned around by the changing roller 110 of one of Examples 1 and 2, on the other hand, the second web 4C conveyed on the outermost side, in the radial direction, of the changing roller 110 is not creased because the rotation distance (L1) of the absorber web 4' is larger than the length (L2) of the absorber core 4A.

Modified Examples

The direction changing mechanism according to the foregoing description is configured only by the changing roller 110. Alternatively, direction changing mechanisms according to modified examples may include the following modifications. Here, the explanation will be provided mainly for the differences from the foregoing description, with the same numerals denoting the same elements.

Modified Example 1

Firstly, a configuration of a direction changing mechanism according to Modified Example 1 will be explained with reference to Fig. 6 which is a side view similar to FIG.5 and showing Modified Example 1.

As shown in Fig. 6, the direction changing mechanism

includes multiple changing rollers 110A which are arranged around a rotational axis similar to that defined by the shaft 111 in FIG.5, and are rotatable about axes parallel to the rotational axis. In this case as well, the multiple changing rollers 110A change the conveyor direction MD of the absorber web 4' passing the multiple changing rollers 110A, in such a way that the absorber web 4' is rotated, while being supported by the changing rollers 110A, about the rotational axis in the conveyance direction MD by the rotation distance (L1) which is larger than the length (L2) of the absorber core 4A when seen in the shaft direction of the changing rollers 110A, i.e., along the rotational axis.

15 Modified Example 2

Secondly, a configuration of a direction changing mechanism according to Modified Example 2 will be explained with reference to Fig. 7 which is a side view similar to FIG.5 and showing Modified Example 2.

20 As shown in Fig. 7, the direction changing mechanism includes the conveyor system 120. The conveyor system 120 includes: multiple rollers 121 (only one roller 121 is shown) which are rotatable about a rotational axis similar to that defined by the shaft 111 in FIG. 5; an endless belt 122 configured to rotate around the multiple rollers 121 and convey the absorber web 4'; and a vacuum unit 123 configured to suck the absorber web 4' onto the belt 122. Here, multiple vacuum holes (not illustrated) for sucking the absorber web 4' are formed in the belt

122.

In this case as well, when seen in the shaft direction of the rollers 121, the conveyor system 120 changes the conveyor direction MD of the absorber web 4' passing the belt 122, in such a way that the absorber web 4' is rotated about the rotational axis in the conveyance direction MD by the rotation distance (L1) which is larger than the length (L2) of the absorber core 4A.

10 Note that the conveyor system 120 does not necessarily include the vacuum unit 123, as long as it includes at least one roller 121 and the belt 122.

Further Embodiments

15 As described above, details of several embodiments have been exemplarily disclosed. However, it should not be understood that the description and drawings constituting part of this disclosure limit the present invention. Based on this disclosure, those skilled in the art may come up with various alternative embodiments, examples and application techniques.

For example, the following additional embodiments can be envisaged. Specifically, the absorbent article 1 has been described as including the front waistline portion 10, the back waistline portion 20 and the crotch portion 30. However, the absorbent article 1 is not limited to this configuration, but may be formed entirely in a single unit. In this case, needless to say, a different method of manufacturing such an absorbent

article is employed.

Additionally, a description has been provided for the web conveyor used to convey the absorbers 4 for the absorbent articles 1 (so-called disposal diapers).

5 However, the web conveyor is not limited to such use. For example, the web conveyor may be used to convey absorbers 4 for sanitary napkins, panty liners or the like.

Moreover, a description has been provided for the
10 leg-surrounding opening region 40 formed by cutting the web 7A and the web 7B. However, the formation of the leg-surrounding opening region 40 is not limited to this arrangement. The leg-surrounding opening region 40 may be formed by cutting, together with the web 7A and the
15 web 7B, the back sheet 3 constituting the crotch portion member 30A.

Furthermore, a description has been provided for the web conveyor configured to convey the absorber web 4' including the absorber cores 4A sandwiched between
20 the webs 4A and 4B. However, the web conveyor is not limited to this configuration. For example, the web conveyor may convey the back sheet 3 on which the absorbers 4 are laminated, as long as the conveyor is conveying a sheet including at least the absorbers 4.

25 In addition, a description has been provided for the changing roller 110 which turns the conveyor direction MD of the absorber web 4' around. However, the changing roller 110 is not limited to this particular turning angle. For example, the changing roller 110 may

change the conveyance direction MD of the absorber web 4' by any angle of 90° or more.

Further, a description has been provided for the changing roller 110 which supports two absorber cores 4A at once. However, the changing roller 110 is not limited to this arrangement. The changing roller 110 may support three or more absorber cores 4A at once. In other words, what is needed is that the rotation distance (L1) of the absorber web 4' is longer than the length (L2) of the absorber core 4A in the conveyance direction MD of the absorber web 4'.

Furthermore, the length (L2) of the absorber core 4A in the conveyance direction MD of the absorber web 4' has been described as being corresponding to the length of the absorber 4 in the longitudinal direction. However, the length (L2) is not limited to such length, and may correspond to the width of the absorber core 4A. In other words, the changing roller 110 may change the conveyance direction of the absorber web 4' conveyed by a crosswise conveying method.

As described above, the present invention naturally includes various embodiments which are not described herein. Accordingly, the technical scope of the present invention should be determined only by the matters to define the invention in the scope of claims regarded as appropriate based on the description.

The entire content of Japanese Patent Application 2009-048412 (filed on March 2, 2009) is incorporated herein by reference.

INDUSTRIAL APPLICABILITY

Therefore, since the web conveyor and method of manufacturing absorbent article of the present invention provides more reliably suppressing manufacturing
5 defects in absorbers included in an absorber web in a continuous manner and each including an absorber core and a covering member, in the case of changing a conveyance direction of the absorber web by 90° or more, it is useful in manufacturing technology for absorbent
10 articles.

Reference Signs List

- 1 absorbent article
- 2 top sheet
- 15 3 back sheet
- 4 absorber
- 4' absorber web
- 4A absorber core
- 4A' mixed powder
- 20 4B first web
- 4C second web
- 5 waterproof sheet
- 6A waist gather
- 6B leg gather
- 25 7, 7A, 7B web
- 10 front waistline portion
- 10A side edge
- 20 back waistline portion
- 20A side edge

	30	crotch portion
	40	leg-surrounding ~~openings~~ <u>opening region</u>
	50	joint portion
	50A	joint region
5	60	waist ~~openings~~ <u>opening region</u>
	100	web conveyor
	110	changing roller
	110A	multiple changing rollers
	111	shaft core
10	120	conveyor system
	121	roller
	122	belt
	123	vacuum unit

CLAIMS

[Claim 1]

A web conveyor
5 used in manufacturing an absorber including an
absorber core and a covering member covering
the absorber core, and
which conveys an absorber web including the absorber
core sandwiched by a pair of webs to form the covering
10 member,
the web conveyor comprising a direction changing
mechanism configured to change a conveyance direction
of the absorber web by 90° or more,
a thickness (t1) of the absorber core is larger than
15 a thickness (t2) of the covering member,
wherein
the direction changing mechanism changes the
conveyance direction of the absorber web passing the
changing mechanism, in such a way that the absorber web
20 is rotated in the conveyance direction by a rotation
distance (L1) which is larger than a length (L2) of the
absorber core when the absorber web is seen along a
surface of the absorber web in a cross direction
perpendicular to the conveyance direction of the absorber
25 web.

[Claim 2]

The web conveyor according to claim 1, wherein
the direction changing mechanism includes a roller,

and

the rotation distance (L1) of the absorber web is a length of a semi-circumference of the roller.

5 [Claim 3]

The web conveyor according to claim 1, wherein the direction changing mechanism includes a plurality of rollers.

10 [Claim 4]

The web conveyor according to claim 1, wherein the direction changing mechanism includes:

a plurality of rollers; and

an endless belt configured to convey the absorber
15 web and rotate around the plurality of rollers.

[Claim 5]

The web conveyor according to any one of claims 1 to 4, wherein the rotation distance (L1) of the absorber
20 web is at least twice as large as the length (L2) of the absorber core in the conveyance direction of the absorber web.

[Claim 6]

25 The web conveyor according to claim 5, wherein the direction changing mechanism supports two of the absorber cores at once.

[Claim 7]

The web conveyor according to any one of claims 1 to 6, wherein the absorber cores are disposed on a continuum of the covering members at predetermined intervals.

[Claim 8]

A working method used during manufacturing an absorber having an absorber core and a covering member covering the absorber core,

the method comprising the steps of:
conveying an absorber web including the absorber core sandwiched by a pair of webs to form the covering member; and

changing a conveyance direction of the absorber web by 90° or more by a direction changing mechanism of a web conveyor, and

wherein a thickness (t1) of the absorber core is larger than a thickness (t2) of the covering member, wherein

the direction changing mechanism changes the conveyance direction of the absorber web passing the changing mechanism, in such a way that the absorber web is rotated in the conveyance direction by a rotation distance (L1) which is larger than a length (L2) of the absorber core when the absorber web is seen along a surface of the absorber web in a cross direction perpendicular to the conveyance direction of the absorber web.

30

ABSTRACT

The web conveyer 100 is used for manufacturing a absorber 4 including an absorber core 4A and a covering member covering the absorber core 4A, and conveys an absorber web 4' including the absorber core 4A sandwiched by a pair of webs 4B and 4C to form the covering member. A thickness (t1) of the absorber core 4A is larger than a thickness (t2) of the covering member. The web conveyer 100 includes a direction changing mechanism (for example, a changing roller 110) which changes a conveyance direction of the absorber web 4' by 90° or more. A rotation distance (L1) of the absorber web 4, that is, the length of a semi-circumference of the changing roller 110, is larger than is longer than a length (L2) of each of the absorber cores 4A in the conveyance direction MD of the absorber web 4'.

