

Señor Director

NUEVAS CREACIONES

Superintendencia de Industria y Comercio

E. S. D.

Referencia: Expediente NC2017/0006273

Asunto: Solicitud de patente para: UN NÚCLEO DESPRENDIBLE, UN ROLLO QUE COMPRENDE TAL NÚCLEO Y UN MÉTODO DE ELABORACIÓN DE NÚCLEO DESPRENDIBLE

Solicitante: SCA TISSUE FRANCE

Fecha de solicitud: 11 de septiembre de 2017

RESPUESTA A PRIMER EXAMEN DE PATENTABILIDAD

ANDRES RINCON USCATEGUI, identificado como aparece al pie de mi firma, en mi condición de apoderado de la sociedad solicitante de la patente de la referencia, doy respuesta al Oficio **9926**, notificado por fijación en lista el 15 de agosto de 2018, para lo cual pedí plazo adicional el 7 de noviembre de 2017.

I. MODIFICACIONES AL CAPÍTULO REIVINDICATORIO

En respuesta al examen de patentabilidad aporté un Capítulo Reivindicatorio modificado conformado por **15** reivindicaciones en las que se han incluido las siguientes modificaciones:

1. Se han eliminado las antiguas reivindicaciones 8 y 10;
2. Se ha incluido el fragmento *“de modo que la banda interna (34) tiene mayor capacidad de absorción de agua que la banda externa (33)”* en las reivindicaciones 1 y 14;
3. Se ha incluido el fragmento *“de modo que la banda externa (33) tiene mayor capacidad de absorción de agua que la banda interna (34)”* en las reivindicaciones 1 y 14;
4. Se han ajustado las dependencias de las reivindicaciones de acuerdo con las modificaciones realizadas.

Estas modificaciones se ajustan al Artículo 34 de la Decisión 486 de 2000, ya que no constituyen una ampliación de la protección que correspondería a la divulgación contenida en la solicitud inicial.

II. MODIFICACIÓN A LA DESCRIPCIÓN

El Solicitante desea aportar una descripción modificada en la cual se ha incluido la traducción del término “*descenso de agua*” al inglés (*water drop*) en la línea 18 de la página 14.

Esta inclusión se hace considerando que el término *water drop* no tiene una traducción específica al español y que en el inglés tiene un significado bien definido y conocido en el área. En particular, el término “*water drop*” proviene de un método que se utiliza para evaluar la velocidad de absorción del cartón (Método de prueba TAPPI / ANSI T 831 om-14)¹, establecido por la Asociación Técnica de la Industria de Pulpa y Papel (TAPPI por su acrónimo en inglés).

Vale la pena mencionar que esta modificación se ajusta al Artículo 34 de la Decisión 486 de 2000, ya que no constituyen una ampliación de la protección que correspondería a la divulgación contenida en la solicitud inicial.

III. EN CUANTO A LA SUPUESTA FALTA DE CLARIDAD

El Examinador ha considerado que las antiguas reivindicaciones 8 y 10 hacían referencia a resultados a alcanzar por comprender fragmentos como: “*el descenso de agua de la banda interna (34) es de unos cuantos minutos mientras que el descenso de agua de la banda externa (33) es de tamaño no definido*” (Reiv. 8); “*el descenso de agua de la banda externa (33) es de unos cuantos minutos mientras que el descenso de agua de la banda interna (34) es de tamaño no definido*” (Reiv. 10).

Con respecto a la objeción del Examinador es preciso poner de presente que las reivindicaciones 8 y 10 han sido eliminadas del nuevo capítulo reivindicatorio; por tanto, se deberá entender como superada cualquier objeción relacionada con las mismas.

¹ <https://imisrise.tappi.org/TAPPI/Products/01/T/0104T831.aspx>

IV. ESTADO DE LA TÉCNICA

El Examinador determinó un documento como relevante para realizar el análisis de patentabilidad de la presente patente de invención:

1. D1, referido al documento WO2011092590 titulado *“Core for a product in sheet form wound around this core, and roll formed with such a core”* que se relaciona con un núcleo (5) que tiene una pared cilíndrica (8) que puede desgarrarse axialmente y está formada por dos tiras superpuestas, que son respectivamente una tira exterior (10) en contacto con el producto y una banda interior (11), estas tiras se enrollan entre sí y se unen entre sí mediante regiones de unión, por ejemplo mediante unión (12). Al menos uno de los bordes longitudinales de la tira interna (11) no está unido o está débilmente unido sobre un ancho determinado en orden, sobre al menos parte de su longitud helicoidal, para formar una pestaña libre y accesible (19) que mira hacia afuera tira (10).

V. EN CUANTO A LA SUPUESTA FALTA DE NOVEDAD

El Examinador ha considerado que la presente solicitud carecía de novedad a la luz del documento D1. Examinador ha afirmado que el documento D1 también enseñaba que *“las bandas (33, 34) se elaboran de materiales que tienen características tales que, ya sea la banda interna (34) se elabore de cartón que tiene un descenso de agua inferior al descenso de agua de la banda externa (33), o la banda externa (33) se elabore de cartón que tiene un descenso de agua inferior al descenso de agua de la banda interna (34)”* (página 10, líneas 14 a 18).; Sin embargo, el fragmento de D1 citado por el examinador establece que: *“El núcleo Rc estaba hecho de una tira de cartón exterior y una tira de cartón interior. La tira de cartón exterior tenía un ancho de 70 mm y un gramaje de 180 g / m² La tira interna de cartón tenía un ancho de 80 mm y un gramaje de 230 g / m².*

Si se evalúa de manera cuidadosa, es claro que el documento D1 no menciona nada relacionado con el descenso de agua de las bandas internas y externas. Más específicamente D1 no revela o sugiere el hecho de que la disposición de una de las bandas exterior e interior tengan un descenso de agua inferior al de la otra banda.

Así mismo, y teniendo en cuenta el análisis de patentabilidad del Examinador, se desea respetuosamente llamar la atención con respecto a la diferencia entre concepto *“descenso de agua”* y *“gramaje”*. En particular, como se mencionó en el numeral II del

presente memorial, el término *descenso de agua (water drop)* en el contexto de esta solicitud se refiere a un término conocido para la persona versada en la materia, el cual “(...) *evalúa la absorción de agua por el material de cartón. Se mide al dejar caer una gota de agua sobre la superficie de cartón y medir el tiempo en segundos/minutos que le toma a la gota ser absorbida por completo*” (página 14, líneas 18 a 22).

Por lo tanto, el hecho de que una primera de las bandas internas y externas tengan menor descenso de agua que la otra banda tiene implicaciones en la fabricación de dicha primera banda, la cual tiene una capacidad de absorción más alta que la otra dicha banda. De hecho, una misma gota de agua es absorbida por dicha primera banda en menor tiempo que por la otra banda.

Por el contrario, gramaje se define como “*el peso en gramos del papel por metro cuadrado*”², lo cual no cuantifica la capacidad de absorción del material. De esta manera, se hace evidente que el Examinador está de manera errónea comparando un parámetro diferente del producto reivindicado con el arte previo.

Adicionalmente, y con el único fin de aclarar por completo el concepto de descenso de agua se han incluido en las reivindicaciones 1 y 14 los fragmentos “*de modo que la banda interna (34) tiene mayor capacidad de absorción de agua que la banda externa (33)*” y “*de modo que la banda externa (33) tiene mayor capacidad de absorción de agua que la banda interna (34)*”, tal y cómo se menciona en el numeral I del presente memorial.

Teniendo en cuenta las aclaraciones realizadas, es claro que la materia reclamada por las reivindicaciones 1 y 15 de la presente solicitud es nueva e inventiva a la luz de las enseñanzas de D1, mucho más si se tiene en cuenta que el *descenso de agua* no se menciona ni mucho menos se define en el documento D1.

Esta conclusión también ha sido establecida durante la fase internacional, en donde se determinó que ninguno de los documentos del arte previo sugiere un núcleo desprendible alternativo que facilite la transición de la cadencia de producción durante el proceso productivo, tal y como el enseñado en la presente Solicitud. De manera similar, las oficinas de patentes de Rusia, Europa y Estados Unidos han concluido que la presente solicitud era novedosa e inventiva, aún sin incluir en dichas reivindicaciones las limitaciones enseñadas en las nuevas reivindicaciones presentadas junto con este memorial.

² <https://dle.rae.es/srv/search?m=30&w=gramaje>

Concesión de solicitudes equivalentes:

Tal y cómo se mencionó anteriormente, el mérito investigativo de la presente invención ha sido reconocido por otras oficinas de patentes del mundo, las cuales han otorgado patentes para invenciones equivalentes. Tal es el caso de las Oficinas de Patentes de Estados Unidos, Europa y Rusia, las cuales han emitido una notificación de aceptación para las solicitudes equivalentes No. 15/536,754, 14 846 754.1 y 2017125736, respectivamente.

A este respecto, deseamos poner de presente que si bien cada país es autónomo de conceder o negar una solicitud luego de la realización del estudio de fondo, es claro que el hecho de que la novedad y el nivel inventivo de una invención hayan sido reconocidos por varias oficinas a nivel mundial, es un indicio de la patentabilidad de la misma toda vez que (i) el estudio de novedad y nivel inventivo en todas las Oficinas de Patentes del mundo es realizado por personas con conocimientos técnicos en el área de interés que son consideradas personas idóneas para emitir conceptos sobre la patentabilidad de una invención y que (ii) los resultados de los exámenes de novedad o de patentabilidad efectuados respecto a solicitudes extranjeras pueden ser reconocidos como suficientes para acreditar el cumplimiento de las condiciones de patentabilidad de la invención, tal como se señala en el artículo 46 de la Decisión 486:

“Artículo 46.- La oficina nacional competente podrá requerir el informe de expertos o de organismos científicos o tecnológicos que se consideren idóneos, para que emitan opinión sobre la patentabilidad de la invención. Asimismo, cuando lo estime conveniente, podrá requerir informes de otras oficinas de propiedad industrial.

De ser necesario, a efectos del examen de patentabilidad y a requerimiento de la oficina nacional competente, el solicitante proporcionará, en un plazo que no excederá de 3 meses, uno o más de los siguientes documentos relativos a una o más de las solicitudes extranjeras referidas total o parcialmente a la misma invención que se examina:

- a) copia de la solicitud extranjera;*
- b) copia de los resultados de exámenes de novedad o de patentabilidad efectuados respecto a esa solicitud extranjera;*
- (...)*

*La oficina nacional competente podrá **reconocer los resultados de los exámenes referidos en el literal b) como suficientes para acreditar el cumplimiento de las condiciones de patentabilidad de la invención***” (Negrilla fuera del texto).

VI. PETICIÓN

1. Puesto que se ha dado respuesta a todas las objeciones formuladas por la Dirección de Nuevas Creaciones, solicito proceder al otorgamiento de la solicitud de patente.

2. Subsidiariamente, en caso de que su Despacho considere que la modificación introducida al Capítulo Reivindicatorio amerita revisión adicional, solicito un segundo examen de patentabilidad de conformidad con lo dispuesto en el Artículo 2 de la Resolución 3719 de 02 de febrero de 2016, para lo cual realizo el pago de tasa correspondiente.

VII. ANEXOS

1. Capítulo Reivindicatorio modificado conformado por **15** reivindicaciones;
2. Descripción modificada;
3. Pago en línea por concepto de examen de patentabilidad adicional;
4. Publicación de la patente equivalente emitida por la USPTO;
5. Intención de concesión emitida por la EPO;
6. Traducción a las ingles de la intención de concesión de la oficina rusa de patentes.

Señor Director,

ANDRÉS RINCÓN USCÁTEGUI

C.C. 79.780.910 de Bogotá

T.P. 114.908

Your reference: **196 458 aa/uhi**
Our reference: **2420-542618RU**
Application No.: **2017125736**
Attorney Name: **Sergey A. Dorofeev**

GORODISSKY

Page 1 of 8

**FEDERAL SERVICE FOR INTELLECTUAL PROPERTY
(ROSPATENT)**

bld. 30-1, Berezhkovskaya nab., Moscow, G-59, GSP-5, Russia, 123995 Telephone (8-499) 240-60-15. Fax (8-495) 531-63-18

To No. 2420-542618RU
Our No. 2017125736/13 (044289)

To "Gorodissky & Partners" Law firm Ltd.,
B. Spasskaya str., 25, bldg. 3, Moscow,
129090, Russia

In correspondence, please refer to the application number
and report a receipt date of this communication of

08.05.2018

**DECISION TO GRANT
A PATENT FOR INVENTION**

(21) Application No. **2017125736/(044289)**

(22) Application filing date **19 December 2014**

As a result of the substantive examination of the application for invention, it has been stated that the claimed group of inventions relates to the objects of patent rights, complies with the patentability conditions, the essence of the claimed invention (inventions) is disclosed in the application documents in a manner sufficiently complete to carry out the invention (inventions)*, in view of which a decision on granting an invention patent has been issued.

A Report on results of examination is enclosed herewith.

Enclosure: on 7 pages in 1 copy.

Deputy Chief of the Organizing Department
for Providing State Services,
Chief of the Patent Law Department *Digital signature*

V.G. Galkovskaya

**Evaluation of the sufficiency of disclosure of the claimed invention essence shall be performed for applications for inventions filed after 01.10.2014.*



Your reference: **196 458 aa/uhi**
Our reference: **2420-542618RU**
Application No.: **2017125736**
Attorney Name: **Sergey A. Dorofeev**

Decision on Grant

Page 2 of 8

REPORT ON RESULTS OF EXAMINATION

(21) Application No. **2017125736/(044289)** (22) Application filing date **19 December 2014**
(24) Date from which the patent will be valid **19 December 2014**
(85) Date of beginning the consideration of the International application in the national phase **19 July 2017**

PRIORITY IS SET ON THE DATE OF

☒ (22) filing the application **19 December 2014**

(86) Application No. **PCT/IB2014/003180** of **19 December 2014**.

(87) PCT-Application publication number and publication date **WO2016/097798** of **23 June 2016**

(72) Inventor(s)

CATTACIN, Gilles

FR

BRENDLE, Damien

FR

(73) Patentee(s)

SCA TISSUE FRANCE

FR

(54) Title of invention **A TEARABLE CORE, A ROLL COMPRISING SUCH A CORE AND A TEARABLE CORE MANUFACTURING METHOD**

As a result of the substantive examination of the application conducted in accordance with Article 1386 and Clause 1 of Article 1387 of the Russian Federation Civil Code set in force by the Federal Law No. 35-FL of 12 March 2014 (hereinafter the Code) in respect to the original claims, the compliance of the claimed group of inventions with the requirements of the Code Article 1349, with the patentability conditions stipulated by the Code Article 1350, and the compliance of the application documents with the requirement of sufficiency of disclosure of the invention essence stipulated by the Code Article 1375 Clause 2 have been stated.

The claims are presented in page(s) 3–7.

Attention! In order to eliminate errors, please check the data present in the Report because this data will be introduced without changes into the State Register of Inventions of the Russian Federation, and please immediately inform about errors revealed.

(21) **2017125736/13**

(51) IPC

B65H 75/10 (2006.01)

A47K 10/16 (2006.01)

(57)

1. A tearable core (3), adapted for winding a sheet product (2), comprising a cylindrical body wall (31) defining a longitudinal hole (35) of longitudinal axis XX', the cylindrical body wall (31) being tearable from an edge (51), the cylindrical body wall (31) comprising an outer strip (33) and an inner strip (34), the outer strip (33) being a part of the tearable cylindrical body wall (31) adapted to be in contact with the wound sheet product (2), the inner strip (34) being another part of the tearable cylindrical body wall (31) facing the longitudinal hole (35), the outer strip (33) and the inner strip (34) being helically wound on one another and displacedly overlapped in a lateral direction parallel to the longitudinal axis XX', the outer strip (33) and the inner strip (34) being secured together through their mutually facing surfaces by a first region of attachment (36), characterized in that:

- the strips (33, 34) are made of materials having characteristics such that, either the inner strip (34) is made of cardboard having a water drop less than the water drop of the outer strip (33), or the outer strip (33) is made of cardboard having a water drop less than the water drop of the inner strip (34); and

- the cylindrical body wall (31) is built-up as a core tube by securing together the outer strip (33), a first end part (38) of the outer strip (33) of one turn (A) being superposed and secured to a second end part (42A) of the outer strip (33) of an adjacent turn (B) through their mutually facing surfaces by means of a second region of attachment (37).

2. The tearable core (3) of claim 1, wherein the first and second region of attachment (36, 37) are positioned such that two vis-à-vis surfaces (43) of the outer strip (33) and the inner strip (34) are not attached together over a defined width at an overlapping helical area (44) where two adjacent turns overlap so as to form a free and internally accessible tab (50) at the edge (51) of the tearable core (3).

3. The tearable core (3) of claim 1 or 2, wherein the outer strip (33) and the inner strip (34), and the end parts (38, 42A) of the outer strip (33) are secured together by adhesive bonding through their

mutually facing surfaces, the first and second region of attachment (36, 37) being made of a film of adhesive, the film of adhesive being continuous or discontinuous.

4. The tearable core (3) of claim 1 or 2, wherein the outer strip (33) and the inner strip (34), and the end parts (38, 42A) of the outer strip (33) are secured together by mechanical fastening through their mutually facing surfaces.

5. The tearable core (3) according to claim 1 or 2, wherein the first region of attachment (36) extends from a first end part (38) of the outer strip (33) to a second end part (39) of the inner strip (34), and wherein a width W_{33} of the outer strip (33) is identical to or smaller than a width W_{34} of the inner strip (34).

6. The tearable core (3) according to claim 1 or 2, wherein the second region of attachment (37) extends over a width that is smaller than a width of the first region of attachment (36).

7. The tearable core (3) according to claim 1 or 2, wherein the inner strip (34) is made of cardboard having a basis weight superior to the basis weight of the outer strip (33).

8. The tearable core (3) according to claim 7, wherein the basis weight of the inner strip (34) is around 50% higher than the basis weight of the outer strip (33), and the water drop of the inner strip (34) is a few minutes while the water drop of the outer strip (33) is unsized.

9. The tearable core (3) according to claim 1 or 2, wherein the outer strip (33) is made of cardboard having a basis weight superior to the basis weight of the inner strip (34).

10. The tearable core (3) according to claim 9, wherein the basis weight of the outer strip (33) is around 50% higher than the basis weight of the inner strip (34), and the water drop of the outer strip (33) is a few minutes while the water drop of the inner strip (34) is unsized.

11. The tearable core (3) according to claim 1 or 2, wherein the basis weight per unit area of one of the strip is ranging from 150 to 200 g/m² and the water drop is around 10 min, and the basis weight per unit area of the other strip is ranging from 400 to 450 g/m² and the water drop is unsized.

12. The tearable core (3) according to claim 1 or 2, wherein the inner strip (34) is made of cardboard having a basis weight equal to the basis weight of the outer strip (33).

13. The tearable core (3) according to claim 12, wherein the basis weight per unit area of one of the strip is ranging from 180 to 230 g/m² and the water drop is around 10 min, and the basis weight per unit area of the other strip is ranging from 180 to 230 g/m² and the water drop is unsized.

14. A roll of sheet product (1) comprising a sheet product (2) wound onto a tearable core (3) according to anyone of the claims 1 to 13.

15. The roll of sheet product of claim 14, wherein the sheet product (2) is a web of tissue paper.

16. A method of manufacturing a tearable core (3) under the form of a cylindrical body wall (31) defining a longitudinal hole (35) of longitudinal axis XX', the cylindrical body wall (31) being tearable from an edge (51), the manufacturing method comprising the steps of:

- making an outer strip (33) and an inner strip (34) in materials having characteristics such that, either the inner strip (34) is made of cardboard having a water drop less than the water drop of the outer strip (33), or the outer strip (33) is made of cardboard having a water drop less than the water drop of the inner strip (34);

- assembling the outer strip (33) and the inner strip (34) by displacedly overlapping the outer strip (33) and the inner strip (34) in a lateral direction parallel to the longitudinal axis XX', the outer strip (33) and the inner strip (34) being secured together through their mutually facing surfaces by a first region of attachment (36);

- helically winding the assembled outer and inner strips (33, 34) such that the cylindrical body wall (31) is built-up as a core tube by securing together the outer strip (34), an external surface of a first end part (38) of the outer strip (33) of one turn being overlapped upon an external surface of a second end part (42) of the outer strip (33) of the adjacent turn and secured together through their mutually facing surfaces by a second region of attachment (37); and

- cutting the tearable core (3) at a defined length (L).

17. The method of manufacturing a tearable core (3) of claim 16, further comprising applying an adhesive on the external surface of the first end part (38) of the outer strip (33) of the assembled outer and inner strips (33, 34) either as a full line or as a dotted line.

(56) WO 2011092590 A1, 04.08.2011;

WO 1999002083 A1, 21.01.1999;

WO 2011154745 A2, 15.12.2011;

US 3940081 A1, 24.02.1976;

RU 2512357 C2, 10.04.2014.

Your reference: **196 458 aa/uhi**
Our reference: **2420-542618RU**
Application No.: **2017125736**
Attorney Name: **Sergey A. Dorofeev**

Decision on Grant

Page 6 of 8

The claims and description as originally filed by the Applicant and the original drawings will be used in publication of information on granting a patent.

Enclosures:

1. Explanations about the payment order of patent fees for State registration of invention, for granting a patent and for maintaining the patent in force, on 1 page in 1 copy.
2. Abstract corrected by the examiner on 1 page in 1 copy.
3. Search Report

Deputy Chief
of the Food Industry and
Agriculture Department
of the FIIP

Digital Signature

O.A.Guseva

To be published with Fig. No. -

Enclosure No. 1

To the application No: 2017125736/(044289)

(54) A TEARABLE CORE, A ROLL COMPRISING SUCH A CORE AND A TEARABLE CORE
MANUFACTURING METHOD

Abstract

(57) The invention relates to a cardboard cylindrical tube onto which a web of absorbent material is wound. A tearable core, adapted for winding a sheet product, comprises a cylindrical body wall defining a longitudinal hole of longitudinal axis XX' . The cylindrical body wall is being tearable from an edge. The cylindrical body wall comprises an outer strip and an inner strip. The outer strip is a part of the tearable cylindrical body wall adapted to be in contact with the wound sheet product, the inner strip is another part of the tearable cylindrical body wall facing the longitudinal hole. The outer strip and the inner strip are being helically wound on one another and displacedly overlapped in a lateral direction parallel to the longitudinal axis XX' . The outer strip and the inner strip are being secured together through their mutually facing surfaces by a first region of attachment. The strips are made of materials having characteristics such that, either the inner strip is made of cardboard having a water drop less than the water drop of the outer strip, or the outer strip is made of cardboard having a water drop less than the water drop of the inner strip. The cylindrical body wall is built-up as a core tube by securing together the outer strip. A first end part of the outer strip of one turn is being superposed and secured to a second end part of the outer strip of an adjacent turn through their mutually facing surfaces by means of a second region of attachment. A roll of sheet product comprises a sheet product wound onto a tearable core. An outer strip and an inner strip are being made. The outer strip and the inner strip are being assembled by displacedly overlapping the outer strip and the inner strip in a lateral direction parallel to the longitudinal axis XX' . The outer strip and the inner strip are being secured together through their mutually facing surfaces by a first region of attachment. The assembled outer and inner strips are being helically wound such that the cylindrical body wall is built-up as a core tube by securing together the outer strip. The tearable core is being cut at a defined length. The invention provides ease of manufacturing the tearable core.

3 indep. claims and 14 dep. claims, 7 figs.

Your reference: **196 458 aa/uhi**
Our reference: **2420-542618RU**
Application No.: **2017125736**
Attorney Name: **Sergey A. Dorofeev**

Decision on Grant

Page 8 of 8

Reviewer Guseinova S.O.



US009950490B2

(12) **United States Patent**
Cattacin et al.

(10) **Patent No.:** **US 9,950,490 B2**
(45) **Date of Patent:** **Apr. 24, 2018**

(54) **TEARABLE CORE, A ROLL INCLUDING
SUCH A CORE AND A TEARABLE CORE
MANUFACTURING METHOD**

75/10 (2013.01); B65H 2701/5112 (2013.01);
B65H 2701/532 (2013.01)

(71) Applicant: **SCA TISSUE FRANCE**, Saint-Ouen
(FR)

(58) **Field of Classification Search**

CPC Y10T 428/18; Y10T 428/183; Y10T
428/187; Y10T 428/24992; Y10T
428/24124; D04H 1/74; E04B 2001/7683

See application file for complete search history.

(72) Inventors: **Gilles Cattacin**, Colmar (FR); **Damien
Brendle**, Obersaasheim (FR)

(56) **References Cited**

(73) Assignee: **SCA TISSUE FRANCE**, Saint-Ouen
(FR)

FOREIGN PATENT DOCUMENTS

(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 0 days.

JP H1129263 A 2/1999
WO WO-2011/092590 A1 8/2011

Primary Examiner — Alexander Thomas

(74) *Attorney, Agent, or Firm* — Drinker Biddle & Reath
LLP

(21) Appl. No.: **15/536,754**

(22) PCT Filed: **Dec. 19, 2014**

(86) PCT No.: **PCT/IB2014/003180**

§ 371 (c)(1),

(2) Date: **Jun. 16, 2017**

(87) PCT Pub. No.: **WO2016/097798**

PCT Pub. Date: **Jun. 23, 2016**

(65) **Prior Publication Data**

US 2017/0361563 A1 Dec. 21, 2017

(51) **Int. Cl.**

B32B 3/14 (2006.01)

B31C 3/00 (2006.01)

B65H 75/10 (2006.01)

B31C 11/00 (2006.01)

B65H 18/28 (2006.01)

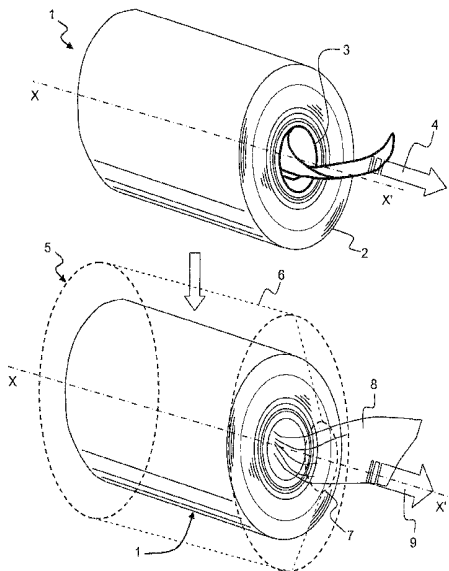
(52) **U.S. Cl.**

CPC **B31C 3/00** (2013.01); **B31C 11/00**
(2013.01); **B65H 18/28** (2013.01); **B65H**

(57) **ABSTRACT**

A tearable core, adapted for winding a sheet product, includes a cylindrical body wall defining a longitudinal hole of longitudinal axis XX'. The cylindrical body wall is tearable from an edge, and includes an outer strip and an inner strip that are helically wound on one another and displacedly overlapped in a lateral direction parallel to the longitudinal axis XX', and secured together through their mutually facing surfaces by a first region of attachment. The strips are made of the material having characteristics such that the inner strip and the outer strip are made of cardboard having different water drops. The cylindrical body wall is formed by securing together the outer strip, a first end part of the outer strip of one turn being superposed and secured to a second end part of the outer strip of an adjacent turn through their mutually facing surfaces by a second region of attachment.