FIG. 1

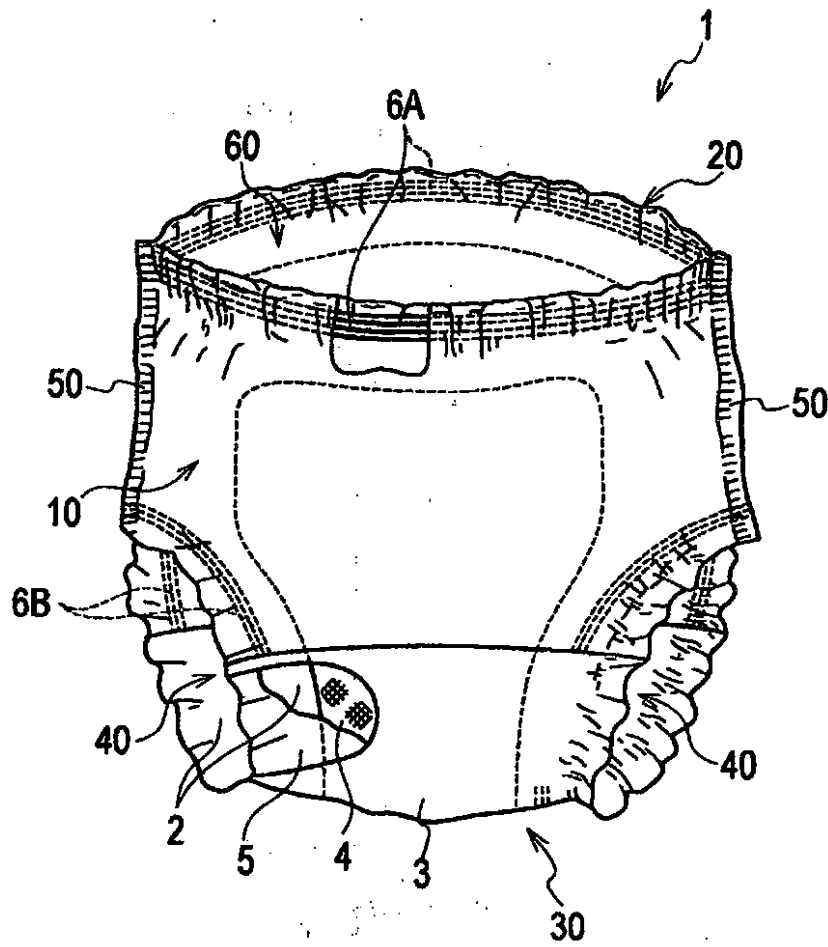


FIG. 2

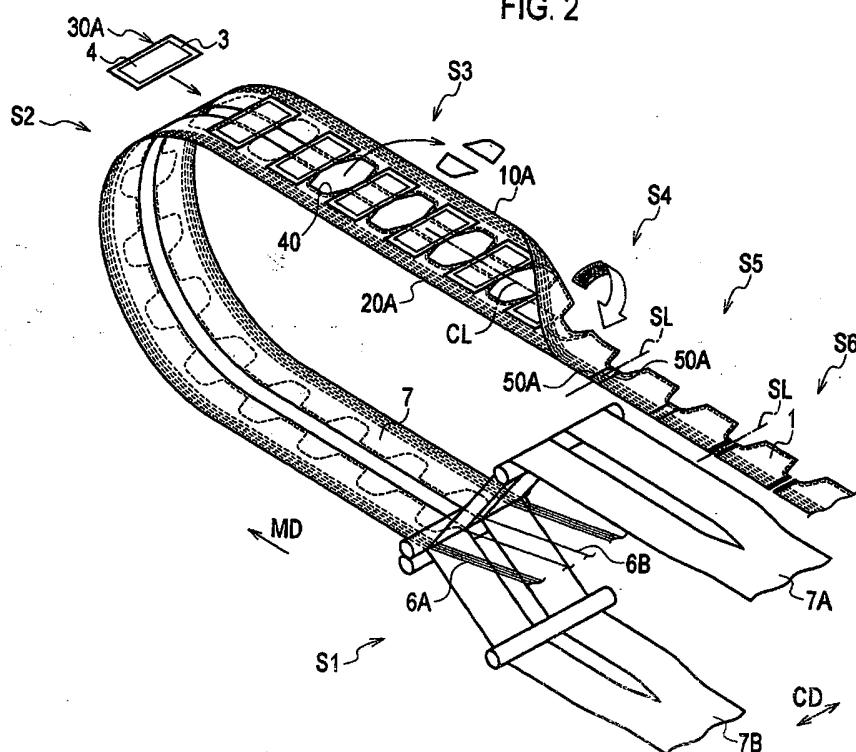


FIG. 4

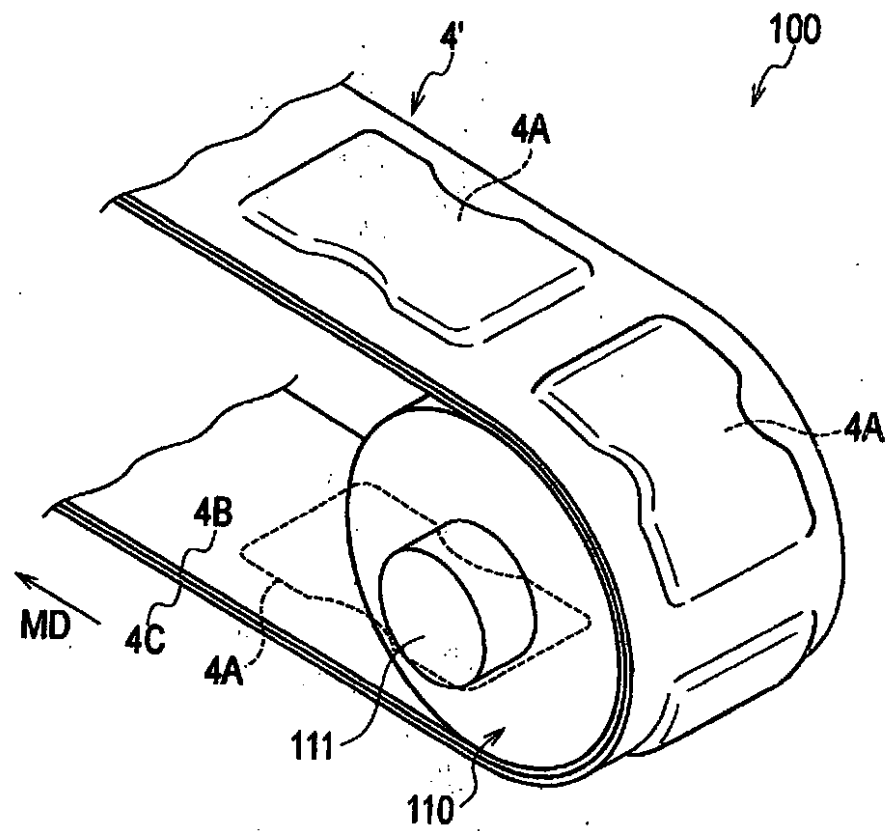
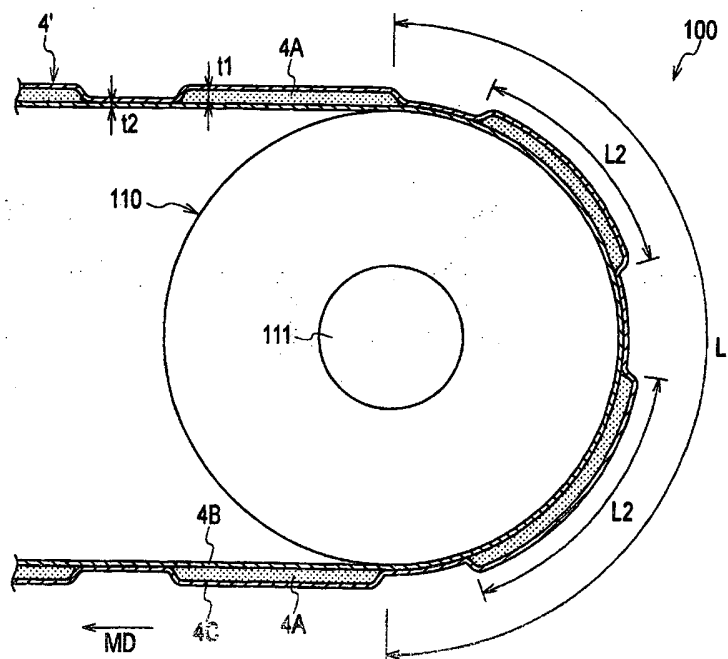
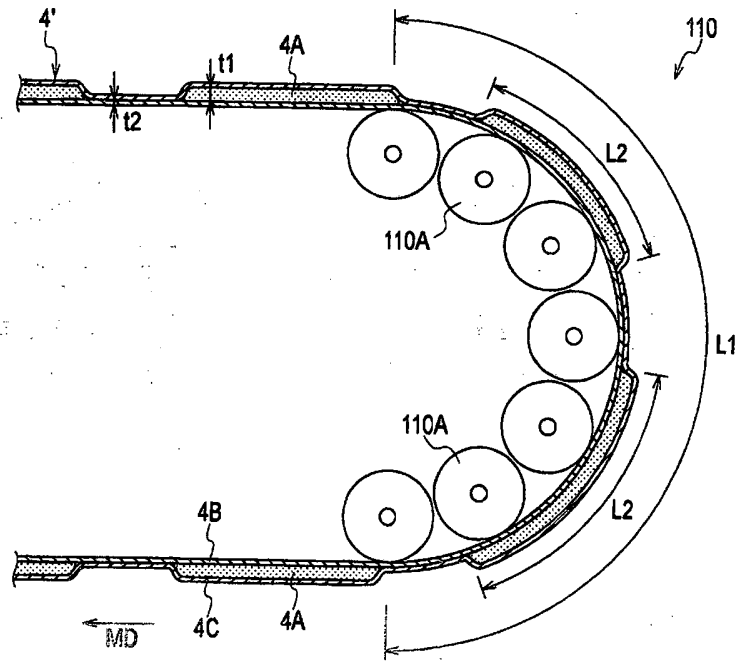


FIG. 5



3

FIG. 6



4c

U.D.C.
PRESENTACION
SOLICITUD
INTERNACIONAL

From the
INTERNATIONAL SEARCHING AUTHORITY

Toranomon Kotohira
Tower, 2-8, Toranomon
1-chome, Minato-ku, Tokyo
1050001 Japan

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY
(PCT Rule 43 *bis*.1)

Date of mailing
(day/month/year) 13.07.2010

FOR FURTHER ACTION
See paragraph 2 below

Priority date (day/month/year)
02.03.2009

Applicant
UNICHARM CORPORATION

1. This opinion contains indications relating to the following items:
- | | | |
|-------------------------------------|--------------|--|
| ☒ | Box No. I | Basis of the opinion |
| ☐ | Box No. II | Priority |
| ☐ | Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability |
| ☐ | Box No. IV | Lack of unity of invention |
| ☒ | Box No. V | Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| ☐ | Box No. VI | Certain documents cited |
| ☐ | Box No. VII | Certain defects in the international application |
| ☐ | Box No. VIII | Certain observations on the international application |
2. **FURTHER ACTION**
- If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.
- If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.
- For further options, see Form PCT/ISA/220.
3. For further details, see notes to Form PCT/ISA/220.

Date of completion of this opinion 05.07.2010

Name and mailing address of the ISAP

Authorized officer

3B	4027
----	------

Japan Patent Office

Ryoichi Ogawa

3-4-3, Kasumigaseki, Chiyoda-ku, Tokyo 100-8915, Japan

Telephone No. +81-3-3581-1101 Ext. 3320

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/JP2010/053733

Box No. 1	Basis of this opinion
1.	With regard to the language, this opinion has been established on the basis of: ☒ the international application in the language in which it was filed. ☐ a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).
2.	☐ This opinion has been established taking into account the rectification of an obvious mistake authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(b)).
3.	With regard to any nucleotide and/or amino acid sequence disclosed in the international application, this opinion has been established on the basis of a sequence listing filed or furnished: a. (means) ☐ on paper ☐ in electronic form b. (time) ☐ in the international application as filed ☐ together with the international application in electronic form ☐ subsequently to this Authority for the purposes of search
4.	☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5.	Additional comments:

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/JP2010/053733

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability, citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-8	YES
	Claims		NO
Inventive step (IS)	Claims	1-8	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-8	YES
	Claims		NO

2. Citations and explanations:

The subject matters of claims 1-8 are neither disclosed in any of the documents cited in the ISR nor obvious to a person skilled in the art.

From the INTERNATIONAL BUREAU

PCTNOTIFICATION CONCERNING
SUBMISSION OR TRANSMITTAL
OF PRIORITY DOCUMENT

(PCT Administrative Instructions, Section 411)

To:

MIYOSHI, Hidekazu
Toranomon Kotohira Tower, 2-8, Toranomon
1-chome, Minato-ku, Tokyo
1050001
JAPON

Date of mailing (day/month/year) 18 May 2010 (18.05.2010)	
Applicant's or agent's file reference JUN-082-PCT	IMPORTANT NOTIFICATION
International application No. PCT/JP2010/053733	International filing date (day/month/year) 02 March 2010 (02.03.2010)
International publication date (day/month/year) Not yet published	Priority date (day/month/year) 02 March 2009 (02.03.2009)
Applicant UNICHARM CORPORATION et al	

1. By means of this Form, which replaces any previously issued notification concerning submission or transmittal of priority documents, the applicant is hereby notified of the date of receipt by the International Bureau of the priority document(s) relating to all earlier application(s) whose priority is claimed. Unless otherwise indicated by the letters "NR", in the right-hand column or by an asterisk appearing next to a date of receipt, the priority document concerned was submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b).
2. (If applicable) The letters "NR" appearing in the right-hand column denote a priority document which, on the date of mailing of this Form, had not yet been received by the International Bureau under Rule 17.1(a) or (b). Where, under Rule 17.1(a), the priority document must be submitted by the applicant to the receiving Office or the International Bureau, but the applicant fails to submit the priority document within the applicable time limit under that Rule, the attention of the applicant is directed to Rule 17.1(c) which provides that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances.
3. (If applicable) An asterisk (*) appearing next to a date of receipt, in the right-hand column, denotes a priority document submitted or transmitted to the International Bureau but not in compliance with Rule 17.1(a) or (b) (the priority document was received after the time limit prescribed in Rule 17.1(a) or the request to prepare and transmit the priority document was submitted to the receiving Office after the applicable time limit under Rule 17.1(b)). Even though the priority document was not furnished in compliance with Rule 17.1(a) or (b), the International Bureau will nevertheless transmit a copy of the document to the designated Offices, for their consideration. In case such a copy is not accepted by the designated Office as the priority document, Rule 17.1(c) provides that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances.

<u>Priority date</u>	<u>Priority application No.</u>	<u>Country or regional Office or PCT receiving Office</u>	<u>Date of receipt of priority document</u>
02 March 2009 (02.03.2009)	2009-048412	JP	26 April 2010 (26.04.2010)

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. +41 22 338 82 70	Authorized officer Yoshiko Kuwahara e-mail PTU7.PCT@WIPO.INT Telephone No. +41 22 338 74 07
---	--

Form PCT/IB/304 (October 2005)

1/EGP6WMBQ0

From the INTERNATIONAL BUREAU

PCT

SECOND AND SUPPLEMENTARY NOTICE
INFORMING THE APPLICANT OF THE
COMMUNICATION OF THE INTERNATIONAL
APPLICATION (TO DESIGNATED OFFICES
WHICH APPLY THE 30 MONTH TIME
LIMIT UNDER ARTICLE 22(1))

(PCT Rule 47.1(c))

To:

MIYOSHI, Hidekazu
Toranomon Kotohira Tower, 2-8, Toranomon 1-chome,
Minato-ku, Tokyo
1050001
JAPON

Date of mailing (day/month/year)

07 July 2011 (07.07.2011)

Applicant's or agent's file reference

JUN-082-PCT

IMPORTANT NOTICE

International application No.

PCT/JP2010/053733

International filing date (day/month/year)

02 March 2010 (02.03.2010)

Priority date (day/month/year)

02 March 2009 (02.03.2009)

Applicant

UNICHARM CORPORATION et al

1. **ATTENTION:** For any designated Office(s), for which the time limit under Article 22(1), as in force from 1 April 2002 (30 months from the priority date), **does not apply**, please see Form PCT/IB/308(First Notice) issued previously.

2. Notice is hereby given that the following designated Office(s), for which the time limit under Article 22(1), as in force from 1 April 2002, **does apply**, has/have requested that the communication of the international application, as provided for in Article 20, be effected under Rule 93bis.1. The International Bureau has effected that communication on the date indicated below:
10 September 2010 (10.09.2010)

AU, AZ, BY, CN, CO, DZ, EP, HU, KG, KP, KR, MD, MK, MY, MZ, NA, NG, PG, RU, SY, TM, US

In accordance with Rule 47.1(c-bis)(i), 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).

3. The following designated Offices, for which the time limit under Article 22(1), as in force from 1 April 2002, **does apply**, have not requested, as at the time of mailing of the present notice, that the communication of the international application be effected under Rule 93bis.1 :

AE, AG, AL, AM, AO, AP, AT, BA, BB, BG, BH, BR, BW, BZ, CA, CH, CL, CR, CU, CZ, DE, DK, DM, DO, EA, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, ID, IL, IN, IS, KE, KM, KN, KZ, LA, LC, LK, LR, LS, LT, LY, MA, ME, MG, MN, MW, MX, NI, NO, NZ, OA, OM, PE, PH, PL, PT, RO, RS, SC, SD, SE, SG, SK, SL, SM, ST, SV, TH, TJ, TN, TR, TT, UA, UZ, VC, VN, ZA, ZM, ZW

In accordance with Rule 47.1(c-bis)(ii), those Offices accept the present notice as conclusive evidence that the Contracting State for which that Office acts as a designated Office does not require the furnishing, under Article 22, by the applicant of a copy of the international application.

4. **TIME LIMITS** for entry into the national phase

For the designated or elected Office(s) listed above, 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.

In practice, **time limits other than the 30-month time limit** will continue to apply, for various periods of time, in respect of certain of the designated or elected Office(s) listed above. For **regular updates on the applicable time limits** (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>.

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

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

Authorized officer

Gijsbertus Beijer

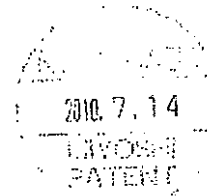
Facsimile No. +41 22 338 82 70

e-mail: ptu7.pct@wipo.int

PATENT COOPERATION TREATY PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)



Applicant's or agent's file reference JUN-082-PCT	FOR FURTHER ACTION	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
International application No. PCT/JP2010/053733	International filing date (day/month/year) 02.03.2010	(Earliest) Priority Date (day/month/year) 02.03.2009
Applicant UNICHARM CORPORATION		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 3 sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the language, the international search was carried out on the basis of:
- ☒ the international application in the language in which it was filed.
 - ☐ a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).
- b. ☐ This international search report has been established taking into account the rectification of an obvious mistake authorized by or notified to this Authority under Rule 91 (Rule 43.6bis(a)).
- c. ☐ With regard to any nucleotide and/or amino acid sequence disclosed in the international application, see Box No. I.
2. ☐ Certain claims were found unsearchable (see Box No. II).
3. ☐ Unity of invention is lacking (see Box No. III).
4. With regard to the title,
- ☒ the text is approved as submitted by the applicant.
 - ☐ the text has been established by this Authority to read as follows:

5. With regard to the abstract,

- ☒ the text is approved as submitted by the applicant.
- ☐ the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the drawings,

- a. the figure of the drawings to be published with the abstract is Figure No. 5
- ☒ as suggested by the applicant.
 - ☐ as selected by this Authority, because the applicant failed to suggest a figure.
 - ☐ as selected by this Authority, because this figure better characterizes the invention.
- b. ☐ none of the figures is to be published with the abstract.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2010/053733

A. CLASSIFICATION OF SUBJECT MATTER		
Int.Cl. A61F13/15 (2006.01) i, A61F13/49 (2006.01) i		
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)		
Int.Cl. A61F13/15, A61F13/49		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Published examined utility model applications of Japan 1922-1995 Published unexamined utility model applications of Japan 1971-2010 Registered utility model specifications of Japan 1956-2010 Published registered utility model applications of Japan 1954-2010		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 11-320742 A (UNI HARTS KK) 1999.11.24, Full text; all drawings (Family: none)	1-8
A	CD-ROM of the specification and drawings annexed to the written application of Japanese Utility Model Application No. 9972/1993 (Laid-open No. 59348/1994) (MISUZU F A KK) 1994.08.19, Full text; all drawings (Family: none)	1-8
A	JP 2008-029749 A (DAIO PAPER CORPORATION) 2008.02.14, Full text; all drawings (Family: none)	1-8
☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "I" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "Z" document member of the same patent family		
Date of the actual completion of the international search		Date of mailing of the international search report
05.07.2010		13.07.2010
Name and mailing address of the ISA/JP Japan Patent Office 3-4-3, Kasumigaseki, Chiyoda-ku, Tokyo 100-8915, Japan		Authorized officer Ryoichi Ogawa Telephone No. +81-3-3581-1101 Ext. 3320
		3B 4027

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2010/053733

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 64-500361 A (Weyerhaeuser Company) 1989.02.09, Full text; all drawings & US 4726807 A & US 4686631 A & US 4854985 A & US 4917682 A & US 4938821 A & EP 262221 A & EP 214183 A & WO 1986/004677 A1 & WO 1987/006189 A1	1-8
A	JP 2004-033549 A (Unicharm Corporation) 2004.02.05, Full text; all drawings & US 2005/0067093 A1 & EP 1532953 A1 & WO 2004/004618 A1	1-8
A	JP 3-143443 A (Oji Paper Co., Ltd.) 1991.06.19, Full text; all drawings (Family: none)	1-8



(51) International Patent Classification:
A61F 13/15 (2006.01) A61F 13/49 (2006.01)

(21) International Application Number:
PCT/JP2010/053733

(22) International Filing Date:
2 March 2010 (02.03.2010)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
2009-048412 2 March 2009 (02.03.2009) JP

(71) Applicant (for all designated States except US):
UNICHARM CORPORATION [JP/JP]; 182, Shimobun, Kinsei-cho, Shikokuchuo-shi, Ehime, 7990111 (JP).