17 Claims, 5 Drawing Sheets



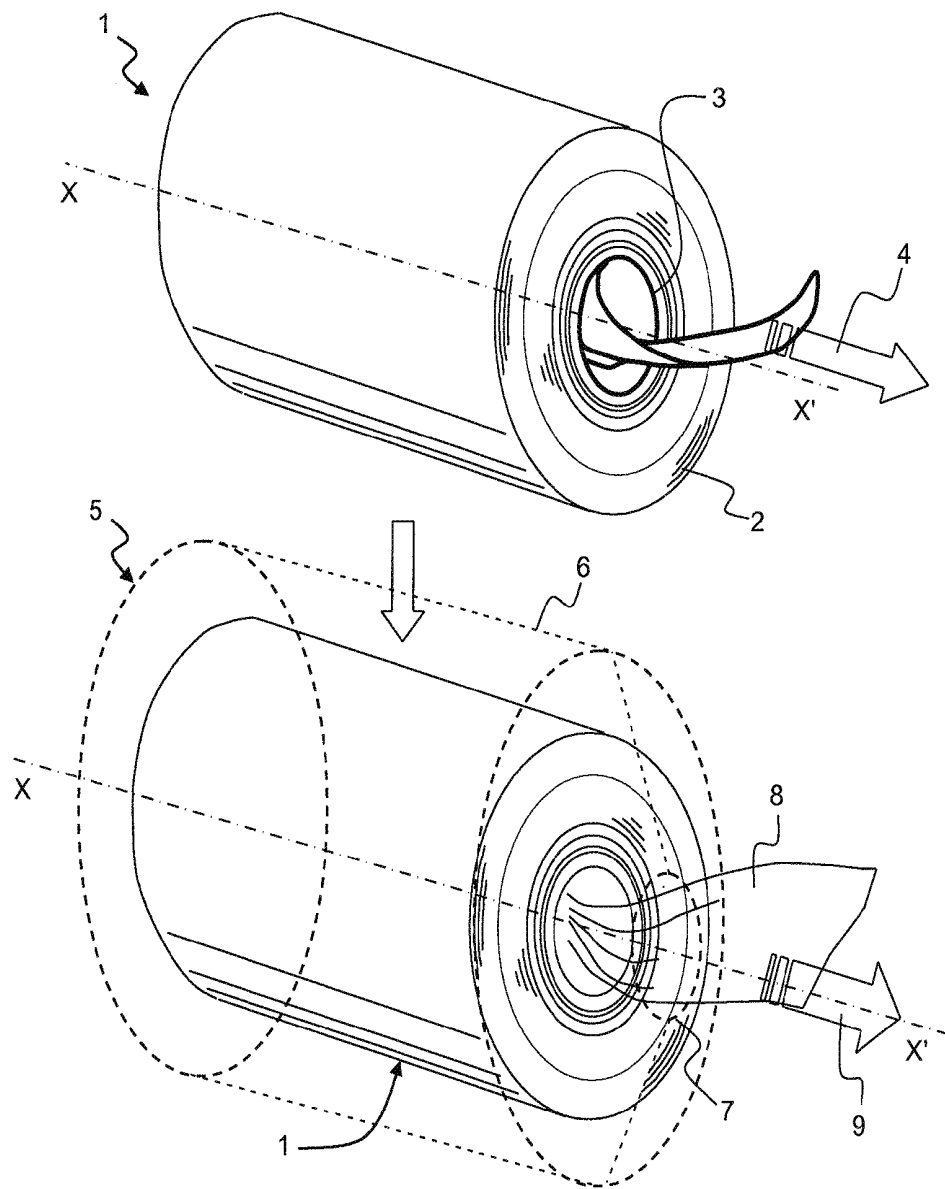


FIG. 1

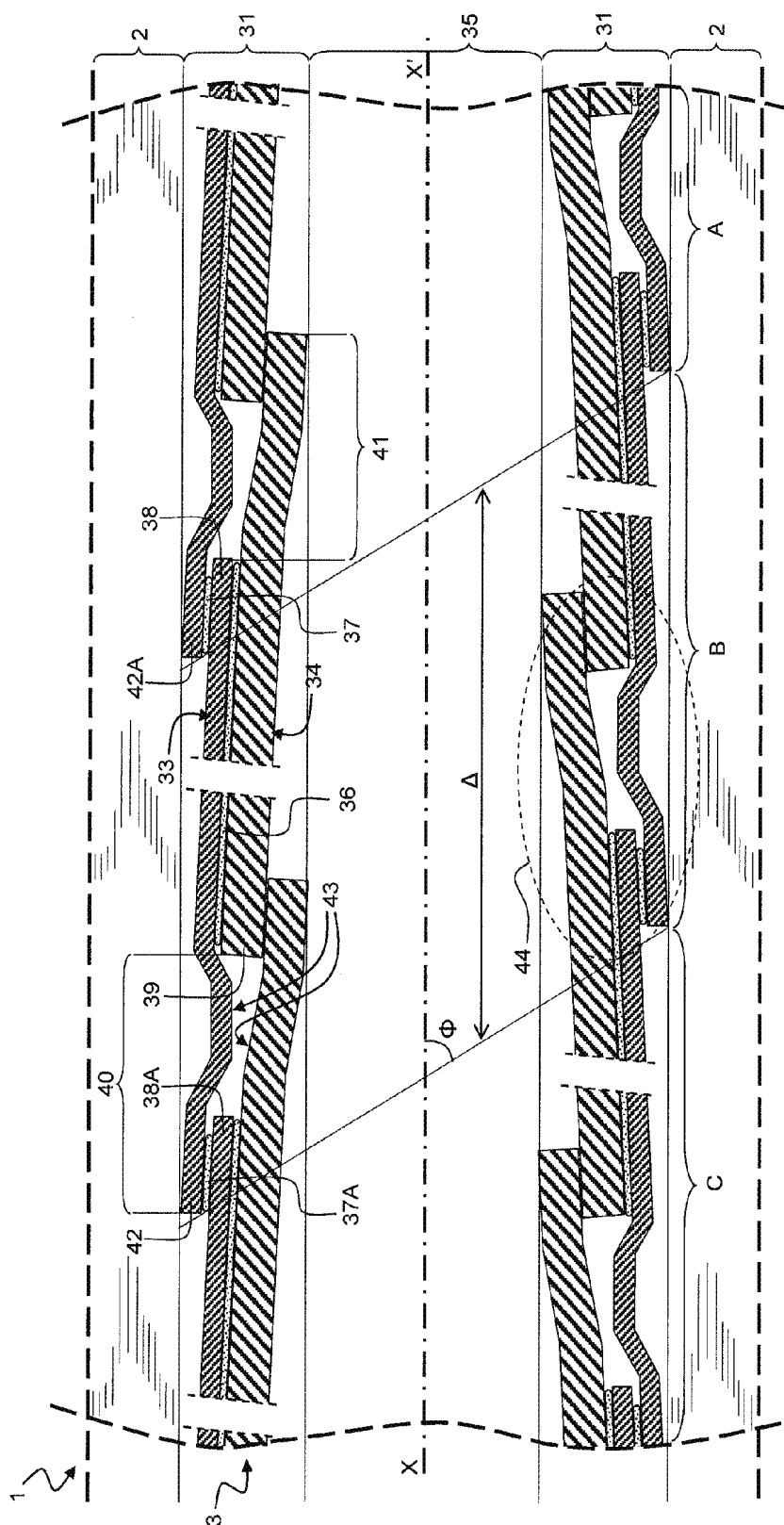


FIG. 2

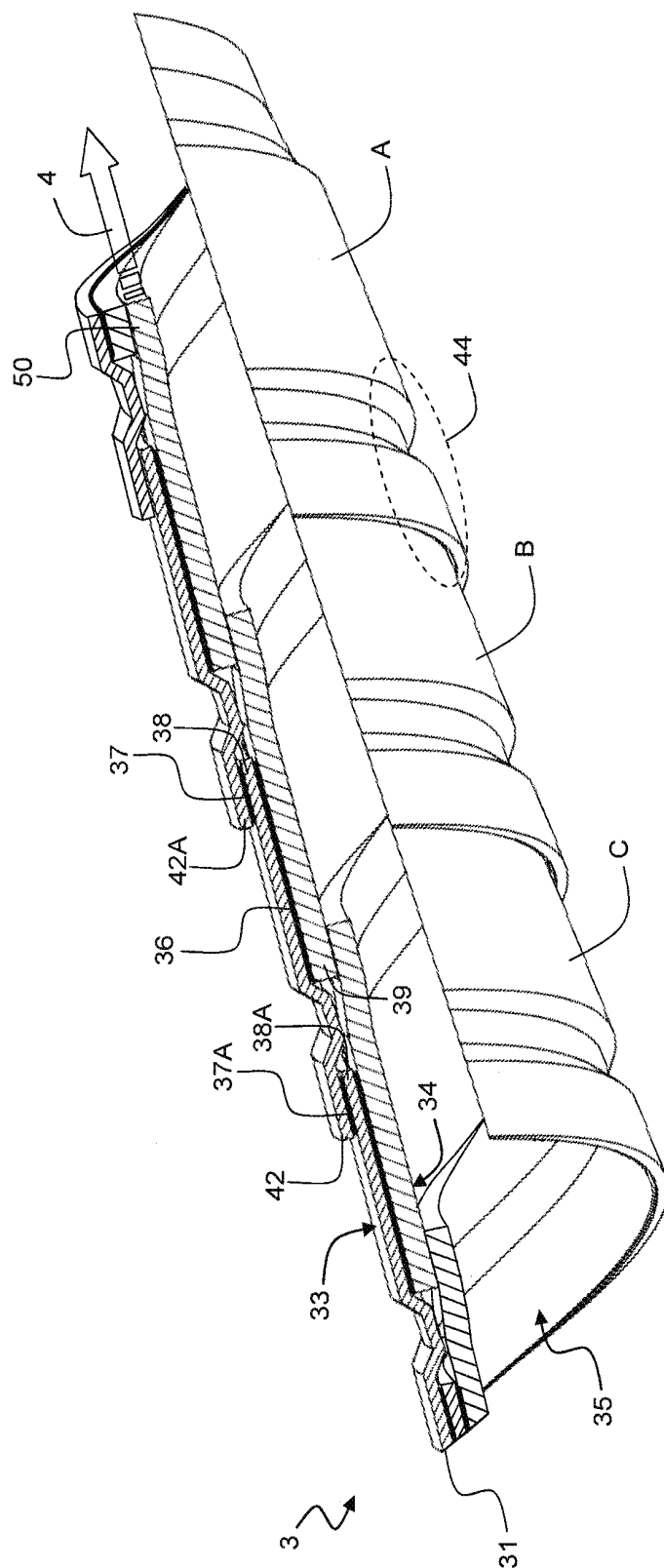


Fig. 4

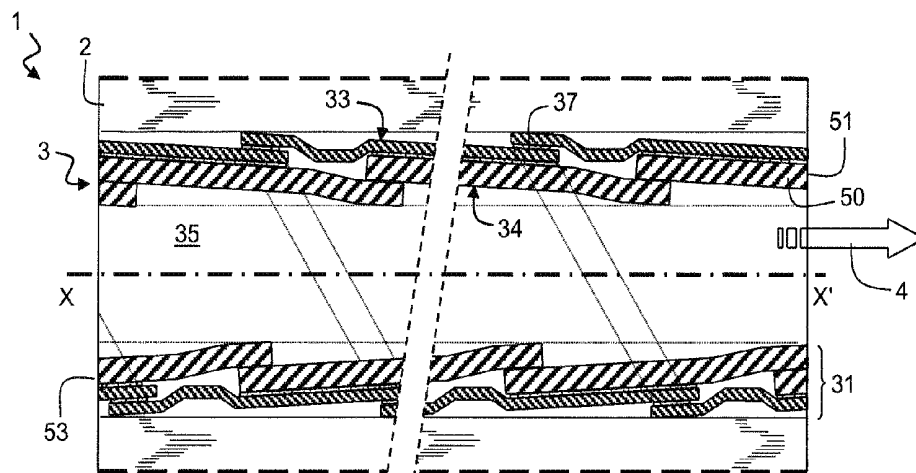


FIG. 5A

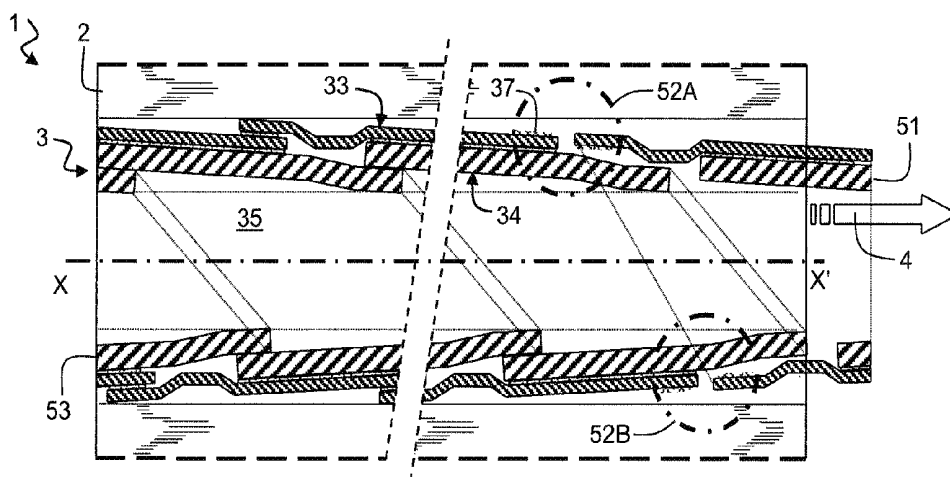


FIG. 5B

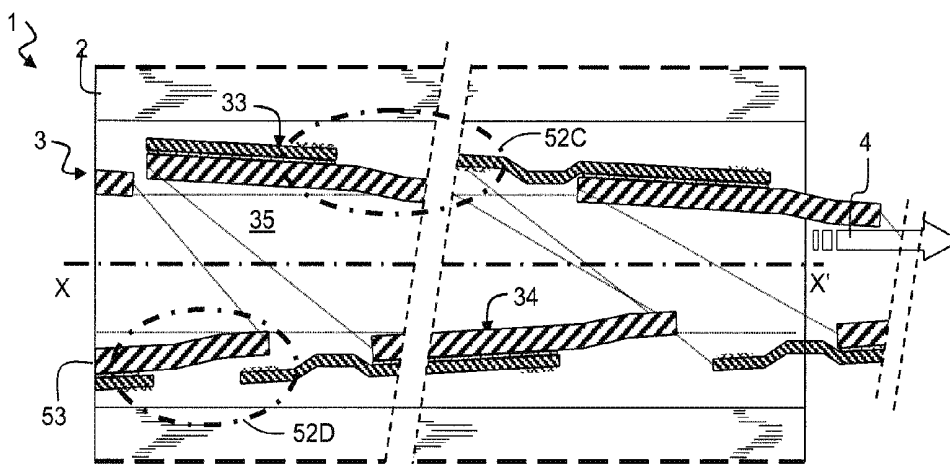


FIG. 5C

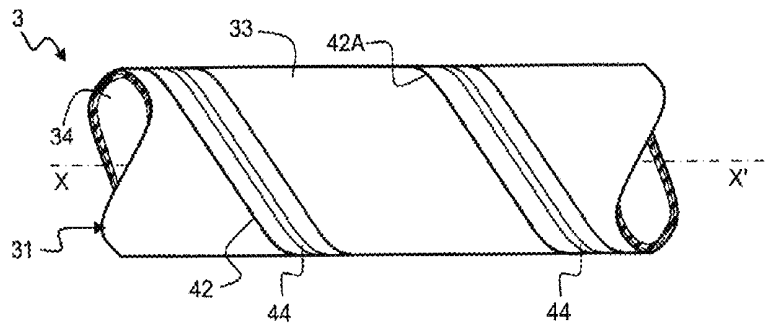


FIG. 3

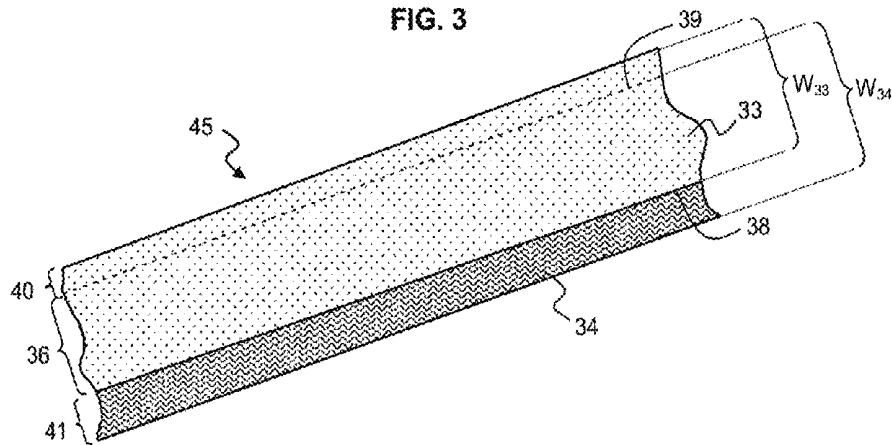


FIG. 6

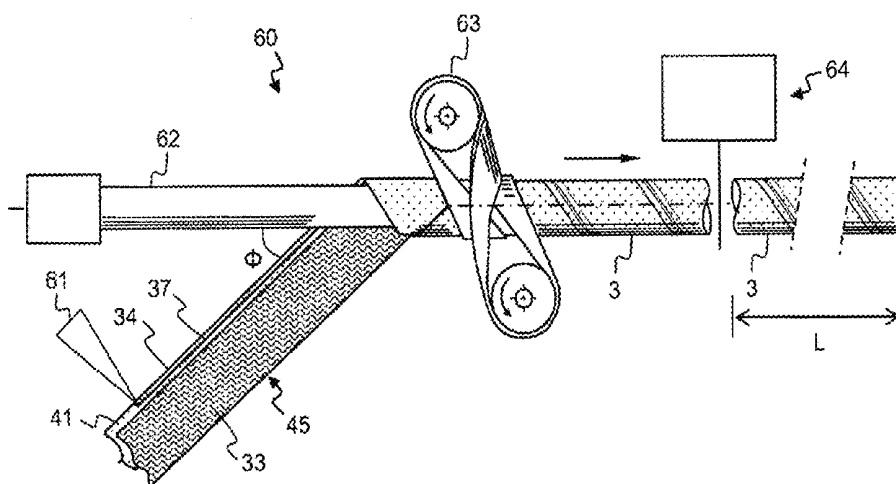


FIG. 7

TEARABLE CORE, A ROLL INCLUDING SUCH A CORE AND A TEARABLE CORE MANUFACTURING METHOD

CROSS-REFERENCE TO PRIOR APPLICATION

This application is a § 371 National Stage Application of PCT International Application No. PCT/IB2014/003180 filed Dec. 19, 2014, which is incorporated herein in its entirety.

TECHNICAL FIELD

An aspect of the disclosure relates to a tearable core, namely a cylindrical tube, more precisely a cardboard cylindrical tube. Such a core finds a particular, though non exclusive, application in the tissue paper industry where a web of absorbent material like a web of tissue paper or a web of non-woven is wound onto such a core. Another aspect of the disclosure relates to a roll including a sheet product wound onto the above core. Still another aspect of the disclosure relates to a core manufacturing method.

BACKGROUND

Rolls of product in sheet form wound around a core are known in the art. Such rolls are used, as example as, paper towel, wiper or toilet tissue rolls for both domestic and professional applications. According to a first type of use, the sheet form product can be dispensed tangentially from the outside of the roll towards the core of the roll by, for example, rotating the roll. According to a second type of use, the sheet form product can be dispensed radially/centrally from the inside towards the outside of the roll. This is a so-called center feed dispensing. In this second case, the core must be removed from the roll before dispensing can start.

The document JPH1129263 describes an inner layer-release paper tube. The inner layer-release paper tube facilitates the disassembly and removal of the paper tube based on a simple pulling of an inner circumferential surface paper strip, and the smooth release of a winding material from the inner side. The inner layer-release paper tube consists of a spiral paper tube in which an outer circumferential surface paper strip from which the outer circumferential surface of the paper tube is formed and an inner circumferential surface paper strip from which the inner circumferential surface of the paper tube is fanned. These strips are overlapped in the lateral direction and wound in a helical manner in such a way that seams of the paper strips do not overlap. The outer circumferential surface paper strip and inner circumferential surface paper strip are intermittently bonded along the seam of the outer circumferential surface paper strip.

The document WO2011/092590 describes a core having a cylindrical wall which can be torn axially. The core is made up of two superposed strips, these respectively being an outer strip in contact with the product and an inner strip. These strips are wound on one another and joined together by regions of attachment for example by bonding. At least one of the longitudinal edges of the inner strip is not attached or is weakly attached over a determined width in order, over at least part of its helical length, to form a free and accessible tab facing the outer strip.

Both above mentioned tearable cores require a precise and careful positioning of the bonding between the inner strip and the outer strip. Therefore, the core manufacturing process is finely adjusted and controlled all over production.

This is particularly true when a production cadence change occurs. Thus, there is a need to ease the manufacturing process of the tearable core, in particular by providing a tearable core that can be easily produced irrespective of the production cadence change.

SUMMARY

It is desirable to form a tearable core that overcomes the above mentioned drawback, and in particular that facilitates transition of production cadence during the manufacturing process.

According to one aspect, there is provided a tearable core, adapted for winding a sheet product, including a cylindrical body wall defining a longitudinal hole of longitudinal axis XX', the cylindrical body wall being tearable from an edge, the cylindrical body wall including an outer strip and an inner strip, the outer strip being a part of the tearable cylindrical body wall adapted to be in contact with the wound sheet product, the inner strip being another part of the tearable cylindrical body wall facing the longitudinal hole, the outer strip and the inner strip being helically wound on one another and displacedly overlapped in a lateral direction parallel to the longitudinal axis XX', the outer strip and the inner strip being secured together through their mutually facing surfaces by a first region of attachment.

In this aspect, the strips are made of materials having characteristics such that, either the inner strip is made of cardboard having a basis weight superior to the basis weight of the outer strip, and a water drop less than to the water drop of the outer strip, or the outer strip is made of cardboard having a basis weight superior to the basis weight of the inner strip, and a water drop less than the water drop of the inner strip.

Also, in this aspect, the cylindrical body wall is built-up as a core tube by securing together the outer strip, a first end part of the outer strip of one turn being superposed and secured to a second end part of the outer strip of an adjacent turn through their mutually facing surfaces by a second region of attachment.

The first and second region of attachment may be positioned such that two vis-à-vis surfaces of the outer strip and the inner strip are not attached together over a defined width at an overlapping helical area where two adjacent turns overlap so as to form a free and internally accessible tab at the edge of the tearable core.

The outer strip and the inner strip, and the end parts of the outer strip may be secured together by adhesive bonding through their mutually facing surfaces, the first and second region of attachment being made of a film of adhesive, the film of adhesive being continuous or discontinuous.

The outer strip and the inner strip, and the end parts of the outer strip may be secured together by mechanical fastening through their mutually facing surfaces.

The first region of attachment may extend from a first end part of the outer strip to a second end part of the inner strip. A width W33 of the outer strip may be identical to or smaller than a width W34 of the inner strip.