(72) Inventor; and

(75) Inventor/Applicant (for US only): YAMAMOTO, Hiroki [JP/JP]; c/o Technical Center of UNICHARM CORPORATION, 1531-7, Wadahama, Toyohama-cho, Kanonji-shi, Kagawa, 7691602 (JP).

(74) Agents: MIYOSHI, Hidekazu et al.; Toranomon Kotohira Tower, 2-8, Toranomon 1-chome, Minato-ku, Tokyo, 1050001 (JP).

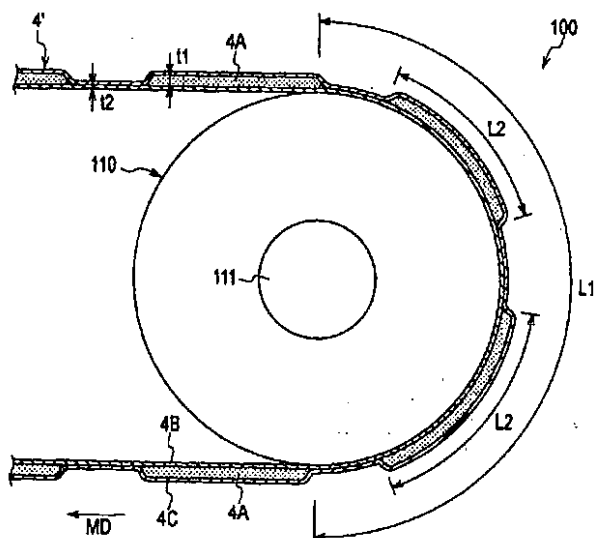
(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, NI, NO, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: WEB CONVEYOR AND METHOD OF MANUFACTURING ABSORBENT ARTICLE

FIG. 5



(57) Abstract: The web conveyor 100 is used for manufacturing a absorber 4 including an absorber core 4A and a covering member covering the absorber core 4A, and conveys an absorber web 4' including the absorber core 4A sandwiched by a pair of webs 4B and 4C to form the covering member. A thickness (t1) of the absorber core 4A is larger than a thickness (t2) of the covering member. The web conveyor 100 includes a direction changing mechanism (for example, a changing roller 110) which changes a conveyance direction of the absorber web 4' by 90° or more. A rotation distance (L1) of the absorber web 4, that is, the length of a semi-circumference of the changing roller 110, is larger than is longer than a length (L2) of each of the absorber cores 4A in the conveyance direction MD of the absorber web 4'.



Published:

— with international search report (Art. 21(3))

— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

DESCRIPTION

Title of Invention

WEB CONVEYOR AND METHOD OF MANUFACTURING ABSORBENT

5 ARTICLE

Technical Field

The present disclosure relates to a web conveyor for use in manufacturing absorbers, each including an absorber core and a covering member covering the absorber core, to convey an absorber web including the absorber cores sandwiched between a pair of webs forming the covering members. The disclosure also relates to a method of manufacturing absorbent articles using such a web conveyor.

Background Art

An absorbent article, such as a disposable diaper or a sanitary napkin, includes an absorber for absorbing body fluid of a person to wear the absorbent article. In general, the absorber is formed of: an absorber core made of ground pulp and superabsorbent polymer particles (SAP), or the like; and a covering member, such as tissue, covering the absorber core (see Patent Literature 1, for example).

Specifically, in an absorber manufacturing process, firstly, a pulp sheet is ground by a grinder, and thereby ground pulp is prepared. Then, superabsorbent polymer particles are mixed into the ground pulp passing a pulp

supply duct, thereby obtaining mixed powder.

Thereafter, the mixed powder is gathered by a core forming and laminating drum to form absorber cores, and the absorber cores thus formed are laminated at
5 predetermined intervals on a web being conveyed and including a continuum of covering members. Then, a web including a continuum of covering members is further laminated on the web on which the absorber cores are laminated, thereby obtaining an absorber web which
10 includes the absorber cores sandwiched between the pair of webs.

Subsequently, the absorber web is cut at predetermined intervals, in a direction perpendicular to a conveyance direction of the absorber web being
15 conveyed. In this way, absorbers are manufactured.

During manufacture of absorbers, the conveyance direction of the absorber web needs to be changed by 90° or more in some cases, to save some space in the production line. For such changing of the conveyance direction of
20 the absorber web by 90° or more, a roller is used in general.

However, the inventors have discovered that when the conveyance direction of the absorber web is changed by 90° or more by a roller, the web may be creased due
25 to the absorber cores which are thicker and softer than the web.

The inventors have especially noted that when the absorber web conveyed on the outermost side, in a radial direction, of the roller is creased, the absorber cores,

sandwiched by the webs including the continuum of covering members, cannot be spread out uniformly. This may cause each of the absorber cores to be non-uniformly deformed or the web to get ripped. Such manufacturing defects need to be reliably suppressed when a change in the conveyance direction of the absorber web by 90° or more is required.

Citation List

10

Patent Literature

PTL 1: Japanese Patent Application Publication No. Hei 11-320742 (pp. 2 and 3, Fig. 4)

15 Summary

To solve the above-described problem, the present invention has the following aspects. A aspect of the present invention provides a web conveyor used in manufacturing an absorber including an absorber core and a covering member covering the absorber core, and which conveys an absorber web including the absorber core sandwiched by a pair of webs to form the covering member, the web conveyor comprising a direction changing mechanism configured to change a conveyance direction of the absorber web by 90° or more, a thickness (t1) of the absorber core is larger than a thickness (t2) of the covering member, wherein the direction changing mechanism changes the conveyance direction of the absorber web passing the changing mechanism, in such a

way that the absorber web is rotated in the conveyance direction by a rotation distance (L1) which is larger than a length (L2) of the absorber core when the absorber web is seen along a surface of the absorber web in a cross
5 direction perpendicular to the conveyance direction of the absorber web.

The aspect of the present invention can provide a web conveyor and a method of manufacturing an absorbent article which are capable of more reliably suppressing
10 manufacturing defects in absorbers included in an absorber web in a continuous manner and each including an absorber core and a covering member, in the case of changing a conveyance direction of the absorber web.

15 **Brief Description of Drawings**

[Fig. 1] Fig. 1 is a partially cutaway, perspective view showing an absorbent article according to one or more embodiments.

[Fig. 2] Fig. 2 is a diagram for explaining a relevant
20 part of a method of manufacturing absorbent articles according to one or more embodiments.

[Fig. 3] Fig. 3 is a diagram for explaining a relevant part of a method of manufacturing absorbers according to one or more embodiments.

25 [Fig. 4] Fig. 4 is a perspective view showing a region near a changing roller of a web conveyor according to one or more embodiments.

[Fig. 5] Fig. 5 is a side view of the region near the changing roller of the web conveyor of FIG. 4.

5

[Fig. 6] Fig. 6 is a side view similar to FIG.5 and showing Modified Example 1.

[Fig. 7] Fig. 7 is a side view similar to FIG.5 and showing Modified Example 2.

5

Detailed Description

Hereinafter, a web conveyor and a method of manufacturing an absorbent article according to one or more embodiments of the present invention will be described with reference to the accompanying drawings. Note that, in the following description and in the drawings, the same or similar numerals denote the same or similar elements. In addition, it should be noted that the drawings are schematic and are not to scale unless otherwise specified. Therefore, specific dimensions and the like should be determined in consideration of the following description. Moreover, the drawings do not necessarily reflect the real-life dimensional relationships and ratios of components.

20 Firstly, a configuration of an absorbent article 1 according to one or more embodiments will be explained with reference to Fig. 1 which is a partially cutaway perspective view showing the absorbent article 1. In this particularly illustrated embodiment, the absorbent article 1 is a disposable pants-type diaper for adults.

25 As shown in Fig. 1, the absorbent article 1 mainly includes a top sheet 2, a back sheet 3, an absorber 4 and a waterproof sheet 5.

The top sheet 2 is adapted to come into contact with

6

the skin of a person to wear the absorbent article 1 (hereinafter, "wearer"). The top sheet 2 is made of a liquid permeable sheet such as a nonwoven fabric or an apertured plastic film. The back sheet 3 is provided
5 outside the top sheet 2 (on the side facing away from the wearer). The back sheet 3 is made of a nonwoven fabric or the like.

The absorber 4 is provided between the top sheet 2 and the back sheet 3, for absorbing excretion discharged
10 from the wearer. The absorber 4 is made of a mixture of ground pulp and superabsorbent polymer particles, or the like. The waterproof sheet 5 is provided between the back sheet 3 and the absorber 4, for blocking the permeation of the excretion from the wearer to the outside
15 of the absorbent article 1. The waterproof sheet 5 is made of a liquid impermeable sheet.

The absorbent article 1 thus configured includes, in combination, a front waistline portion 10 to be fitted to the front waist of a wearer, a back waistline portion
20 20 to be fitted to the back waist of the wearer, and a crotch portion 30 to be fitted to the crotch of the wearer. Incidentally, leg-surrounding opening regions 40 into which the legs of the wearer are inserted are formed on both sides of the crotch portion 30.

25 The front waistline portion 10 and the back waistline portion 20 are joined together by joint portions 50, and thereby form a waistline opening to be fit around the body of the wearer. A waist gather 6A made of an elastic rubber strand or the like is provided to

a peripheral edge of the front waistline portion 10 and the back waistline portion 20.

For example, to make the front waistline portion 10 and the back waistline portion 20 elastic in the cross direction perpendicular to the front-to-back direction from the front waistline portion 10 toward the back waistline portion 20, the front waistline portion 10 and the back waistline portion 20 may be provided with the waist gather 6A, or may themselves be made of elastic sheets.

The crotch portion 30 is provided between the front waistline portion 10 and the back waistline portion 20. Leg gathers 6B made of elastic rubber strands or the like are provided on both sides of the crotch portion 30.

For example, to make the crotch portion 30 elastic in the leg-encircling direction, the crotch portion 30 may be provided with the leg gathers 6B, or may itself be made of an elastic sheet.

Secondly, a method of manufacturing absorbent articles, such as the aforementioned absorbent article 1, according to one or more embodiments will be explained with reference to Fig. 2 which is a diagram for explaining a relevant part of the absorbent article manufacturing method.

As shown in Fig. 2, the method of manufacturing absorbent articles includes at least a waistline forming step S1, an absorber transferring step S2, a leg-surrounding forming step S3, a folding step S4, a joining step S5 and a cutting step S6.

In the waistline forming step S1, gathers (waist gathers 6A and/or leg gathers 6B) are placed between a web 7A and a web 7B, and thereby a web 7 to be processed into the front waistline portion 10 and the back waistline portion 20 is formed.

Note that the web 7 (webs 7A, 7B) during conveyance has elasticity in a cross direction CD (width direction) perpendicular to a conveyance direction MD (machine direction) of the web 7. In addition, the web 7 is asymmetrical with respect to a center line CL that bisects a width in the cross direction CD of the web 7 and extends in the conveyance direction MD of the web 7.

In the absorber transferring step S2, a crotch portion member 30A to form the crotch portion 30 is transferred onto the web 7, more specifically, between the front waistline portion 10 and the back waistline portion 20, after the waistline forming step S1. Here, the crotch portion member 30A includes the back sheet 3 and the absorber 4.

In the leg-surrounding forming step S3, the leg-surrounding opening regions 40 (so-called leg holes) are formed by cutting the web 7 (webs 7A, 7B) after the absorber transferring step S2. Here, the formation of the leg-surrounding opening region 40 does not necessarily involve cutting only the web 7A and the web 7B, but may involve cutting, together with the web 7A and the web 7B, the back sheet 3 constituting the crotch portion member 30A.

Note that the absorber transferring step S2 and the

leg-surrounding forming step S3 may be performed in the reverse order.

In the folding step S4, the web 7 is folded in half along a folding line extending in the conveyance
5 direction MD of the web 7, by bringing a side edge 10A of the front waistline portion 10 toward a side edge 20A of the back waistline portion 20, after the leg-surrounding forming step S3.

Note that, in this particularly illustrated
10 embodiment, the folding line is the center line CL. However, the folding line is not necessarily the center line CL, and may be shifted from the center line CL toward either the first side edge 10A or the second side edge 20A.

15 In the joining step S5, the folded parts of the web 7 are joined together in joint regions 50A through ultrasonic treatment or heat treatment after the folding step S4. Here, the joint regions 50A are to form the joint portions 50 of the absorbent article 1. The joint region
20 50A extends in the conveyance direction MD across an imaginary line SL which indicates a to-be-cut position and extends in the cross direction CD.

In the cutting step S6, the web 7 joined in the joint regions 50A is cut along the imaginary lines SL after
25 the joining step S5. Thereby, the absorbent article 1 is manufactured.

Thirdly, a method of manufacturing absorbers, such as the aforementioned absorber 4, in accordance with one or more embodiments will be explained with reference to

Fig. 3 which is a diagram for explaining a relevant part of the absorber manufacturing method.

As shown in Fig. 3, the absorber 4 is formed of: an absorber core 4A made of ground pulp and superabsorbent polymer particles (SAP), or the like; and a covering member, such as tissue, covering the absorber core 4A. The method of manufacturing thus configured absorber 4 includes at least a powder generating step S13, a core forming and laminating step S23, a conveyance direction changing step S33 and a web cutting step S43.

In the powder generating step S13, a grinder (not shown) prepares ground pulp 301 by grinding a pulp sheet (not shown). Then, superabsorbent polymer particles 302 are mixed into the ground pulp 301 passing a pulp supply duct (not shown), thereby obtaining mixed powder 4A'.

In the core forming and laminating step S23, a core forming and laminating drum (not shown) gathers the mixed powder 4A' to form the absorber core 4A, and then laminates the thus formed absorber core 4A on a first web 4B being conveyed, at predetermined intervals in the conveyance direction MD of the first web 4B. The first web 4B is made of tissue or the like and including a continuum of covering members to be parts of the respective absorber cores 4A. Thereafter, a second web 4C is laminated on the first web 4B, on which the multiple absorber cores 4A are laminated, to obtain an absorber web 4'. The second web 4C is made of tissue or the like and including a continuum of covering members to be parts of the respective absorber cores 4A.

Here, a thickness (t1) of the absorber core 4A is larger than the thickness of the covering member, i.e., a thickness (t2) of the first or second web 4B, 4C (see Fig. 5).

5 After the core forming and laminating step S23, the absorber web 4' is conveyed by driving multiple rollers (not illustrated), in a state where the absorber cores 4A are sandwiched by the pair of the first and second webs 4B and 4C forming the covering members.

10 In the conveyance direction changing step S33, the conveyance direction MD of the absorber web 4' is changed by a changing roller 110 of a web conveyor 100 to be described later. The web conveyor 100 will be described later in detail.

15 In the web cutting step S43, the thus conveyed absorber web 4' is further conveyed by rotation of a rotating drum (not shown), and is cut at predetermined intervals, in the cross direction CD perpendicular to the conveyance direction MD of the absorber web 4' by
20 a cutter roller (not shown) disposed to face an outer circumferential surface of the rotating drum. Thereby, absorbers 4 are separated from each other. Incidentally, the absorber 4 is elongated in the direction from the front waistline portion 10 to the back waistline portion
25 20 (see Fig. 1).

Fourthly, a configuration of the web conveyor 100 used in the aforementioned conveyance direction changing step S33 will be explained with reference to Figs. 4-5.

The web conveyor 100 conveys the absorber web

including the absorber core sandwiched by a pair of webs to form the covering member, The web conveyor 100 comprises a direction changing mechanism configured to change a conveyance direction of the absorber web by 90° or more, wherein the thickness (t1) of the absorber core is larger than The thickness (t2) of the covering member, and wherein the direction changing mechanism changes the conveyance direction of the absorber web passing the changing mechanism, in such a way that the absorber web is rotated in the conveyance direction by a rotation distance (L1) which is larger than a length (L2) of the absorber core when the absorber web is seen along a surface of the absorber web in a cross direction perpendicular to the conveyance direction of the absorber web.

Fig. 4 is a perspective view showing a region near the changing roller 110 of the web conveyor 100 according to one or more embodiments. Fig. 5 is a side view of the region near the changing roller 110 of the web conveyor 100 as seen in a shaft direction of the changing roller 110.

As shown in Figs. 4 and 5, the web conveyor 100 includes a direction changing mechanism configured to change the conveyance direction MD of the absorber web 4' by 90° or more, the absorber web 4' including the aforementioned absorbers 4. In this particularly illustrated embodiment, the direction changing mechanism turns the conveyance direction MD of the absorber web 4' around (i.e., by 180°).

The direction changing mechanism includes the changing roller 110. When the conveyance direction MD of the absorber web 4' is not required to be changed, the web conveyor 100 conveys the absorber web 4' by
5 driving the multiple rollers (not illustrated).

The changing roller 110 rotates about a shaft core 111 which defines a rotational axis about which the absorber web 4' is to be rotated to change the conveyance direction. The changing roller 110 turns the conveyance
10 direction MD of the absorber web 4' around while supporting the absorber web 4'.

As best seen in FIG. 5, when the absorber web 4' is seen along the rotational axis, i.e., in the shaft direction of the changing roller 110, a rotation distance
15 (L1) of the absorber web 4', that is, the distance over which the absorber web 4' travels in a rotational movement about the rotational axis, is longer than a length (L2) of each of the absorber cores 4A in the conveyance direction MD of the absorber web 4'. In the particularly
20 illustrated embodiment when the changing roller 110 turns the conveyance direction MD of the absorber web 4' around (i.e., by 180°), the rotation distance (L1) of the absorber web 4' is the length of a semi-circumference of the changing roller 110.

25 Here, seeing the absorber web 4' along the rotational axis, i.e., in shaft the direction of the changing roller 110, means seeing the absorber web 4' along a surface of the absorber web 4' in the cross direction CD perpendicular to the conveyance direction

MD of the absorber web 4'.

It is especially preferable that the rotation distance (L1) of the absorber web 4' be at least twice as large as the length (L2) of the absorber core 4A in the conveyance direction MD of the absorber web 4' when the absorber web 4' is seen in the shaft direction of the changing roller 110.

The changing roller 110 supports two absorber cores 4A at once. Specifically, while rotating, the changing roller 110 always has two absorber cores 4A of the absorber web 4' being conveyed, on its semi-circle (i.e., L1 in FIG. 5).

The length (L2) of the absorber core 4A in the conveyance direction MD of the absorber web 4' corresponds to the length of the absorber 4 in the longitudinal direction (that is, the cross direction CD shown in Fig. 2). In other words, the changing roller 110 changes the conveyance direction MD of the absorber web 4' conveyed by a lengthwise conveying method.

In the above-described embodiment, when the thickness (t1) of the absorber core 4A is larger than the thickness (t2) of the covering member, that is, the thickness of the first and second web 4B, 4C, the rotation distance (L1) of the absorber web 4' when the absorber web 4' is seen in the shaft direction of the changing roller 110, that is, the length of the semi-circumference of the changing roller 110, is larger than the length (L2) of the absorber core 4A in the conveyance direction MD of the absorber web 4'. With this configuration, the

difference in diameter between the first web 4B conveyed in contact with the changing roller 110 and the second web 4C conveyed on the outermost side, in a radial direction, of the changing roller 110 is smaller, and hence the second web 4C is less likely to stretch, than in a case where the rotation distance (L1) of the absorber web 4' is shorter than the length (L2) of the absorber core 4A. This reduces unnecessary stress applied to the second web 4C, and more reliably suppresses creasing or ripping of the second web 4C. In addition, since the second web 4C is less likely to be creased, the absorber core 4A is stretched out uniformly, and is hence prevented from being deformed non-uniformly. In this way, manufacturing defects in the absorbers 4 can be suppressed more reliably.

However, if the thickness (t1) of the absorber core 4A is smaller than the thickness (t2) of the first or second web 4B, 4C, the difference in diameter between the first web 4B conveyed in contact with the changing roller 110 and the second web 4C conveyed on the outermost side, in the radial direction, of the changing roller 110 is already small. In such a case, the second web 4C is less likely to be creased or ripped, and therefore, the rotation distance (L1) of the absorber web 4' is not required (even though it might be still preferred) to be larger than the length (L2) of the absorber core 4A in the conveyance direction MD of the absorber web 4'.