The second region of attachment may extend over a width that is smaller than a width of the first region of attachment.

The basis weight of the inner strip may be around 50% higher than the basis weight of the outer strip, and the water drop of the inner strip may be a few minutes while the water drop of the outer strip may be unsized.

The basis weight of the outer strip may be around 50% higher than the basis weight of the inner strip, and the water

3

drop of the outer strip may be a few minutes while the water drop of the inner strip may be unsized.

The basis weight per unit area of one of the strip may be ranging from 100 to 150 g/m² and the water drop may be around 10 min, and the basis weight per unit area of the other strip may be ranging from 400 to 450 g/m² and the water drop may be unsized.

According to another aspect, there is provided a roll of sheet product including a sheet product wound onto a tearable core as described above.

The roll of sheet product may be a web of tissue paper.

According to a further aspect, there is provided a method of manufacturing a tearable core under the form of a cylindrical body wall defining a longitudinal hole of longitudinal axis XX', the cylindrical body wall being tearable from an edge, the manufacturing method including:

making an outer strip and an inner strip in materials having characteristics such that, either the inner strip is made of cardboard having a basis weight superior to the basis weight of the outer strip, and a water drop less than the water drop of the outer strip, or the outer strip is made of cardboard having a basis weight superior to the basis weight of the inner strip, and a water drop less than the water drop of the inner strip;

assembling the outer strip and the inner strip by displacedly overlapping the outer strip and the inner strip in a lateral direction parallel to the longitudinal axis XX', the outer strip and the inner strip being secured together through their mutually facing surfaces by a first region of attachment;

helically winding the assembled outer and inner strips such that the cylindrical body wall is built-up as a core tube by securing together the outer strip, an external surface of a first end part of the outer strip of one turn being overlapped upon an external surface of a second end part of the outer strip of the adjacent turn and secured together through their mutually facing surfaces by a second region of attachment; and

cutting the tearable core at a defined length.

The method of manufacturing a tearable core may further include applying an adhesive on the external surface of the first end part of the outer strip of the assembled outer and inner strips either as a full line or as a dotted line.

With embodiments of the invention, it is possible to avoid, or at least greatly reduce, the control and adjustments required during the cores manufacturing process, in particular at production cadence change. This is achieved by the combination of the material constituting the outer and inner strips, and the position of the second region of attachment.

Embodiments of the invention further enable maintaining the capacity of the core to be easily and qualitatively torn before being installed into a dispenser, i.e. before dispensing starts.

Other advantages will become apparent from the herein-after description of particular embodiments of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

Embodiments of the present invention are illustrated by way of examples and not limited to the accompanying drawings, in which like references indicate similar elements:

FIG. 1 top and bottom parts are perspective views schematically illustrating a paper towel roll when a tearable core is being torn, and a paper towel roll in a center feed dispenser during radial/central dispensing, respectively;

4

FIG. 2 is a cross-section view schematically and partially showing a roll including a tearable core and wound absorbent product according to an embodiment of the invention;

FIG. 3 is a side view of the tearable core of FIG. 2 illustrating the overlapping helical area;

FIG. 4 is a partial cross-section and perspective view of the tearable core of FIG. 2;

FIGS. 5A-C are cross-section views schematically and partially showing an extraction sequence of the tearable core of FIG. 2;

FIG. 6 is a top view of a strip including assembled outer and inner cardboard strips used to manufacture the tearable core of FIG. 2; and

FIG. 7 schematically illustrates a manufacturing machine and method for winding and cutting tearable core of FIG. 2.

DETAILED DESCRIPTION OF PARTICULAR EMBODIMENTS

FIG. 1 top part is a perspective view schematically illustrating a tissue paper roll 1. The tissue paper roll 1 includes a wound absorbent product, for example a tissue paper sheet 2 wound onto a tearable core 3 made of cardboard material. The tissue paper sheet 2 may be provided with pre-cuttings transversal lines (not shown) for ease of detaching individual sheets of tissue paper. Before starting dispensing the portions of sheet of tissue paper from the roll 1, the core 3 is torn axially by applying a pulling tearing force 4 according to the roll longitudinal axis XX'. After the core has been torn and fully removed from the roll 3, the first internal windings of the tissue paper roll 1 can be grasped from the hole constituting the center inside of the roll. Then, the roll is fitted within a center feed dispenser 5.

FIG. 1 bottom part is a perspective view schematically illustrating a tissue paper roll 1 (depicted in plain line) in a center feed dispenser 5 (depicted in dotted line) during radial/central dispensing. In this exemplary embodiment, the center feed dispenser 5 includes a body 6 for example of substantially cylindrical shape for housing the tissue paper roll 1. The cylindrical body 6 includes a dispensing opening 7. Unwound portions of sheet of tissue paper 8 are dispensed from the roll 1 through the dispensing opening 7 when a user applies a pulling dispensing force 9 substantially according to the roll longitudinal axis XX'. The center feed dispenser 5 may further include additional elements that are not depicted for sake of drawing clarity, for example a closing mechanism, a nozzle through which the sheet is dispensed or a cutting device for easing detaching portions of sheet of tissue paper 8, etc. Although, the drawings show the longitudinal axis XX', as a horizontal axis, other directions are also appropriate, for example the center feed dispenser 5 may be positioned substantially vertically.

FIGS. 2 to 4 schematically illustrate a tearable core 3 according to a particular embodiment. The tearable core 3 includes a tearable cylindrical body wall 31 defining a longitudinal hole 35 of longitudinal axis XX'.

FIG. 2 is a cross-section view schematically and partially showing a tissue paper roll 1 including the tearable core 3 and the wound absorbent product 2. The tearable cylindrical body wall 31 of the tearable core 3 includes an outer strip 33 and an inner strip 34. The outer strip 33 is the part of the tearable cylindrical body wall 31 in contact with the wound absorbent product 2. The inner strip 34 is the part of the tearable cylindrical body wall 1 facing the longitudinal hole 35 through the tissue paper roll 1. The outer strip 33 and the inner strip 34 are displacedly overlapped in a lateral direction parallel to the longitudinal axis XX'. The outer strip 33

5

and the inner strip **34** are helically wound on one another at appropriate winding angle Φ and pitch Δ . The outer strip **33** and the inner strip **34** are secured together by specific regions of attachments **36, 37** through their mutually facing surfaces such as to form a tube of superposed strips. In the presently described embodiment, the outer strip **33** and the inner strip **34** are secured together by adhesive bonding through their mutually facing surfaces. Adhesive bonding is performed by applying a film of adhesive on the mutually facing surface that needs to be bonded together. The film of adhesive is applied in a continuous manner. However, as an alternative, it may be applied in a discontinuous or intermittent manner.

According to a first and third embodiment, the characteristics of the material constituting the strips are such that the inner strip **34** is made of a cardboard having a basis weight superior to the basis weight of the outer strip **33**, and a water drop less than the water drop of the outer strip **33**. As an example, the outer strip **33** is made of a cardboard having a low basis weight and a high water drop, while the inner strip **34** is made of cardboard having a medium basis weight and a low water drop. According to the first embodiment, the basis weight of the inner strip **34** is around 50% higher than the basis weight of the outer strip **33**, and the water drop of the inner strip **34** is a few minutes while the water drop of the outer strip **33** is unsized. The water drop evaluates the water absorption by cardboard material. It is measured by dropping a drop of water on the surface of cardboard and measuring the time in seconds/minutes for the drop to be completely absorbed. An unsized water drop means that after a determined period of time the drop is still not absorbed by the cardboard material.

More precisely, the method for measuring water drop uses as an equipment, a free standing burette and a stopwatch. Before starting testing, it is necessary to check that the drop height be 7 centimeters more or less 3 millimeters. A sample of cardboard material is prepared. Three drops of water are deposited at a distance of 3 cm to each other onto one side of the cardboard material sample and the stopwatch is immediately started when a drop is deposited. The time is recorded when each drop has been completely absorbed by the cardboard material sample. The same testing operation is repeated for the other side of the sample. For each side, the average of the measures is calculated in minutes.

Examples are given in the tables hereinafter, wherein cardboard material is manufactured and commercialized by the company Sonoco.

TABLE 1

(first embodiment):		
	outer strip 33	inner strip 34
basis weight/weight per unit area (g/m ²)	400-450	150-200
water drop (min)	Unsize	10

Alternatively, according to a second and fourth embodiment, the hereinbefore characteristic of the material constituting the strip may be inversed, meaning that the outer strip **33** is made of a cardboard having a basis weight superior to the basis weight of the inner strip **34**, and a water drop less than the water drop of the inner strip **34**.

6

TABLE 2

(second embodiment):		
	outer strip 33	inner strip 34
basis weight/weight per unit area (g/m ²)	150-200	400-450
water drop (min)	10	Unsize

TABLE 3

(third embodiment):		
	outer strip 33	inner strip 34
basis weight/weight per unit area (g/m ²)	230	180
water drop (min)	unsized	10

TABLE 4

(fourth embodiment):		
	outer strip 33	inner strip 34
basis weight/weight per unit area (g/m ²)	180	230
water drop (min)	unsized	10

A tearable core according to the first and third embodiment is easier to extract than a tearable core according to the second embodiment.

According to a fifth embodiment, the characteristics of the material constituting the strips are such that the inner strip **34** is made of a cardboard having a basis weight substantially similar to the basis weight of the outer strip **33**, and a water drop less than the water drop of the outer strip **33**. As an example, the outer strip **33** is made of a cardboard having a medium basis weight and a high water drop, while the inner strip **34** is made of cardboard having a medium basis weight and a low water drop. According to this specific embodiment, the water drop of the inner strip **34** is a few minutes while the water drop of the outer strip **33** is unsized.

TABLE 5

(fifth embodiment):		
	outer strip 33	inner strip 34
basis weight/weight per unit area (g/m ²)	180-230	180-230
water drop (min)	unsized	10

Further, the positions of the specific regions of attachments **36, 37** are chosen such as to form a robust core **3** for supporting the wound absorbent product **2**, and at the same time to provide a free and internally accessible tab **50** for easing axial tearing of the tearable core **3**.

FIG. 6 is a top view of a strip **45** including assembled outer and inner strips **33, 34** used to manufacture the tearable core of FIG. 2. Both outer and inner strips are flat. The outer strip **33** is displacedly overlapped and bonded to the inner strip **34** by the first region of attachment **36** that extends from a first end part **38** of the outer strip **33** to a second end part **39** of the inner strip **34** through their mutually facing surfaces. As a consequence, a longitudinal surface **40** at the side edge of the outer strip **33**, and a longitudinal surface **41** at another side edge of the inner strip **34** are not attached together. At this stage, the surfaces of these longitudinal surfaces **40, 41** are non-adhesive coated surfaces. The width

W_{33} of the outer strip **33** may be identical to the width W_{34} of the inner strip **34**. Alternatively, the width W_{33} of the outer strip **33** may be smaller than the width W_{34} of the inner strip **34**.

FIG. 2 depicts in cross-section three consecutive turns A (shown partially), B and C (shown partially) obtained by helically winding the strip **45** of FIG. 6. FIG. 4 is a partial cross-section and perspective view showing the same. At one side, the outer strip **33** of one turn, for example turn B, is superposed and attached to the outer strip of the adjacent turn, for example turn A, by a second region of attachment **37** between the first end part **38** of the outer strip **33** of turn B and the second end part **42A** of the outer strip **33** of adjacent turn A. At the other side, the outer strip **33** of the turn B, is superposed and attached to the outer strip of the adjacent turn, for example turn C, by another second region of attachment **37A** between the first end part **38A** of the outer strip **33** of turn C and the second end part **42** of the outer strip **33** of turn B. The second region of attachment **37**, **37A** extends over a width that is smaller than a width of the first region of attachment **36** that bonds both outer and inner strips **33**, **34**. As a consequence, two vis-à-vis surfaces **43** of the outer strip **33** and the inner strip **34** are not attached together over a defined width at an overlapping helical area **44** where two adjacent turns overlap. FIG. 3 is a side view of the tearable core of FIG. 2 illustrating the overlapping helical area **44**. Further, it is to be noted that the tearable cylindrical body wall **31** is maintained as a coherent tube only by the attachment **37** of the outer strip **33**. With the hereinbefore mentioned embodiments (combining the material used for the strips and the position of the region of attachments), an association (first region of attachment **36**) is created between the outer strip **33** and the inner strip **34** that is stronger than the association (second region of attachment **37**) between the adjacent turns of the outer strip **33**. As a consequence, a frangible zone is created at the second region of attachment **37**. The inner strip **34** serves as a means for applying the pulling tearing force that breaks the second region of attachment **37**. A free and internally accessible tab **50** is formed at the edge (selvage) of the core that has been cut substantially perpendicularly to the longitudinal axis XX' . This tab **50** can be easily grasped in order to apply the pulling tearing force **4** shown in FIG. 1.

FIGS. 5A, 5B and 5C are cross-section views schematically and partially showing an extraction sequence of the tearable core of FIG. 2. A user grasps the free and internally accessible tab **50** and applies the pulling tearing force **4** according to a direction substantially parallel the longitudinal axis XX' . The pulling force **4** has the effect to break the association zone **52A**, at the second region of attachment **37**, between the superposed end parts **38**, **42** of the outer strip **33** close to the edge **51** of the tearable core **3**. While the pulling force **4** is further applied, the breaking effect continues to propagate helically and continuously breaks the second region of attachment **37** (various broken association zone **52B**, **52C** and **52D** are shown as steps in the extraction sequence) until the other edge of the tearable core **3** is reached. At the same time, the diameter of the torn core reduced and the cylindrical body wall **31** is not anymore in contact with the sheet product **2**. As a result, the tearable core **3** is torn axially and the user gains access to the first internal sheet product **2** from the inside **35** of the roll **1**.

FIG. 7 is schematically showing the manufacturing of a core **3** under the form of a cylindrical tube. The spirally wound tube core **3** is formed by spirally winding a strip **45** including preassembled outer and inner strips **33**, **34** of cardboard onto a circular cylindrical mandrel at a given

spiral wind angle. The strip **45** is wound such that the external surface of the first end part **38** of the outer strip **33** of one turn is overlapped upon the external surface of the second end part **42** of the outer strip of the adjacent turn and adhered together in the overlapping helical area **44** to build up the cylindrical tube.

As an example, the core has a diameter of around 80 mm, a width W_{33} around 120 mm, a width W_{34} around 140 mm, a width of the vis-à-vis portion **43** around 10 mm, and a width of the overlapping helical area **44** around 40 mm.

More precisely, FIG. 7 schematically illustrates a machine for winding and cutting tearable core tube **3**. The tearable core **3** is spirally wound in the winding unit **60** and then cut to the desired length in the cutting unit **64**.

The winding unit **60** includes a gluing depositing nozzle **61**, a mandrel **62** and a winding belt **63**.

The gluing depositing nozzle **61** is positioned upstream of the mandrel **62** and the winding belt **63**. The gluing depositing nozzle **61** is applying an adhesive (glue) on the external surface (longitudinal surface **41**) of the first end part **38** of the outer strip **33** of the strip **45** of preassembled outer and inner strips **33**, **34** as a full line (as shown) or as a dotted line (not shown). The line may have a width of a few millimeters.

The tearable core tube is formed by spirally winding the strip **45** onto the mandrel **62**. The mandrel **62** may be an elongate metallic cylinder. The winding angle Φ may be 45° , but any other angle may be acceptable.

The winding belt **63** engages the strip **45** and forms a tearable core tube **3**. As a result of this engagement, the core tube advances along the mandrel in a screw fashion. The external surface of the first end part **38** of the outer strip **33** is applied so as to adhere onto the external surface (longitudinal surface **40**) of the second end part **42** of the outer strip of the adjacent turn (see FIG. 2 for details). This results in forming a well defined tearable core tube **3** downstream of the winding belt **63**.

The cutting unit **64** is positioned downstream of the winding unit **60**. The cutting unit **64** cuts tearable core tube **3** of the desired length L . The cutting unit **64** may include a circular saw, a blade, a crushing device, etc. FIG. 3 schematically and partially illustrates the tearable core tube **3** that is obtained with the machine depicted in FIG. 7.

The overall process may be continuous or discontinuous, meaning that the strip **45** may be manufactured (preassembled) separately and then temporarily stored as a roll (this is not shown) before being wound as tube cores in the described machine.

With embodiments of the invention, the manufacturing is simplified resulting in the possibility to increase the production cadency from 30-35 m/min up to 80 m/min.

The drawings and their descriptions hereinbefore illustrate rather than limit the invention.

The sizes, densities, angles and positions of the respective strips in the depicted embodiments are non limitative examples. The skilled person will readily recognize that these sizes, densities, angles and positions may be changed if desired or deemed necessary with respect to the required tearable effect to be achieved, or to adjust the section of the core to other dimension, etc. Further, the examples given in the tables are non limitative examples based on currently commercialized cardboard material; one can imagine that, in the future, cardboard material having a basis weight decreasing up to 80 g/m^2 may be possible.