In this particularly illustrated embodiment, it is preferable that the rotation distance (L1) of the

16.

absorber web 4' be at least twice as large as the length (L2) of the absorber core 4A in the conveyance direction MD of the absorber web 4'. Moreover, the changing roller 110 supports two absorber cores 4A at once. With this configuration, the difference in diameter between the first web 4B and the second web 4C becomes even smaller, and the second web 4C is certainly less likely to stretch, than in a case where the rotation distance (L1) of the absorber web 4' is shorter than the length (L2) of the absorber core 4A. This further reduces unnecessary stress applied to the second web 4C, and further reliably suppresses creasing or ripping of the second web 4C.

Especially when the changing roller 110 turns the conveyance direction MD of the absorber web 4' around, the disclosed embodiments can reliably suppress creasing or ripping of the second web 4C, and is hence effective. Comparative Evaluation.

Next, comparative evaluation performed by using changing rollers according to the following Comparative Examples and Examples will be described to make the effects disclosed herein clearer. Note that the present invention is not intended to be limited by the examples.

Configurations and evaluation results of the changing rollers according to the Comparative Examples and Examples will be described with reference to Table 1.

[Table 1]

	Comparativ e Example 1	Comparativ e Example 2	Exempl e 1	Exempl e 2
Rotation distance (L1) of absorber web	95 mm	315 mm	285 mm	700 mm
Length (L2) of absorber core	190 mm	350 mm	190 mm	350 mm
L1:L2 (ratio)	0.5:1	0.9:1	1.5:1	2:1
Thicknes s (t1) of absorber core	5 mm	9 mm	5 mm	6 mm
Thicknes s (t2) of covering member	0.1 mm	0.1 mm	0.1 mm	0.1 mm
Creased or not	Yes	Yes	No	No

The following facts were revealed as shown in Table

5 1. When the absorber web 4' is turned around by the
changing roller according to one of Comparative Examples

1 and 2, the second web 4C conveyed on the outermost side, in the radial direction, of the changing roller is creased because the rotation distance (L1) of the absorber web 4' is smaller than the length (L2) of the absorber core 4A.

When the absorber web 4' is turned around by the changing roller 110 of one of Examples 1 and 2, on the other hand, the second web 4C conveyed on the outermost side, in the radial direction, of the changing roller 110 is not creased because the rotation distance (L1) of the absorber web 4' is larger than the length (L2) of the absorber core 4A.

Modified Examples

The direction changing mechanism according to the foregoing description is configured only by the changing roller 110. Alternatively, direction changing mechanisms according to modified examples may include the following modifications. Here, the explanation will be provided mainly for the differences from the foregoing description, with the same numerals denoting the same elements.

Modified Example 1

Firstly, a configuration of a direction changing mechanism according to Modified Example 1 will be explained with reference to Fig. 6 which is a side view similar to FIG.5 and showing Modified Example 1.

As shown in Fig. 6, the direction changing mechanism

includes multiple changing rollers 110A which are arranged around a rotational axis similar to that defined by the shaft 111 in FIG.5, and are rotatable about axes parallel to the rotational axis. In this case as well, the multiple changing rollers 110A change the conveyor direction MD of the absorber web 4' passing the multiple changing rollers 110A, in such a way that the absorber web 4' is rotated, while being supported by the changing rollers 110A, about the rotational axis in the conveyance direction MD by the rotation distance (L1) which is larger than the length (L2) of the absorber core 4A when seen in the shaft direction of the changing rollers 110A, i.e., along the rotational axis.

15 Modified Example 2

Secondly, a configuration of a direction changing mechanism according to Modified Example 2 will be explained with reference to Fig. 7 which is a side view similar to FIG.5 and showing Modified Example 2.

20 As shown in Fig. 7, the direction changing mechanism includes the conveyor system 120. The conveyor system 120 includes: multiple rollers 121 (only one roller 121 is shown) which are rotatable about a rotational axis similar to that defined by the shaft 111 in FIG. 5; an
25 endless belt 122 configured to rotate around the multiple rollers 121 and convey the absorber web 4'; and a vacuum unit 123 configured to suck the absorber web 4' onto the belt 122. Here, multiple vacuum holes (not illustrated) for sucking the absorber web 4' are formed in the belt

122.

In this case as well, when seen in the shaft direction of the rollers 121, the conveyor system 120 changes the conveyor direction MD of the absorber web 4' passing the belt 122, in such a way that the absorber web 4' is rotated about the rotational axis in the conveyance direction MD by the rotation distance (L1) which is larger than the length (L2) of the absorber core 4A.

10 Note that the conveyor system 120 does not necessarily include the vacuum unit 123, as long as it includes at least one roller 121 and the belt 122.

Further Embodiments

15 As described above, details of several embodiments have been exemplarily disclosed. However, it should not be understood that the description and drawings constituting part of this disclosure limit the present invention. Based on this disclosure, those skilled in 20 the art may come up with various alternative embodiments, examples and application techniques.

For example, the following additional embodiments can be envisaged. Specifically, the absorbent article 1 has been described as including the front waistline portion 10, the back waistline portion 20 and the crotch portion 30. However, the absorbent article 1 is not 25 limited to this configuration, but may be formed entirely in a single unit. In this case, needless to say, a different method of manufacturing such an absorbent

article is employed.

Additionally, a description has been provided for the web conveyor used to convey the absorbers 4 for the absorbent articles 1 (so-called disposal diapers).

5 However, the web conveyor is not limited to such use. For example, the web conveyor may be used to convey absorbers 4 for sanitary napkins, panty liners or the like.

Moreover, a description has been provided for the
10 leg-surrounding opening region 40 formed by cutting the web 7A and the web 7B. However, the formation of the leg-surrounding opening region 40 is not limited to this arrangement. The leg-surrounding opening region 40 may be formed by cutting, together with the web 7A and the
15 web 7B, the back sheet 3 constituting the crotch portion member 30A.

Furthermore, a description has been provided for the web conveyor configured to convey the absorber web 4' including the absorber cores 4A sandwiched between
20 the webs 4A and 4B. However, the web conveyor is not limited to this configuration. For example, the web conveyor may convey the back sheet 3 on which the absorbers 4 are laminated, as long as the conveyor is conveying a sheet including at least the absorbers 4.

25 In addition, a description has been provided for the changing roller 110 which turns the conveyor direction MD of the absorber web 4' around. However, the changing roller 110 is not limited to this particular turning angle. For example, the changing roller 110 may

change the conveyance direction MD of the absorber web 4' by any angle of 90° or more.

Further, a description has been provided for the changing roller 110 which supports two absorber cores 4A at once. However, the changing roller 110 is not limited to this arrangement. The changing roller 110 may support three or more absorber cores 4A at once. In other words, what is needed is that the rotation distance (L1) of the absorber web 4' is longer than the length (L2) of the absorber core 4A in the conveyance direction MD of the absorber web 4'.

Furthermore, the length (L2) of the absorber core 4A in the conveyance direction MD of the absorber web 4' has been described as being corresponding to the length of the absorber 4 in the longitudinal direction. However, the length (L2) is not limited to such length, and may correspond to the width of the absorber core 4A. In other words, the changing roller 110 may change the conveyance direction of the absorber web 4' conveyed by a crosswise conveying method.

As described above, the present invention naturally includes various embodiments which are not described herein. Accordingly, the technical scope of the present invention should be determined only by the matters to define the invention in the scope of claims regarded as appropriate based on the description.

The entire content of Japanese Patent Application 2009-048412 (filed on March 2, 2009) is incorporated herein by reference.

INDUSTRIAL APPLICABILITY

Therefore, since the web conveyor and method of manufacturing absorbent article of the present invention provides more reliably suppressing manufacturing
5 defects in absorbers included in an absorber web in a continuous manner and each including an absorber core and a covering member, in the case of changing a conveyance direction of the absorber web by 90° or more, it is useful in manufacturing technology for absorbent
10 articles.

Reference Signs List

- 1 absorbent article
- 2 top sheet
- 15 3 back sheet
- 4 absorber
- 4' absorber web
- 4A absorber core
- 4A' mixed powder
- 20 4B first web
- 4C second web
- 5 waterproof sheet
- 6A waist gather
- 6B leg gather
- 25 7, 7A, 7B web
- 10 front waistline portion
- 10A side edge
- 20 back waistline portion
- 20A side edge

- 30 crotch portion
- 40 leg-surrounding opening region
- 50 joint portion
- 50A joint region
- 5 60 waist opening region
- 100 web conveyor
- 110 changing roller
- 110A multiple changing rollers
- 111 shaft core
- 10 120 conveyor system
- 121 roller
- 122 belt
- 123 vacuum unit

CLAIMS

[Claim 1]

A web conveyor

5 used in manufacturing an absorber including an
absorber core and a covering member covering
the absorber core, and

which conveys an absorber web including the absorber
core sandwiched by a pair of webs to form the covering
10 member,

the web conveyor comprising a direction changing
mechanism configured to change a conveyance direction
of the absorber web by 90° or more,

a thickness (t1) of the absorber core is larger than
15 a thickness (t2) of the covering member,
wherein

the direction changing mechanism changes the
conveyance direction of the absorber web passing the
changing mechanism, in such a way that the absorber web
20 is rotated in the conveyance direction by a rotation
distance (L1) which is larger than a length (L2) of the
absorber core when the absorber web is seen along a
surface of the absorber web in a cross direction
perpendicular to the conveyance direction of the absorber
25 web.

[Claim 2]

The web conveyor according to claim 1, wherein
the direction changing mechanism includes a roller,

and

the rotation distance (L1) of the absorber web is a length of a semi-circumference of the roller.

5 [Claim 3]

The web conveyor according to claim 1, wherein the direction changing mechanism includes a plurality of rollers.

10 [Claim 4]

The web conveyor according to claim 1, wherein the direction changing mechanism includes:

a plurality of rollers; and

15 an endless belt configured to convey the absorber web and rotate around the plurality of rollers.

[Claim 5]

20 The web conveyor according to any one of claims 1 to 4, wherein the rotation distance (L1) of the absorber web is at least twice as large as the length (L2) of the absorber core in the conveyance direction of the absorber web.

[Claim 6]

25 The web conveyor according to claim 5, wherein the direction changing mechanism supports two of the absorber cores at once.

[Claim 7]

The web conveyor according to any one of claims 1 to 6, wherein the absorber cores are disposed on a continuum of the covering members at predetermined intervals.