Though the depicted and described embodiments show the outer strip and the inner strip, and the end parts of the outer strip to be secured together by adhesive bonding through their mutually facing surfaces, these strips or parts

of strip may alternatively be secured together by mechanical fastening through their mutually facing surfaces, for example by knurling. In this case, the deformation of the mutually facing surfaces of the strips or parts of strip resulting from a knurling process constitutes the first and second region of attachment.

The core may be used in a winding sheet product as "rolls of sheet product". This has a large meaning encompassing, as examples, the rolls of paper towels, toilet tissues, plastic sheets or the like, metal sheets (e.g. aluminum) sheets or the like, food preservation bags, wraps, etc. The sheet product may be rolled as a continuous non-perforated sheet or pre-perforated sheets. The "roll of sheet product" may be used for residential or commercial applications. A dispenser assembly may dispense the sheets of product from the roll of sheet product either manually (a user may pull the sheet of material with a hand) or motor assisted (a motor may assist in automatically dispensing the sheet of material on wish). Such dispenser assembly and mechanisms are not germane to the present invention and will not be further described in details.

Any reference sign in a claim should not be construed as limiting the claim. The word "comprising" does not exclude the presence of other elements than those listed in a claim. The word "a" or "an" or "at least one" preceding an element does not exclude the presence of a plurality of such element.

The invention claimed is:

1. A tearable core, adapted for winding a sheet product, comprising a cylindrical body wall defining a longitudinal hole of longitudinal axis XX', the cylindrical body wall being tearable from an edge, the cylindrical body wall comprising an outer strip and an inner strip, the outer strip being a part of the tearable cylindrical body wall adapted to be in contact with the wound sheet product, the inner strip being another part of the tearable cylindrical body wall facing the longitudinal hole, the outer strip and the inner strip being helically wound on one another and displacedly overlapped in a lateral direction parallel to the longitudinal axis XX', the outer strip and the inner strip being secured together through their mutually facing surfaces by a first region of attachment,

wherein the inner and outer strips are made of materials having characteristics such that, either the inner strip is made of cardboard having a water drop less than the water drop of the outer strip, or the outer strip is made of cardboard having a water drop less than the water drop of the inner strip, and

wherein the cylindrical body wall is built-up as a core tube by securing together the outer strip, a first end part of the outer strip of one turn being superposed and secured to a second end part of the outer strip of an adjacent turn through their mutually facing surfaces by a second region of attachment.

2. The tearable core of claim 1, wherein the first and second regions of attachment are positioned such that two vis-à-vis surfaces of the outer strip and the inner strip are not attached together over a defined width at an overlapping helical area where two adjacent turns overlap so as to form a free and internally accessible tab at the edge of the tearable core.

3. The tearable core of claim 1, wherein the outer strip and the inner strip, and the first and second end parts of the outer strip are secured together by adhesive bonding through their mutually facing surfaces, the first and second regions of attachment being made of a film of adhesive, the film of adhesive being continuous or discontinuous.

4. The tearable core of claim 1, wherein the outer strip and the inner strip, and the first and second end parts of the outer strip are secured together by mechanical fastening through their mutually facing surfaces.

5. The tearable core of claim 1, wherein the first region of attachment extends from a first end part of the outer strip to a second end part of the inner strip, and wherein a width of the outer strip is identical to or smaller than a width of the inner strip.

6. The tearable core of claim 1, wherein the second region of attachment extends over a width that is smaller than a width of the first region of attachment.

7. The tearable core of claim 1, wherein the inner strip is made of cardboard having a basis weight superior to the basis weight of the outer strip.

8. The tearable core of claim 7, wherein the basis weight of the inner strip is around 50% higher than the basis weight of the outer strip, and the water drop of the inner strip is a few minutes while the water drop of the outer strip is unsized.

9. The tearable core of claim 1, wherein the outer strip is made of cardboard having a basis weight superior to the basis weight of the inner strip.

10. The tearable core of claim 9, wherein the basis weight of the outer strip is around 50% higher than the basis weight of the inner strip, and the water drop of the outer strip is a few minutes while the water drop of the inner strip is unsized.

11. The tearable core of claim 1, wherein the basis weight per unit area of one of the outer strip or the inner strip is ranging from 150 to 200 g/m² and the water drop is around 10 min, and the basis weight per unit area of the other of the outer strip or the inner strip is ranging from 400 to 450 g/m² and the water drop is unsized.

12. The tearable core of claim 1, wherein the inner strip is made of cardboard having a basis weight equal to the basis weight of the outer strip.

13. The tearable core of claim 12, wherein the basis weight per unit area of one of the outer strip or the inner strip is ranging from 180 to 230 g/m² and the water drop is around 10 min, and the basis weight per unit area of the other of the outer strip or the inner strip is ranging from 180 to 230 g/m² and the water drop is unsized.

14. A roll of sheet product comprising a sheet product wound onto the tearable core of claim 1.

15. The roll of sheet product of claim 14, wherein the sheet product is a web of tissue paper.

16. A method of manufacturing a tearable core under the form of a cylindrical body wall defining a longitudinal hole of longitudinal axis XX', the cylindrical body wall being tearable from an edge, comprising:

making an outer strip and an inner strip in materials having characteristics such that, either the inner strip is made of cardboard having a water drop less than the water drop of the outer strip, or the outer strip is made of cardboard having a water drop less than the water drop of the inner strip;

assembling the outer strip and the inner strip by displacedly overlapping the outer strip and the inner strip in a lateral direction parallel to the longitudinal axis XX', the outer strip and the inner strip being secured together through their mutually facing surfaces by a first region of attachment;

helically winding the assembled outer and inner strips such that the cylindrical body wall is built-up as a core tube by securing together the outer strip, an external surface of a first end part of the outer strip of one turn

11

being overlapped upon an external surface of a second end part of the outer strip of the adjacent turn and secured together through their mutually facing surfaces by a second region of attachment; and
cutting the tearable core at a defined length.

5

17. The method of manufacturing a tearable core of claim **16**, further comprising applying an adhesive on the external surface of the first end part of the outer strip of the assembled outer and inner strips either as a full line or as a dotted line.

* * * * *

10

12

REIVINDICACIONES

1. Un núcleo desprendible (3), adaptado para enrollar un producto en lámina (2), que comprende una pared de cuerpo cilíndrico (31) que define un orificio longitudinal (35) de eje longitudinal XX', siendo desprendible, de un borde (51) , la pared de cuerpo cilíndrico (31), comprendiendo la pared de cuerpo cilíndrico una banda externa (33) y una banda interna (34), siendo la banda externa (33) una parte de la pared de cuerpo cilíndrico desprendible (31), adaptada para estar en contacto con el producto en lámina enrollado (2), siendo la banda interna (34) otra parte de la pared de cuerpo cilíndrico desprendible (31) , de frente al orificio longitudinal (35), enrollándose de manera helicoidal la banda externa (33) y la banda interna (34) entre sí y colocándose en sobreposición de manera desplazada, en una dirección lateral, paralela al eje longitudinal XX', asegurándose en conjunto la banda externa (33) y la banda interna (34) a través de sus superficies mutuamente de frente mediante una primera región de acoplamiento (36) , caracterizado porque:

- las bandas (33, 34) se elaboran de materiales que tienen características tales que, ya sea la banda interna (34) se elabore de cartón que tiene un descenso de agua inferior al descenso de agua de la banda externa (33), de modo que la banda interna (34) tiene mayor capacidad de absorción de agua que la banda externa (33) o la banda externa (33) se elabore de cartón que tiene un descenso de agua inferior al descenso de agua de la banda interna (34) de modo que la banda externa (33) tiene mayor capacidad de absorción de agua que la banda interna (34); y
- la pared de cuerpo cilíndrico (31) se construye como un tubo de núcleo al asegurar en conjunto la banda externa (33), una primera parte de extremo (38) de la banda externa (33) de un giro (A) que se coloca en sobreposición y se asegura a una segunda parte (42A) de extremo de la banda externa (33) de un giro adyacente (B) a través de sus superficies mutuamente de frente, por medio de una segunda región de acoplamiento (37).

2. El núcleo desprendible (3) de conformidad con la reivindicación 1, caracterizado porque la primera y segunda región de acoplamiento (36, 37) se colocan de tal manera que dos superficies (43) de frente de la banda externa (33) y la banda interna (34) no se acoplan en conjunto sobre una amplitud definida en un área de sobreposición helicoidal (44) donde dos giros adyacentes se colocan en sobreposición a fin de formar una lengüeta internamente accesible y libre (50) , en el borde (51) del núcleo desprendible (3).

3. El núcleo desprendible (3) de conformidad con la reivindicación 1 o 2, caracterizado porque la banda externa (33) y la banda interna (34), y las partes de extremo (38, 42A) de la banda externa (33), se aseguran en conjunto mediante unión adhesiva, a través de sus superficies mutuamente de frente, elaborándose la región de acoplamiento, primera y segunda, de una película de adhesivo (36, 37), siendo continua o discontinua la película de adhesivo.
4. El núcleo desprendible (3) de conformidad con la reivindicación 1 o 2, caracterizado porque la banda externa (33) y la banda interna (34), y las partes de extremo (38, 42A) de la banda externa (33), se aseguran en conjunto mediante sujeción mecánica, a través de sus superficies mutuamente de frente.
5. El núcleo desprendible (3) de conformidad con cualquiera de las reivindicaciones 1 a 4, caracterizado porque la primera región de acoplamiento (36) se extiende desde una primera parte de extremo (38) de la banda externa (33) hasta una segunda parte de extremo (39) de la banda interna (34), y en donde una amplitud W_{33} de la banda externa (33) es idéntica o inferior a una amplitud W_{34} de la banda interna (34).
6. El núcleo desprendible (3) de conformidad con cualquiera de las reivindicaciones 1 a 5, caracterizado porque la segunda región de acoplamiento (37) se extiende sobre una amplitud que es inferior a una amplitud de la primera región de acoplamiento (36).
7. El núcleo (3) desprendible de conformidad con cualquiera de las reivindicaciones 1 a 6, caracterizado porque la banda interna (34) se elabora de cartón que tiene un peso base superior al peso base de la banda externa (33).
8. El núcleo desprendible (3) de conformidad con cualquiera de las reivindicaciones 1 a 6, caracterizado porque la banda externa (33) se elabora de cartón que tiene un peso base superior al peso base de la banda interna (34).
9. El núcleo desprendible (3) de conformidad con cualquiera de las reivindicaciones 1 a 7 y 9, caracterizado porque el peso base por área de unidad de una de las bandas varía desde 150 hasta 200 g/m² y el descenso de agua es de 10 minutos, y el peso base por área de unidad de la otra banda varía desde 400 hasta 450 g/m² y el descenso de agua es de tamaño no definido.

10. El núcleo desprendible (3) de conformidad con cualquiera de las reivindicaciones 1 a 6, caracterizado porque la banda interna (34) se elabora de cartón que tiene un peso base igual al peso base de la banda externa (33).

11. El núcleo desprendible (3) de conformidad con la reivindicación 10, caracterizado porque el peso base por área de unidad de una de las bandas varía desde 180 hasta 230 g/m² y el descenso de agua es de 10 minutos, y el peso base por área de unidad de la otra banda varía desde 180 hasta 230 g/m² y el descenso de agua es de tamaño no definido.

12. Un rollo de producto en lámina (1), caracterizado porque comprende un producto en lámina (2) enrollado sobre un núcleo desprendible (3) de conformidad con cualquiera de las reivindicaciones 1 a 11.

13. El rollo de producto en lámina de conformidad con la reivindicación 12, caracterizado porque el producto en lámina (2) es una trama de papel tisú.

14. Un método de elaboración de un núcleo desprendible (3) bajo la forma de una pared de cuerpo cilíndrico (31) que define un orificio longitudinal (35) de eje longitudinal XX', la pared de cuerpo cilíndrico, siendo desprendible, de un borde (51), caracterizado el método de elaboración porque comprende las etapas de:

- elaborar una banda externa (33) y una banda interna (34) en materiales que tienen características tales que, ya sea la banda interna (34) se elabora de cartón que tiene un descenso de agua inferior al descenso de agua de la banda externa (33) de modo que la banda interna (34) tiene mayor capacidad de absorción de agua que la banda externa (33), o la banda externa (33) se elabora de cartón que tiene un descenso de agua inferior al descenso de agua de la banda interna (34) de modo que la banda externa (33) tiene mayor capacidad de absorción de agua que la banda interna (34);
- ensamblar la banda externa (33) y la banda interna (34) mediante colocación en superposición de manera desplazada de la banda externa (33) y la banda interna (34), en una dirección lateral, paralela al eje longitudinal XX', asegurándose en conjunto la banda externa y la banda interna a través de sus superficies mutuamente de frente, mediante una primera región de acoplamiento (36);
- enrollar de manera helicoidal las bandas ensambladas, externa e interna (33, 34), de tal manera que la pared de cuerpo cilíndrico (31) se construye como un tubo de núcleo al asegurar en conjunto la banda externa (34), colocándose en superposición una superficie externa de una primera parte de extremo (38) de la banda externa (33) de

un giro, sobre una superficie externa de una segunda parte de extremo (42) de la banda externa (33) del giro adyacente y asegurándose en conjunto a través de sus superficies mutuamente de frente, mediante una segunda región de acoplamiento (37); y cortar el núcleo desprendible (3) a una longitud definida (L).

15. El método de elaboración de un núcleo desprendible (3) de conformidad con la reivindicación 14, caracterizado porque comprende además la aplicación de un adhesivo sobre la superficie externa de la primera parte de extremo (38) de la banda externa (33) de las bandas ensambladas, externa e interna (33, 34), ya sea como una línea completa o como una línea punteada.

LAG\LAG\ID-600374\WPC20007



Formalities Officer
Name: Teixeira, Antonio
Tel: +31 70 340 - 3118
or call
+31 (0)70 340 45 00

INFORMATION
according to applicant's waiver of right to
receive a further communication under Rule 71(3) EPC

Application No. 14 846 754.1 - 1017	Ref. 196 454 aa/uhi	Date 26.11.2018
Applicant Essity Operations France		

Information under Rule 71(3) EPC

1. Intention to grant

The examining division intends to grant a European patent on the basis of the above application, with the text and drawings and the related bibliographic data as indicated below.

A copy of the relevant documents is enclosed.

1.1 In the text for the Contracting States:

AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT
RO RS SE SI SK SM TR

Description, Pages

1, 2, 4-6, 8-12	as published	
3, 7	filed in electronic form on	29-10-2018

Claims, Numbers

1-17	filed in electronic form on	29-10-2018
------	-----------------------------	------------

Drawings, Sheets

1/5-5/5	as published
---------	--------------

1.2 Bibliographic data

The title of the invention in the three official languages of the European Patent Office, the international patent classification, the designated contracting states, the registered name(s) of the applicant(s) and the other bibliographic data are shown on **EPO Form 2056** (enclosed).

2. **Consent to the applicant's waiver of the right to receive a further communication under Rule 71(3) EPC**

Following the communication under Rule 71(3) EPC of 22.06.2018, the applicant indicated to the EPO that he wished to waive his right to receive a further communication under Rule 71(3) EPC.

By indicating this wish and by fulfilling the requirements concerning the payment of the fees under Rule 71(3) EPC and, where applicable, Rule 71(4) EPC, as well as the filing of the translations of the claims under Rule 71(3) EPC, the applicant is deemed to have approved the grant of the patent as amended or corrected and to have verified the bibliographic data (see Notice from the EPO dated 8 June 2015, OJ EPO 2015, A52).

The examining division gives its consent to the amendments or corrections requested by the applicant on 29.10.2018 and, since there is agreement as to the text to be granted and all the formal requirements mentioned above have been met, to the waiver indicated by the applicant.

Once the patent has been granted, no errors remaining in the text of the patent as approved can be corrected under Rule 140 EPC.

3. **Further procedure**

- 3.1 Since the conditions for consent to the waiver have been met, the decision to grant the European patent will be issued and the **mention of the grant** of the patent published in the European Patent Bulletin.

Note on payment of the renewal fee

If a renewal fee becomes due before the next possible date for publication of the mention of the grant of the European patent, publication will be effected only after the renewal fee and any additional fee have been paid (Rule 71a(4) EPC).

Under Article 86(2) EPC, the obligation to pay renewal fees to the European Patent Office terminates with the payment of the renewal fee due in respect of the year in which the mention of the grant of the European patent is published.

Note on payment of the designation fee(s)

If the designation fee(s) become(s) due after the information under Rule 71(3) EPC has been published, the mention of the grant of the European patent will not be published until these fees have been paid (Rule 71a(3) EPC).

- 3.2 After publication, the **European patent specification** can be downloaded free of charge from the EPO publication server <https://data.epo.org/publication-server>.

4. **Notes concerning fee payments**

4.1 **Making payments**

For payments made via deposit account, please note that as from 1 December 2017 debit orders will only be carried out if filed in an electronically processable format (xml), using an accepted means of filing as laid down in the Arrangements for deposit accounts (ADA), published in the Supplementary publication in the Official Journal.

All relevant information related to the modes of payment of fees to the EPO can be retrieved from the EPO website at "**Making Payments**".

4.2 Information concerning fee amounts

Procedural fees are usually adjusted every two years, on even years, with effect from 1 April. Therefore, before making a payment, parties should verify the amounts actually due on the date of payment using the applicable version of the Schedule of fees and expenses, published as a Supplement to the Official Journal of the EPO, available on the EPO website (www.epo.org) at www.epo.org/schedule-of-fees. The "Schedule of fees" table allows the viewing, downloading and searching of individual fee amounts, both current and previous.

Examining Division:

Chairman:	Guthmuller, Jacques
2nd Examiner:	Rupcic, Zoran
1st Examiner:	Pussemier, Bart



Teixeira, Antonio
For the Examining Division
Tel. No.: +31 70 340 - 3118

Branch at The Hague

Enclosures: Text intended for grant

EPO Form 2056

Annex to EPO Form 2004, Communication pursuant to Rule 71(3) EPC

Bibliographical data of European patent application No. 14 846 754.1

For the intended grant of the European patent, the bibliographical data are set out below, for information:

Title of invention:

- ZERREISSBARER KERN, ROLLE MIT SOLCH EINEM KERN UND VERFAHREN ZUR HERSTELLUNG EINES ZERREISSBAREN KERNS
- A TEARABLE CORE, A ROLL COMPRISING SUCH A CORE AND A TEARABLE CORE MANUFACTURING METHOD
- PARTIE CENTRALE POUVANT ÊTRE DÉCHIRÉE, ROULEAU COMPRENANT UNE TELLE PARTIE CENTRALE, ET PROCÉDÉ DE FABRICATION DE PARTIE CENTRALE POUVANT ÊTRE DÉCHIRÉE

Classification: INV. B65H75/10 B65H75/50

Date of filing: 19.12.2014

Priority claimed:

Contracting States*
for which fees have been paid:

AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU
LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

Extension States*
for which fees have been paid:

Validation States*
for which fees have been paid:

Applicant(s):** Essity Operations France
151-161, boulevard Victor Hugo
93400 Saint-Ouen
FR

Inventor(s): CATTACIN, Gilles
c/o Sca Tissue France
151-161 Boulevard Victor Hugo
93400 St Ouen
FR

BRENDLE, Damien
c/o Sca Tissue France
151-161 Boulevard Victor Hugo
93400 St Ouen
FR

- *) If the time limit for the payment of designation fees according to Rule 39(1) EPC has not yet expired and the applicant has not withdrawn any designation, **all Contracting States/Extension States/Validation States** are currently still deemed to be designated. See also Rule 71a(3) EPC and, if applicable, the above Note to users of the automatic debiting procedure.
- **) If two or more applicants have designated different Contracting States, this is indicated here.

WO 2016/097798

PCT/IB2014/003180

1

A TEARABLE CORE, A ROLL COMPRISING SUCH A CORE AND A TEARABLE CORE MANUFACTURING METHOD

FIELD OF THE INVENTION

5 An aspect of the invention relates to a tearable core, namely a cylindrical tube, more precisely a cardboard cylindrical tube. Such a core finds a particular, though non exclusive, application in the tissue paper industry where a web of absorbent material like a web of tissue paper or a web of non-woven is wound onto such a core. Another aspect of the invention relates to a roll comprising a sheet
10 product wound onto a core of the invention. Still another aspect of the invention relates to a core manufacturing method.

BACKGROUND OF THE INVENTION

 Rolls of product in sheet form wound around a core are known in the art. Such rolls are used, as example as, paper towel, wiper or toilet tissue rolls for both
15 domestic and professional applications. According to a first type of use, the sheet form product can be dispensed tangentially from the outside of the roll towards the core of the roll by, for example, rotating the roll. According to a second type of use, the sheet form product can be dispensed radially/centrally from the inside towards the outside of the roll. This is a so-called center feed dispensing. In this second case,
20 the core must be removed from the roll before dispensing can start.

 The document JPH1129263 describes an inner layer-release paper tube. The inner layer-release paper tube facilitates the disassembly and removal of the paper tube based on a simple pulling of an inner circumferential surface paper strip, and the smooth release of a winding material from the inner side. The inner layer-
25 release paper tube consists of a spiral paper tube in which an outer circumferential surface paper strip from which the outer circumferential surface of the paper tube is formed and an inner circumferential surface paper strip from which the inner circumferential surface of the paper tube is formed. These strips are overlapped in the lateral direction and wound in a helical manner in such a way that seams of the
30 paper strips do not overlap. The outer circumferential surface paper strip and inner circumferential surface paper strip are intermittently bonded along the seam of the outer circumferential surface paper strip.

 The document WO2011/092590 describes a core having a cylindrical wall which can be torn axially. The core is made up of two superposed strips, these
35 respectively being an outer strip in contact with the product and an inner strip. These strips are wound on one another and joined together by regions of attachment for

WO 2016/097798

PCT/IB2014/003180

2

example by bonding. At least one of the longitudinal edges of the inner strip is not attached or is weakly attached over a determined width in order, over at least part of its helical length, to form a free and accessible tab facing the outer strip.

Both above mentioned tearable cores require a precise and careful positioning of the bonding between the inner strip and the outer strip. Therefore, the core manufacturing process is finely adjusted and controlled all over production. This is particularly true when a production cadence change occurs. Thus, there is a need to ease the manufacturing process of the tearable core, in particular by providing a tearable core that can be easily produced irrespective of the production cadence change.

SUMMARY OF THE INVENTION

It is an object of the invention to propose a tearable core that overcomes the above mentioned drawback, and in particular that facilitates transition of production cadence during the manufacturing process.

According to one aspect, there is provided a tearable core, adapted for winding a sheet product, comprising a cylindrical body wall defining a longitudinal hole of longitudinal axis XX' , the cylindrical body wall being tearable from an edge, the cylindrical body wall comprising an outer strip and an inner strip, the outer strip being a part of the tearable cylindrical body wall adapted to be in contact with the wound sheet product, the inner strip being another part of the tearable cylindrical body wall facing the longitudinal hole, the outer strip and the inner strip being helically wound on one another and displacedly overlapped in a lateral direction parallel to the longitudinal axis XX' , the outer strip and the inner strip being secured together through their mutually facing surfaces by a first region of attachment, wherein:

- the strips are made of materials having characteristics such that, either the inner strip is made of cardboard having a basis weight superior to the basis weight of the outer strip, and a water drop less than to the water drop of the outer strip, or the outer strip is made of cardboard having a basis weight superior to the basis weight of the inner strip, and a water drop less than the water drop of the inner strip; and

- the cylindrical body wall is built-up as a core tube by securing together the outer strip, a first end part of the outer strip of one turn being superposed and secured to a second end part of the outer strip of an adjacent turn through their mutually facing surfaces by means of a second region of attachment.

The first and second region of attachment may be positioned such that two vis-à-vis surfaces of the outer strip and the inner strip are not attached together over a defined width at an overlapping helical area where two adjacent turns overlap so

14 846 754.1
Essity Operations France

3

196 454 t9/fba

as to form a free and internally accessible tab at the edge of the tearable core.

The outer strip and the inner strip, and the end parts of the outer strip may be secured together by adhesive bonding through their mutually facing surfaces, the first and second region of attachment being made of a film of adhesive, the film of
5 adhesive being continuous or discontinuous.

The outer strip and the inner strip, and the end parts of the outer strip may be secured together by mechanical fastening through their mutually facing surfaces.

The first region of attachment may extend from a first end part of the outer strip to a second end part of the inner strip. A width W33 of the outer strip may be
10 identical to or smaller than a width W34 of the inner strip.

The second region of attachment may extend over a width that is smaller than a width of the first region of attachment.

The basis weight of the inner strip may be around 50% higher than the basis weight of the outer strip, and the water drop of the inner strip may be a few minutes
15 while the water drop of the outer strip may be unsized.

The basis weight of the outer strip may be around 50% higher than the basis weight of the inner strip, and the water drop of the outer strip may be a few minutes while the water drop of the inner strip may be unsized.

The basis weight per unit area of one of the strip may be ranging from 400
20 to 450 g/m² and the water drop may be around 10 min, and the basis weight per unit area of the other strip may be ranging from 150 to 200 g/m² and the water drop may be unsized.

According to another aspect, there is provided a roll of sheet product comprising a sheet product wound onto a tearable core of the invention.

25 The roll of sheet product may be a web of tissue paper.

According to a further aspect, there is provided a method of manufacturing a tearable core under the form of a cylindrical body wall defining a longitudinal hole of longitudinal axis XX', the cylindrical body wall being tearable from an edge, the manufacturing method comprising the steps of:

30 - making an outer strip and an inner strip in materials having characteristics such that, either the inner strip is made of cardboard having a basis weight superior to the basis weight of the outer strip, and a water drop less than the water drop of the outer strip, or the outer strip is made of cardboard having a basis weight superior to the basis weight of the inner strip, and a water drop less than the water drop of the
35 inner strip;

- assembling the outer strip and the inner strip by displacedly overlapping the outer strip and the inner strip in a lateral direction parallel to the longitudinal axis

WO 2016/097798

PCT/IB2014/003180

4

XX', the outer strip and the inner strip being secured together through their mutually facing surfaces by a first region of attachment;

- helically winding the assembled outer and inner strips such that the cylindrical body wall is built-up as a core tube by securing together the outer strip, an external surface of a first end part of the outer strip of one turn being overlapped upon an external surface of a second end part of the outer strip of the adjacent turn and secured together through their mutually facing surfaces by a second region of attachment; and

- cutting the tearable core at a defined length.

The method of manufacturing a tearable core may further comprise applying an adhesive on the external surface of the first end part of the outer strip of the assembled outer and inner strips either as a full line or as a dotted line.

With the invention, it is possible to avoid at least greatly reduce the control and adjustments required during the cores manufacturing process, in particular at production cadence change. This is achieved by the combination of the material constituting the outer and inner strips, and the position of the second region of attachment.

The invention further enables maintaining the capacity of the core to be easily and qualitatively torn before being installed into a dispenser, i.e. before dispensing starts.

Other advantages will become apparent from the hereinafter description of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention is illustrated by way of examples and not limited to the accompanying drawings, in which like references indicate similar elements:

- FIG. 1 top and bottom parts are perspective views schematically illustrating a paper towel roll when a tearable core is being torn, and a paper towel roll in a center feed dispenser during radial/central dispensing, respectively;
- FIG. 2 is a cross-section view schematically and partially showing a roll comprising a tearable core and wound absorbent product according to an embodiment of the invention;
- FIG. 3 is a side view of the tearable core of FIG.2 illustrating the overlapping helical area;
- FIG. 4 is a partial cross-section and perspective view of the tearable core of FIG.2;
- FIG. 5 is a cross-section view schematically and partially showing an

WO 2016/097798

PCT/IB2014/003180

5

extraction sequence of the tearable core of FIG. 2;

- FIG. 6 is a top view of a strip comprising assembled outer and inner cardboard strips used to manufacture the tearable core of FIG.2; and
- FIG. 7 schematically illustrates a manufacturing machine and method for winding and cutting tearable core of FIG.2.

5

DETAILED DESCRIPTION OF THE INVENTION

FIG. 1 top part is a perspective view schematically illustrating a tissue paper roll 1. The tissue paper roll 1 comprises a wound absorbent product, for example a tissue paper sheet 2 wound onto a tearable core 3 made of cardboard material. The tissue paper sheet 2 may be provided with pre-cuttings transversal lines (not shown) for ease of detaching individual sheets of tissue paper. Before starting dispensing the portions of sheet of tissue paper from the roll 1, the core 3 is torn axially by applying a pulling tearing force 4 according to the roll longitudinal axis XX'. After the core has been torn and fully removed from the roll 3, the first internal windings of the tissue paper roll 1 can be grasped from the hole constituting the center inside of the roll. Then, the roll is fitted within a center feed dispenser 5.

FIG. 1 bottom part is a perspective view schematically illustrating a tissue paper roll 1 (depicted in plain line) in a center feed dispenser 5 (depicted in dotted line) during radial/central dispensing. In this exemplary embodiment, the center feed dispenser 5 comprises a body 6 for example of substantially cylindrical shape for housing the tissue paper roll 1. The cylindrical body 6 comprises a dispensing opening 7. Unwound portions of sheet of tissue paper 8 are dispensed from the roll 1 through the dispensing opening 7 when a user applies a pulling dispensing force 9 substantially according to the roll longitudinal axis XX'. The center feed dispenser 5 may further comprise additional elements that are not depicted for sake of drawing clarity, for example a closing mechanism, a nozzle through which the sheet is dispensed or a cutting device for easing detaching portions of sheet of tissue paper 8, etc... Although, the drawings show the longitudinal axis XX' as a horizontal axis, others directions are also appropriate, for example the center feed dispenser 5 may be positioned substantially vertically.

FIGS. 2 to 4 schematically illustrate a tearable core 3 of the invention according to a preferred embodiment of the invention. The tearable core 3 comprises a tearable cylindrical body wall 31 defining a longitudinal hole 35 of longitudinal axis XX'.

FIG. 2 is a cross-section view schematically and partially showing a tissue paper roll 1 comprising the tearable core 3 and the wound absorbent product 2. The tearable cylindrical body wall 31 of the tearable core 3 comprises an outer strip 33

35

WO 2016/097798

PCT/IB2014/003180

6

and an inner strip 34. The outer strip 33 is the part of the tearable cylindrical body wall 31 in contact with the wound absorbent product 2. The inner strip 34 is the part of the tearable cylindrical body wall 31 facing the longitudinal hole 35 through the tissue paper roll 1. The outer strip 33 and the inner strip 34 are displacedly overlapped in a lateral direction parallel to the longitudinal axis XX'. The outer strip 33 and the inner strip 34 are helically wound on one another at appropriate winding angle Φ and pitch Δ . The outer strip 33 and the inner strip 34 are secured together by means of specific regions of attachments 36, 37 through their mutually facing surfaces such as to form a tube of superposed strips. In the presently described embodiment of the invention, the outer strip 33 and the inner strip 34 are secured together by adhesive bonding through their mutually facing surfaces. Adhesive bonding is performed by applying a film of adhesive on the mutually facing surface that needs to be bonded together. The film of adhesive is applied in a continuous manner. However, as an alternative, it may be applied in a discontinuous or intermittent manner.

According to a first and third embodiment the invention, the characteristics of the material constituting the strips are such that the inner strip 34 is made of a cardboard having a basis weight superior to the basis weight of the outer strip 33, and a water drop less than the water drop of the outer strip 33. As an example, the outer strip 33 is made of a cardboard having a low basis weight and a high water drop, while the inner strip 34 is made of cardboard having a medium basis weight and a low water drop. According to the first embodiment, the basis weight of the inner strip 34 is around 50% higher than the basis weight of the outer strip 33, and the water drop of the inner strip 34 is a few minutes while the water drop of the outer strip 33 is unsized. The water drop evaluates the water absorption by cardboard material. It is measured by dropping a drop of water on the surface of cardboard and measuring the time in seconds/minutes for the drop to be completely absorbed. An unsized water drop means that after a determined period of time the drop is still not absorbed by the cardboard material.

More precisely, the method for measuring water drop uses as an equipment, a free standing burette and a stopwatch. Before starting testing, it is necessary to check that the drop height be 7 centimeters more or less 3 millimeters. A sample of cardboard material is prepared. Three drops of water are deposited at a distance of 3cm to each other onto one side of the cardboard material sample and the stopwatch is immediately started when a drop is deposited. The time is recorded when each drop has been completely absorbed by the cardboard material sample. The same testing operation is repeated for the other side of the sample. For each

14 846 754.1
Essity Operations France

7

196 454 t9/fba

side, the average of the measures is calculated in minutes.

Examples are given in the tables hereinafter, wherein cardboard material is manufactured and commercialized by the company Sonoco.

Table 1 (first embodiment):

	outer strip 33	inner strip 34
basis weight/weight per unit area (g/m ²)	150-200	400-450
water drop (min)	unsized	10

- 5 Alternatively, according to a second and fourth embodiment of the invention, the hereinbefore characteristic of the material constituting the strip may be inversed, meaning that the outer strip 33 is made of a cardboard having a basis weight superior to the basis weight of the inner strip 34, and a water drop less than the water drop of the inner strip 34.

- 10 *Table 2 (second embodiment):*

	outer strip 33	inner strip 34
basis weight/weight per unit area (g/m ²)	400-450	150-200
water drop (min)	10	unsized

Table 3 (third embodiment):

	outer strip 33	inner strip 34
basis weight/weight per unit area (g/m ²)	180	230
water drop (min)	unsized	10

Table 4 (fourth embodiment):

	outer strip 33	inner strip 34
basis weight/weight per unit area (g/m ²)	230	180
water drop (min)	10	unsized

A tearable core according to the first and third embodiment is easier to extract than a tearable core according to the second embodiment.