[Claim 8]

A working method used during manufacturing an absorber having an absorber core and a covering member covering the absorber core,

the method comprising the steps of:
conveying an absorber web including the absorber core sandwiched by a pair of webs to form the covering member; and
changing a conveyance direction of the absorber web by 90° or more by a direction changing mechanism of a web conveyor, and
wherein a thickness (t1) of the absorber core is larger than a thickness (t2) of the covering member,

wherein
the direction changing mechanism changes the conveyance direction of the absorber web passing the changing mechanism, in such a way that the absorber web is rotated in the conveyance direction by a rotation distance (L1) which is larger than a length (L2) of the absorber core when the absorber web is seen along a surface of the absorber web in a cross direction perpendicular to the conveyance direction of the absorber web.

30

FIG. 1

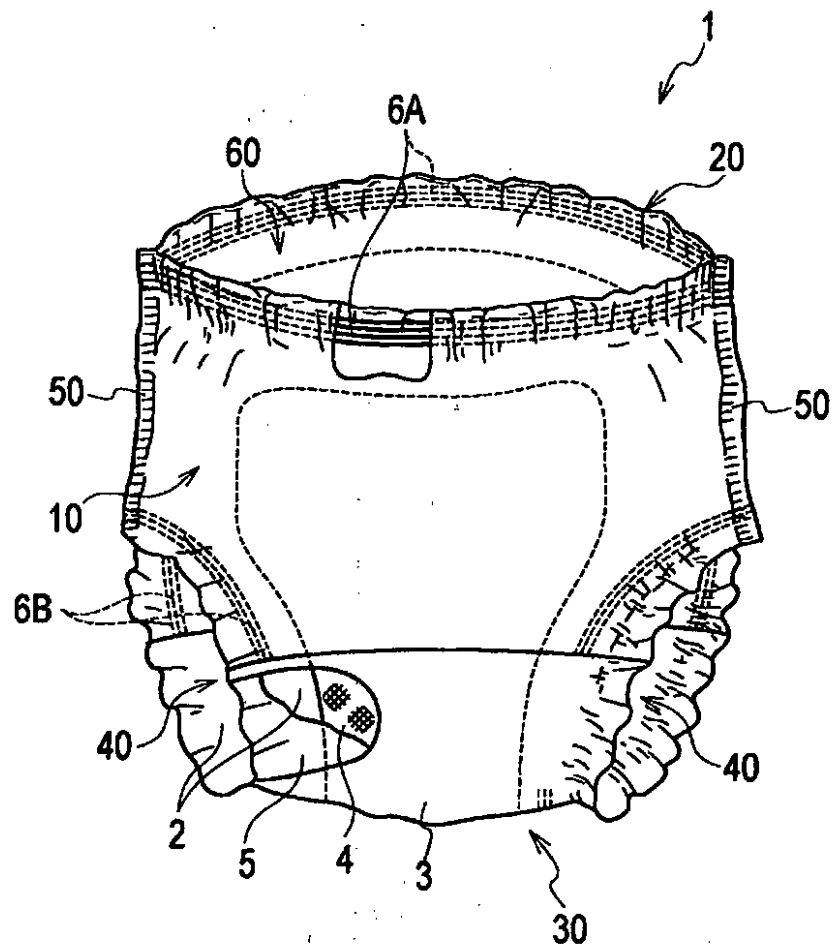


FIG. 2

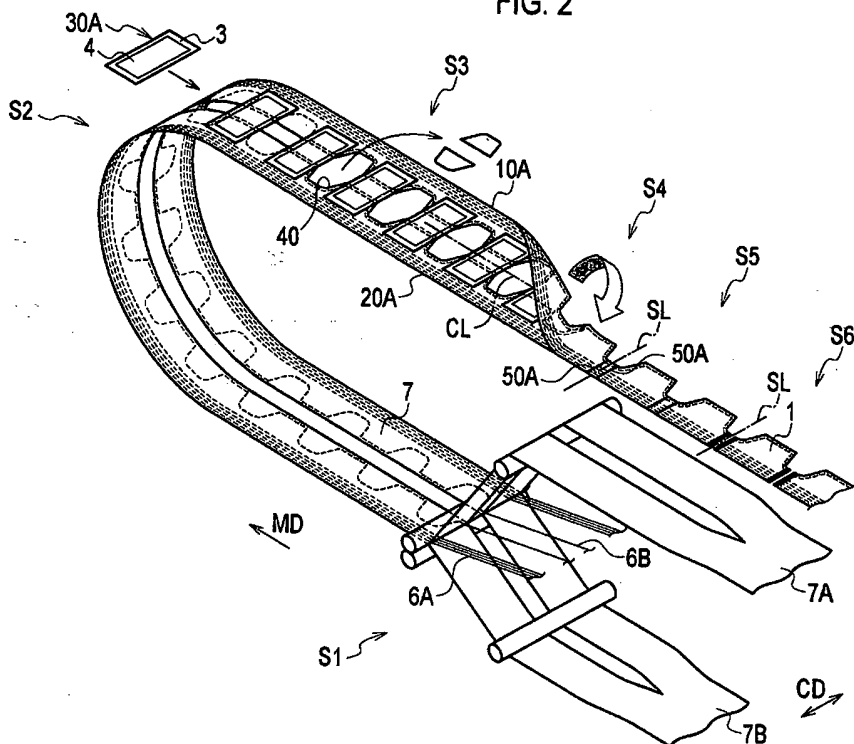


FIG. 3

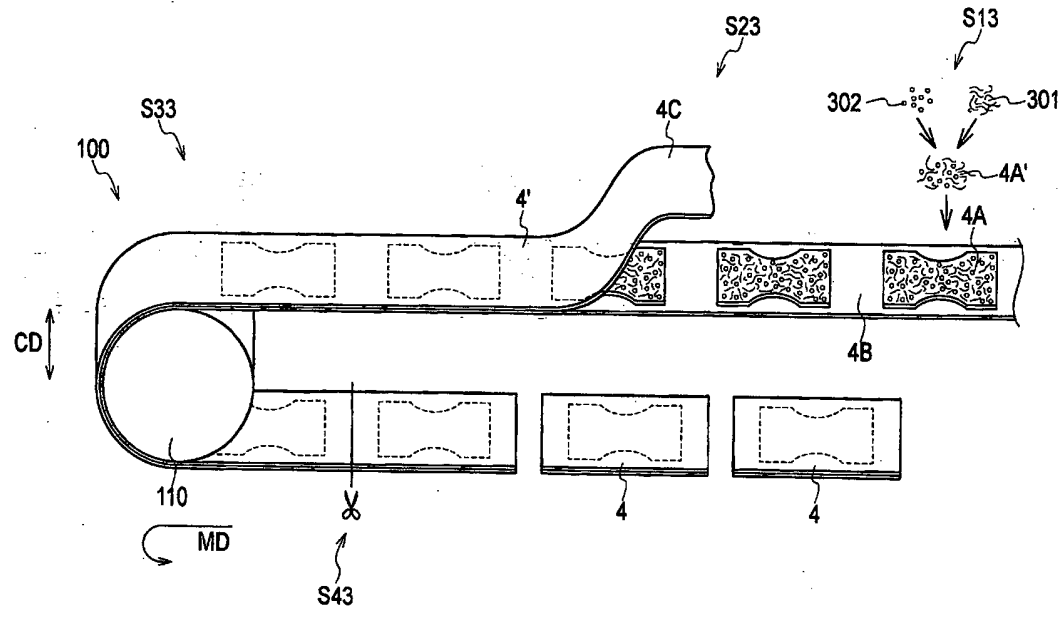


FIG. 4

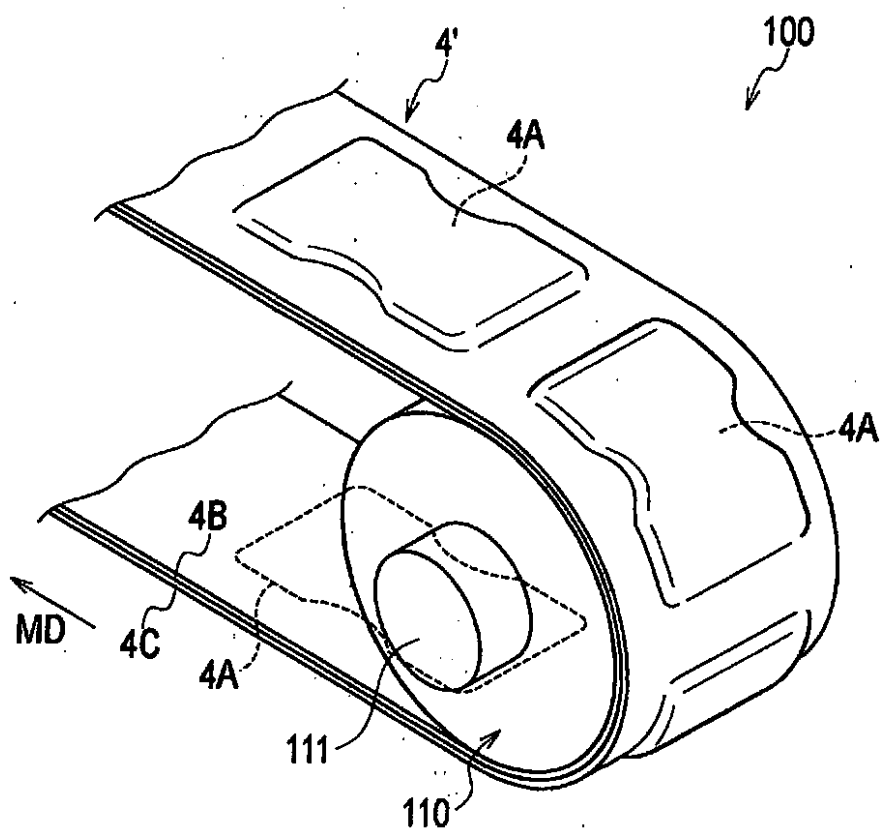


FIG. 5

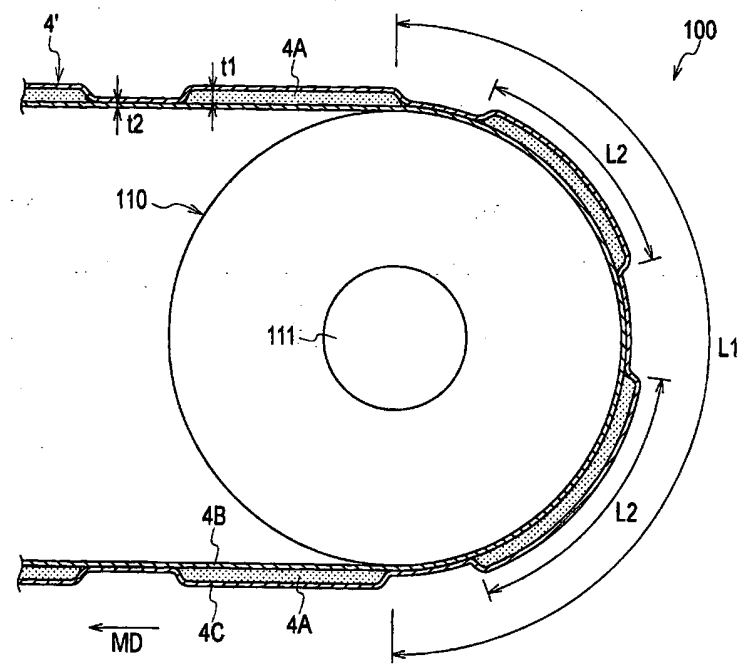
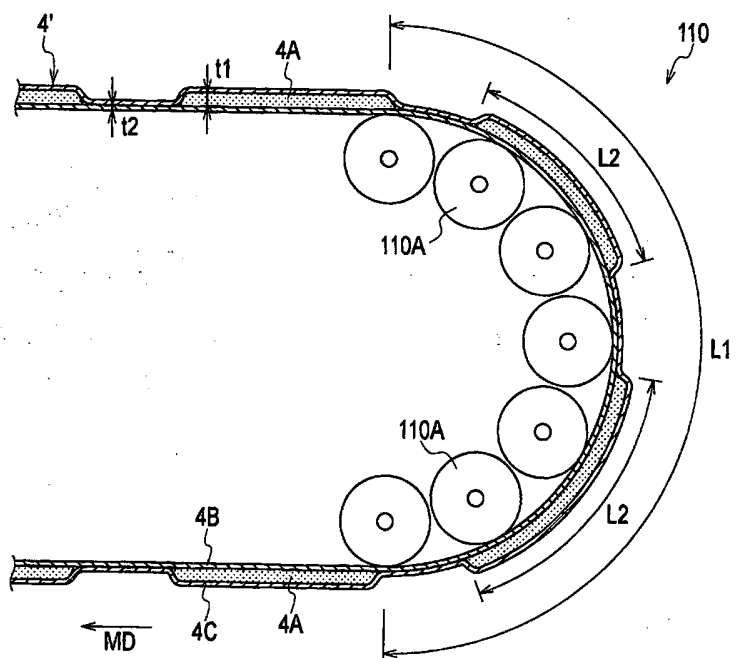
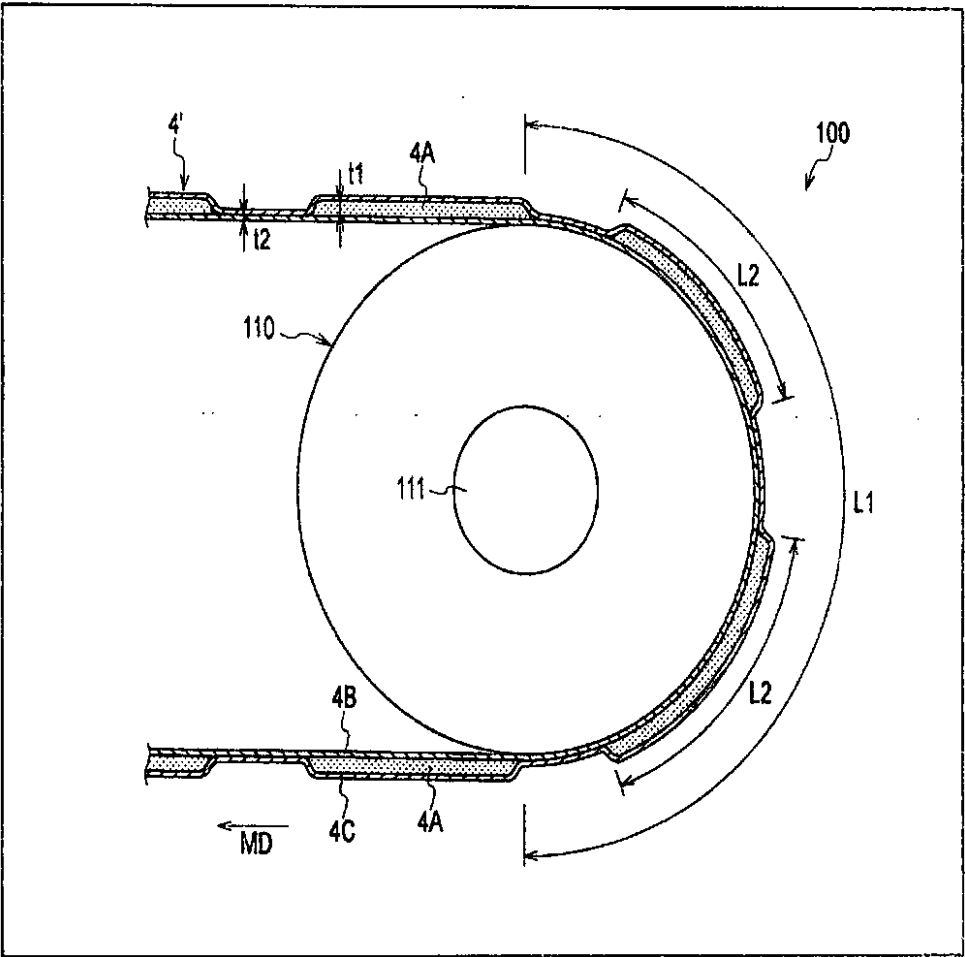
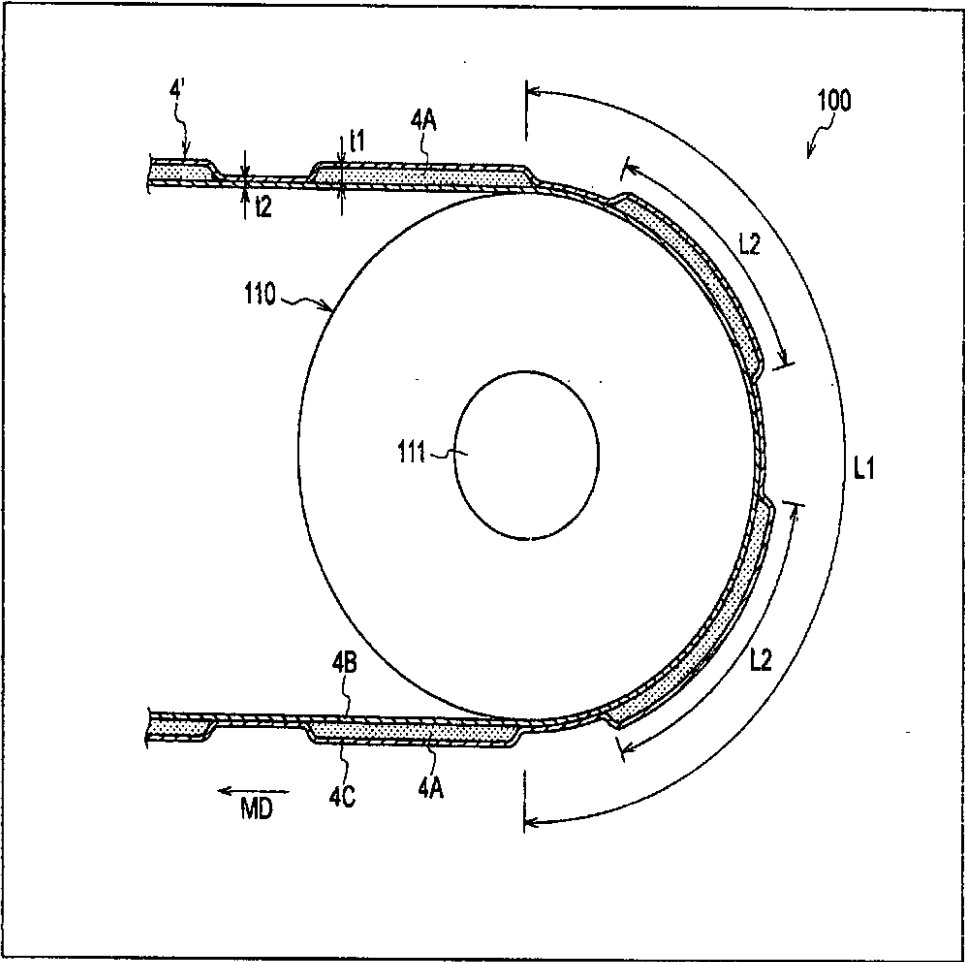


FIG. 6







No. 11-121346-00000-0000

Fecha: 2011-09-19 10:52:38

Dep. 2020 DIR.NUEVASCR

Tra. 11 PATENTEIYII

Eve: 378 FASENACIONALI

Act. 411 PRESENTACION

Folios: 121

Tra. 11 PATENTEIYII

Eve: 378 FASENACIONALI