WO 2016/097798

PCT/IB2014/003180

8

According to a fifth embodiment the invention, the characteristics of the material constituting the strips are such that the inner strip 34 is made of a cardboard having a basis weight substantially similar to the basis weight of the outer strip 33, and a water drop less than the water drop of the outer strip 33. As an example, the outer strip 33 is made of a cardboard having a medium basis weight and a high water drop, while the inner strip 34 is made of cardboard having a medium basis weight and a low water drop. According to this specific embodiment, the water drop of the inner strip 34 is a few minutes while the water drop of the outer strip 33 is unsized.

Table 5 (fifth embodiment):

	outer strip 33	inner strip 34
basis weight/weight per unit area (g/m ²)	180-230	180-230
water drop (min)	unsized	10

Further, according to the invention, the positions of the specific regions of attachments 36, 37 are chosen such as to form a robust core 3 for supporting the wound absorbent product 2, and at the same time to provide a free and internally accessible tab 50 for easing axial tearing of the tearable core 3.

FIG. 6 is a top view of a strip 45 comprising assembled outer and inner strips 33, 34 used to manufacture the tearable core of FIG. 2. Both outer and inner strips are flat. The outer strip 33 is displacedly overlapped and bonded to the inner strip 34 by means of the first region of attachment 36 that extends from a first end part 38 of the outer strip 33 to a second end part 39 of the inner strip 34 through their mutually facing surfaces. As a consequence, a longitudinal surface 40 at the side edge of the outer strip 33, and a longitudinal surface 41 at another side edge of the inner strip 34 are not attached together. At this stage, the surfaces of these longitudinal surfaces 40, 41 are non-adhesive coated surface. The width W_{33} of the outer strip 33 may be identical to the width W_{34} of the inner strip 34. Alternatively, the width W_{33} of the outer strip 33 may be smaller than the width W_{34} of the inner strip 34.

FIG.2 depicts in cross-section three consecutive turns A (shown partially), B and C (shown partially) obtained by helically winding the strip 45 of FIG. 6. FIG. 4 is a partial cross-section and perspective view showing the same. At one side, the outer strip 33 of one turn, for example turn B, is superposed and attached to the outer strip of the adjacent turn, for example turn A, by means of a second region of

WO 2016/097798

PCT/IB2014/003180

9

attachment 37 between the first end part 38 of the outer strip 33 of turn B and the second end part 42A of the outer strip 33 of adjacent turn A. At the other side, the outer strip 33 of the turn B, is superposed and attached to the outer strip of the adjacent turn, for example turn C, by means of another second region of attachment 37A between the first end part 38A of the outer strip 33 of turn C and the second end part 42 of the outer strip 33 of turn B. The second region of attachment 37, 37A extends over a width that is smaller than a width of the first region of attachment 36 that bonds both outer and inner strips 33, 34. As a consequence, two vis-à-vis surfaces 43 of the outer strip 33 and the inner strip 34 are not attached together over a defined width at an overlapping helical area 44 where two adjacent turns overlap. FIG. 3 is a side view of the tearable core of FIG. 2 illustrating the overlapping helical area 44. Further, it is to be noted that the tearable cylindrical body wall 31 is maintained as a coherent tube only by means of the attachment 37 of the outer strip 33. With the hereinbefore mentioned embodiments (combining the material used for the strips and the position of the region of attachments), an association (first region of attachment 36) is created between the outer strip 33 and the inner strip 34 that is stronger than the association (second region of attachment 37) between the adjacent turns of the outer strip 33. As a consequence, a frangible zone is created at the second region of attachment 37. The inner strip 34 serves as a means for applying the pulling tearing force that breaks the second region of attachment 37. A free and internally accessible tab 50 is formed at the edge (selvage) of the core that has been cut substantially perpendicularly to the longitudinal axis XX'. This tab 50 can be easily grasped in order to apply the pulling tearing force 4 shown in FIG. 1.

FIGS. 5A, 5B and 5C are cross-section views schematically and partially showing an extraction sequence of the tearable core of FIG. 2. A user grasps the free and internally accessible tab 50 and applies the pulling tearing force 4 according to a direction substantially parallel the longitudinal axis XX'. The pulling force 4 has the effect to break the association zone 52A, at the second region of attachment 37, between the superposed end parts 38, 42 of the outer strip 33 close to the edge 51 of the tearable core 3. While the pulling force 4 is further applied, the breaking effect continues to propagate helically and continuously breaks the second region of attachment 37 (various broken association zone 52B, 52C and 52D are shown as steps in the extraction sequence) until the other edge of the tearable core 3 is reached. At the same time, the diameter of the torn core reduced and the cylindrical body wall 31 is not anymore in contact with the sheet product 2. As a result, the tearable core 3 is torn axially and the user gains access to the first internal sheet product 2 from the inside 35 of the roll 1.

WO 2016/097798

PCT/IB2014/003180

10

FIG. 7 is schematically showing the manufacturing of a core 3 under the form of a cylindrical tube. The spirally wound tube core 3 is formed by spirally winding a strip 45 comprising preassembled outer and inner strips 33, 34 of cardboard onto a circular cylindrical mandrel at a given spiral wind angle. The strip 45 is wound such that the external surface of the first end part 38 of the outer strip 33 of one turn is overlapped upon the external surface of the second end part 42 of the outer strip of the adjacent turn and adhered together in the overlapping helical area 44 to build up the cylindrical tube.

As an example, the core has a diameter of around 80 mm, a width W33 around 120 mm, a width W34 around 140 mm, a width of the vis-à-vis portion 43 around 10 mm, and a width of the overlapping helical area 44 around 40 mm.

More precisely, FIG. 7 schematically illustrates a machine for winding and cutting tearable core tube 3. The tearable core 3 is spirally wound in the winding unit 60 and then cut to the desired length in the cutting unit 64.

The winding unit 60 comprises a gluing depositing nozzle 61, a mandrel 62 and a winding belt 63.

The gluing depositing nozzle 61 is positioned upstream the mandrel 62 and the winding belt 63. The gluing depositing nozzle 61 is applying an adhesive (glue) on the external surface (longitudinal surface 41) of the first end part 38 of the outer strip 33 of the strip 45 of preassembled outer and inner strips 33, 34 as a full line (as shown) or as a dotted line (not shown). The line may have a width of a few millimeters.

The tearable core tube is formed by spirally winding the strip 45 onto the mandrel 62. The mandrel 62 may be an elongate metallic cylinder. The winding angle Φ may be 45° , but any other angle may be acceptable.

The winding belt 63 engages the strip 45 and forms a tearable core tube 3. As a result of this engagement, the core tube advances along the mandrel in a screw fashion. The external surface of the first end part 38 of the outer strip 33 is applied so as to adhere onto the external surface (longitudinal surface 40) of the second end part 42 of the outer strip of the adjacent turn (see FIG. 2 for details). This results in forming a well defined tearable core tube 3 downstream the winding belt 63.

The cutting unit 64 is positioned downstream the winding unit 60. The cutting unit 64 cuts tearable core tube 3 of the desired length L. The cutting unit 64 may comprise a circular saw, a blade, a crushing device, etc... FIG. 3 schematically and partially illustrates the tearable core tube 3 that is obtained with the machine depicted in FIG. 7.

WO 2016/097798

PCT/IB2014/003180

11

The overall process may be continuous or discontinuous, meaning that the strip 45 may be manufactured (preassembled) separately and then temporarily stored as roll (this is not shown) before being wound as tube cores in the hereinbefore described machine.

5 With the invention, the manufacturing is simplified resulting in the possibility to increase the production cadency from 30-35 m/min up to 80 m/min.

The drawings and their descriptions hereinbefore illustrate rather than limit the invention.

10 The sizes, densities, angles and positions of the respective strips in the depicted embodiments are non limitative examples. The skilled person will readily recognize that these sizes, densities, angles and positions may be changed if desired or deemed necessary with respect to the required tearable effect to be achieved, or to adjust the section of the core to other dimension, etc.... Further, the examples given in the tables are non limitative examples based on currently
15 commercialized cardboard material; one can imagine that, in the future, cardboard material having a basis weight decreasing up to 80 g/m² may be possible.

Though the depicted and described embodiments show the outer strip and the inner strip, and the end parts of the outer strip to be secured together by adhesive bonding through their mutually facing surfaces, these strips or parts of strip
20 may alternatively be secured together by mechanical fastening through their mutually facing surfaces, for example by knurling. In this case, the deformation of the mutually facing surfaces of the strips or parts of strip resulting from a knurling process constitutes the first and second region of attachment.

The core of the invention may be used in winding sheet product as "rolls of sheet product". This has a large meaning encompassing, as examples, the rolls of
25 paper towels, toilet tissues, plastic sheets or the like, metal sheets (e.g. aluminum) sheets or the like, food preservation bags, wraps, etc... The sheet product may be rolled as a continuous non-perforated sheet or pre-perforated sheets. The "roll of sheet product" may be used for residential or commercial applications. A dispenser assembly may dispense the sheets of product from the roll of sheet product either
30 manually (a user may pull the sheet of material with a hand) or motor assisted (a motor may assist in automatically dispensing the sheet of material on wish). Such dispenser assembly and mechanisms are not germane to the present invention and will not be further described in details.

35 Any reference sign in a claim should not be construed as limiting the claim. The word "comprising" does not exclude the presence of other elements than those

WO 2016/097798**PCT/IB2014/003180**

12

listed in a claim. The word “a” or “an” or “at least one” preceding an element does not exclude the presence of a plurality of such element.

14 846 754.1
Essity Operations France

13

196 454 t9/fba

CLAIMS

1. A tearable core (3), adapted for winding a sheet product (2), comprising a cylindrical body wall (31) defining a longitudinal hole (35) of longitudinal axis XX', the cylindrical body wall (31) being tearable from an edge (51), the cylindrical body wall (31) comprising an outer strip (33) and an inner strip (34), the outer strip (33) being a part of the tearable cylindrical body wall (31) adapted to be in contact with the wound sheet product (2), the inner strip (34) being another part of the tearable cylindrical body wall (31) facing the longitudinal hole (35), the outer strip (33) and the inner strip (34) being helically wound on one another and displacedly overlapped in a lateral direction parallel to the longitudinal axis XX', the outer strip (33) and the inner strip (34) being secured together through their mutually facing surfaces by a first region of attachment (36), characterized in that:

- the strips (33, 34) are made of materials having characteristics such that, either the inner strip (34) is made of cardboard having a water drop less than the water drop of the outer strip (33), or the outer strip (33) is made of cardboard having a water drop less than the water drop of the inner strip (34); and

- the cylindrical body wall (31) is built-up as a core tube by securing together the outer strip (33), a first end part (38) of the outer strip (33) of one turn (A) being superposed and secured to a second end part (42A) of the outer strip (33) of an adjacent turn (B) through their mutually facing surfaces by means of a second region of attachment (37).

2. The tearable core (3) of claim 1, wherein the first and second region of attachment (36, 37) are positioned such that two vis-à-vis surfaces (43) of the outer strip (33) and the inner strip (34) are not attached together over a defined width at an overlapping helical area (44) where two adjacent turns overlap so as to form a free and internally accessible tab (50) at the edge (51) of the tearable core (3).

3. The tearable core (3) of claim 1 or 2, wherein the outer strip (33) and the inner strip (34), and the end parts (38, 42A) of the outer strip (33) are secured together by adhesive bonding through their mutually facing surfaces, the first and second region of attachment (36, 37) being made of a film of adhesive, the film of adhesive being continuous or discontinuous.

4. The tearable core (3) of claim 1 or 2, wherein the outer strip (33) and the inner strip (34), and the end parts (38, 42A) of the outer strip (33) are secured together by mechanical fastening through their mutually facing surfaces.

5. The tearable core (3) according to any one of the claims 1 to 4, wherein the first region of attachment (36) extends from a first end part (38) of the outer strip (33) to a second end part (39) of the inner strip (34), and wherein a width W_{33} of the outer strip (33) is identical to or smaller than a width W_{34} of the inner strip (34).

14 846 754.1
Essity Operations France

14

196 454 t9/fba

6. The tearable core (3) according to any one of the claims 1 to 5, wherein the second region of attachment (37) extends over a width that is smaller than a width of the first region of attachment (36).

5 7. The tearable core (3) according to any one of the claims 1 to 6, wherein the inner strip (34) is made of cardboard having a basis weight superior to the basis weight of the outer strip (33).

8. The tearable core (3) according to claim 7, wherein the basis weight of the inner strip (34) is around 50% higher than the basis weight of the outer strip (33), and the water drop of the inner strip (34) is a few minutes while the water drop of the
10 outer strip (33) is unsized.

9. The tearable core (3) according to any one of the claims 1 to 6, wherein the outer strip (33) is made of cardboard having a basis weight superior to the basis weight of the inner strip (34).

10. The tearable core (3) according to claim 9, wherein the basis weight of the outer strip (33) is around 50% higher than the basis weight of the inner strip (34), and the water drop of the outer strip (33) is a few minutes while the water drop of the inner strip (34) is unsized.
15

11. The tearable core (3) according to any one of the claims 1 to 7 and 9, wherein the basis weight per unit area of one of the strip is ranging from 400 to 450 g/m² and the water drop is around 10 min, and the basis weight per unit area of the other strip is ranging from 150 to 200 g/m² and the water drop is unsized.
20

12. The tearable core (3) according to any one of the claims 1 to 6, wherein the inner strip (34) is made of cardboard having a basis weight equal to the basis weight of the outer strip (33).

13. The tearable core (3) according to claim 12, wherein the basis weight per unit area of one of the strip is ranging from 180 to 230 g/m² and the water drop is around 10 min, and the basis weight per unit area of the other strip is ranging from 180 to 230 g/m² and the water drop is unsized.
25

14. A roll of sheet product (1) comprising a sheet product (2) wound onto a tearable core (3) according to anyone of the claims 1 to 13.
30

15. The roll of sheet product of claim 14, wherein the sheet product (2) is a web of tissue paper.

16. A method of manufacturing a tearable core (3) under the form of a cylindrical body wall (31) defining a longitudinal hole (35) of longitudinal axis XX', the cylindrical body wall (31) being tearable from an edge (51), the manufacturing method comprising the steps of:
35

- making an outer strip (33) and an inner strip (34) in materials having characteristics such that, either the inner strip (34) is made of cardboard having a

14 846 754.1
Essity Operations France

15

196 454 t9/fba

water drop less than the water drop of the outer strip (33), or the outer strip (33) is made of cardboard having a water drop less than the water drop of the inner strip (34);

- assembling the outer strip (33) and the inner strip (34) by displacedly overlapping the outer strip (33) and the inner strip (34) in a lateral direction parallel to the longitudinal axis XX', the outer strip (33) and the inner strip (34) being secured together through their mutually facing surfaces by a first region of attachment (36);

- helically winding the assembled outer and inner strips (33, 34) such that the cylindrical body wall (31) is built-up as a core tube by securing together the outer strip (34), an external surface of a first end part (38) of the outer strip (33) of one turn being overlapped upon an external surface of a second end part (42) of the outer strip (33) of the adjacent turn and secured together through their mutually facing surfaces by a second region of attachment (37); and

- cutting the tearable core (3) at a defined length (L).
- 15 **17.** The method of manufacturing a tearable core (3) of claim 16, further comprising applying an adhesive on the external surface of the first end part (38) of the outer strip (33) of the assembled outer and inner strips (33, 34) either as a full line or as a dotted line.