Act. 411 PRESENTACION

Folios: 120

ADMISION A TRAMITE = NUEVAS CREACIONES

Industria y Comercio
SUPERINTENDENCIA

PATENTE DE INVENCION ☐MODELO DE UTILIDAD ☐

Art 33 Decisión 486/00

☐	Indicación que se solicita una patente.
☐	Datos de identificación del solicitante o de la persona que presenta la solicitud
☐	Descripción de la invención
☐	Dibujos de ser estos pertinentes
☐	Comprobante de pago de las tasas establecidas (De ser el caso formato de descuento)
Completa ☐	Incompleta ☐

PATENTE DE INVENCION PCT ☒ MODELO DE UTILIDAD PCT ☐ Art.33 Decisión 486/00, Circular Única

☒	Indicación que se solicita una PCT
☒	Copia de la solicitud en español, tal como fue presentada inicialmente (capítulo descriptivo, reivindicatorio, resumen)
☒	Dibujos de ser estos pertinentes
☒	Comprobante de pago de las tasas establecidas (de ser el caso formato de descuento)
Completa ☒	Incompleta ☐

DISEÑO INDUSTRIAL ☐

(Art. 119 Decisión 486/00)

☐	Indicación que se solicita Diseño industrial
☐	Datos de identificación del solicitante o de la persona que presenta la solicitud
☐	Representación gráfica y fotográfica del Diseño industrial o muestra del material que incorpora el diseño
☐	Comprobante de pago de las tasas establecidas
Completa ☐	Incompleta ☐

ESQUEMA DE TRAZADO ☐

(Art. 92 Decisión 486/00)

☐	Indicación que se solicita un esquema de trazado
☐	Datos de identificación del solicitante o de la persona que presenta la solicitud
☐	Representación gráfica de un esquema de trazado
☐	Comprobante de pago de las tasas establecidas
Completa ☐	Incompleta ☐