WO 2016/097798

1/5

PCT/IB2014/003180

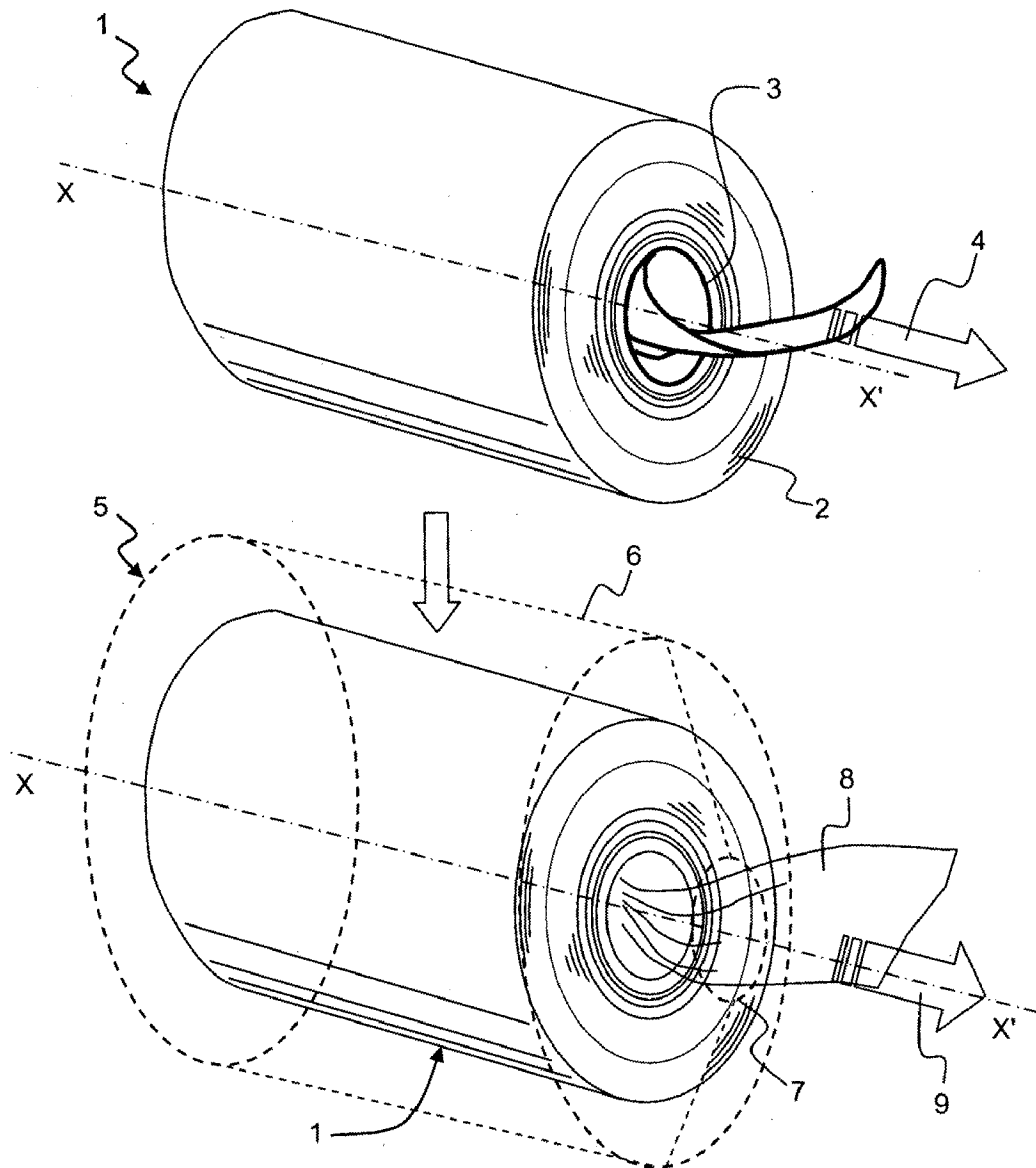


FIG. 1

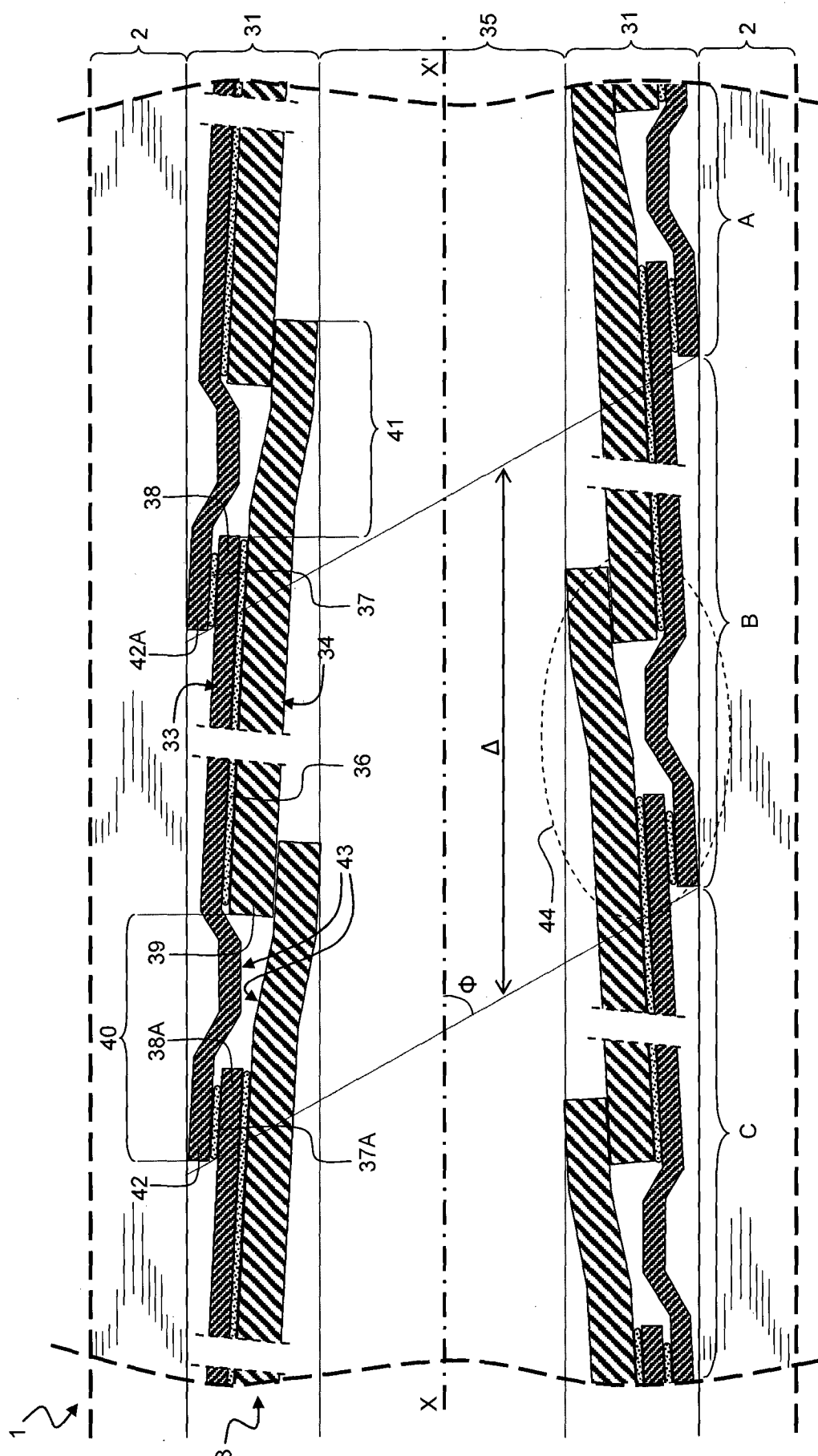


FIG. 2

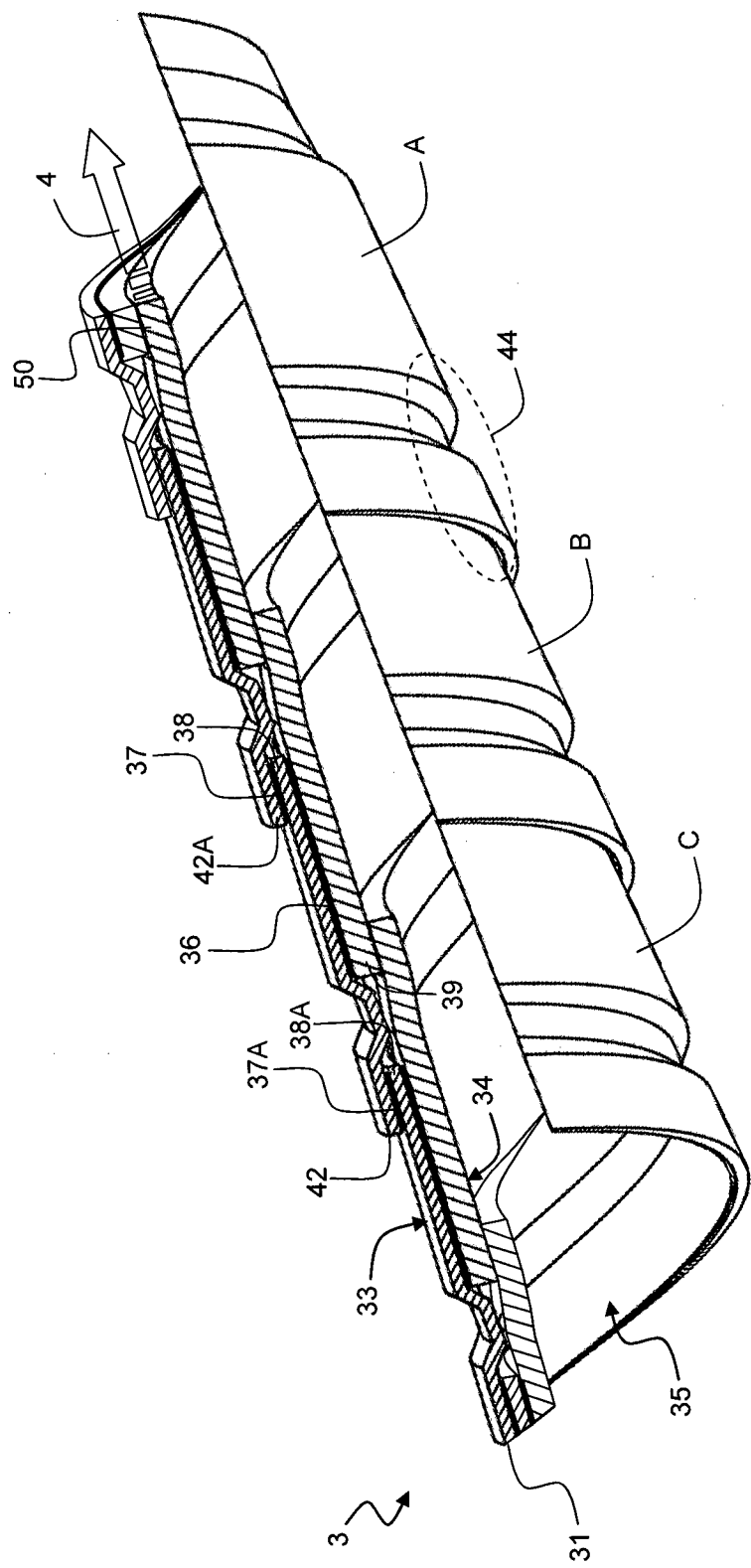


FIG. 4

WO 2016/097798

PCT/IB2014/003180

4/5

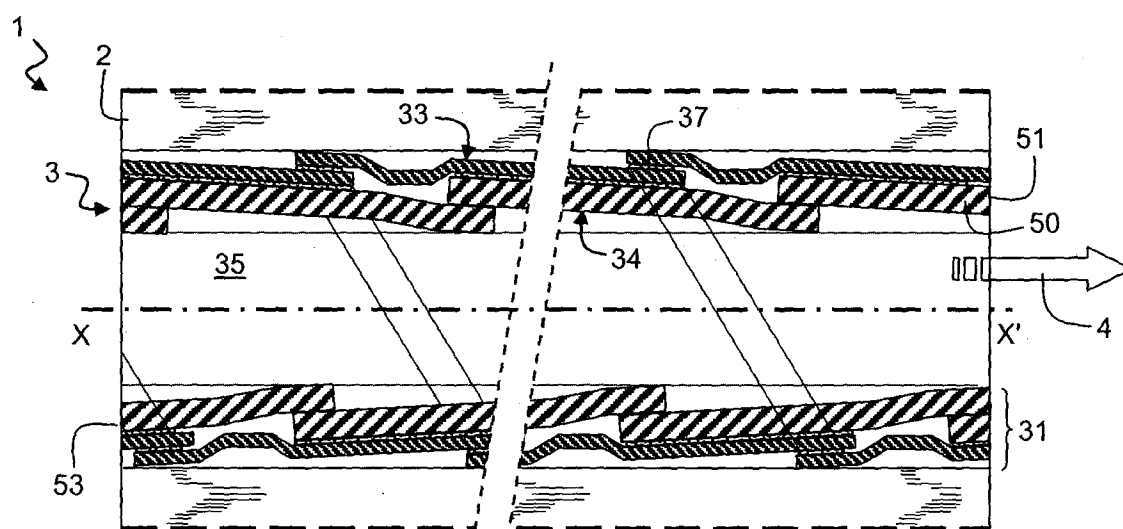


FIG. 5A

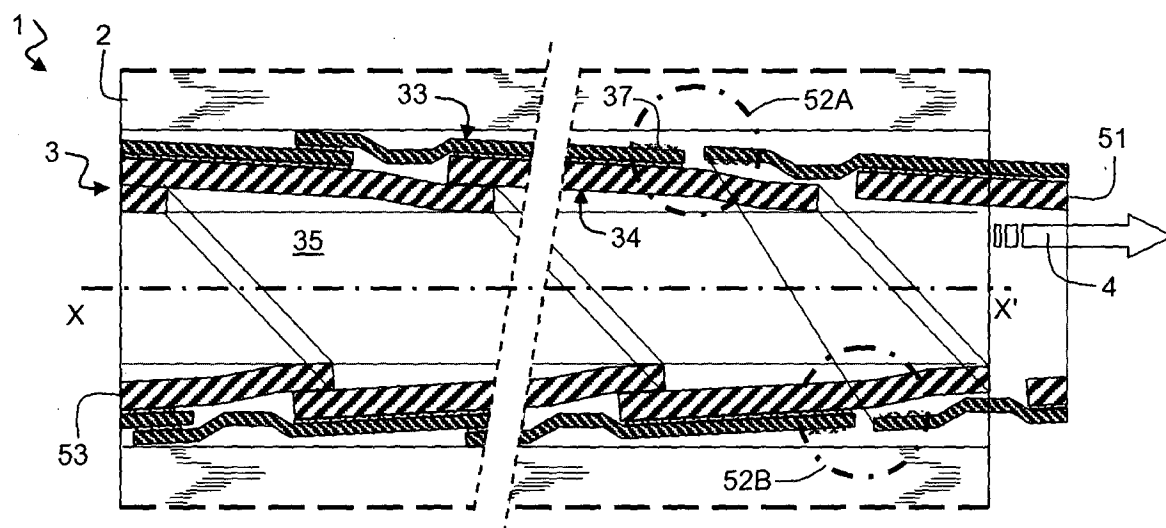


FIG. 5B

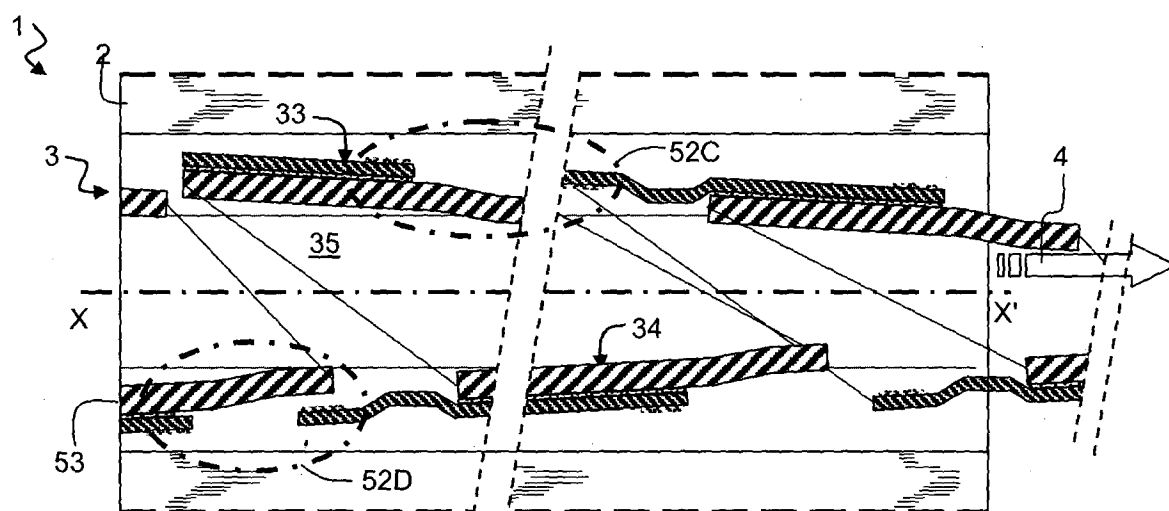


FIG. 5C

WO 2016/097798

PCT/IB2014/003180

5/5

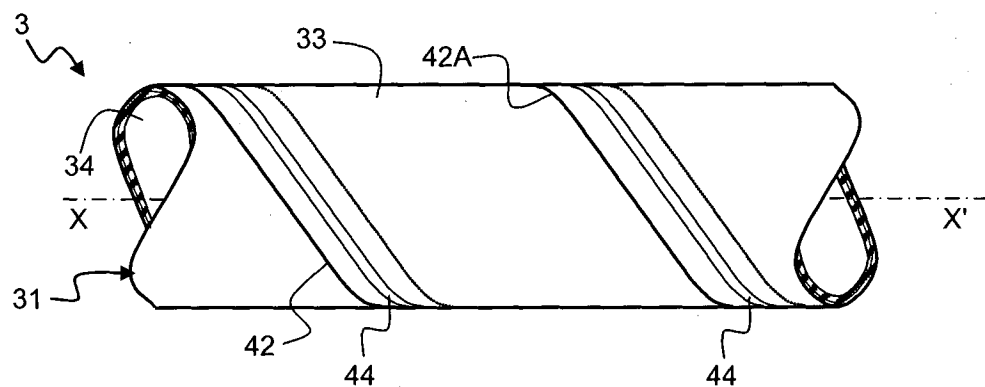


FIG. 3

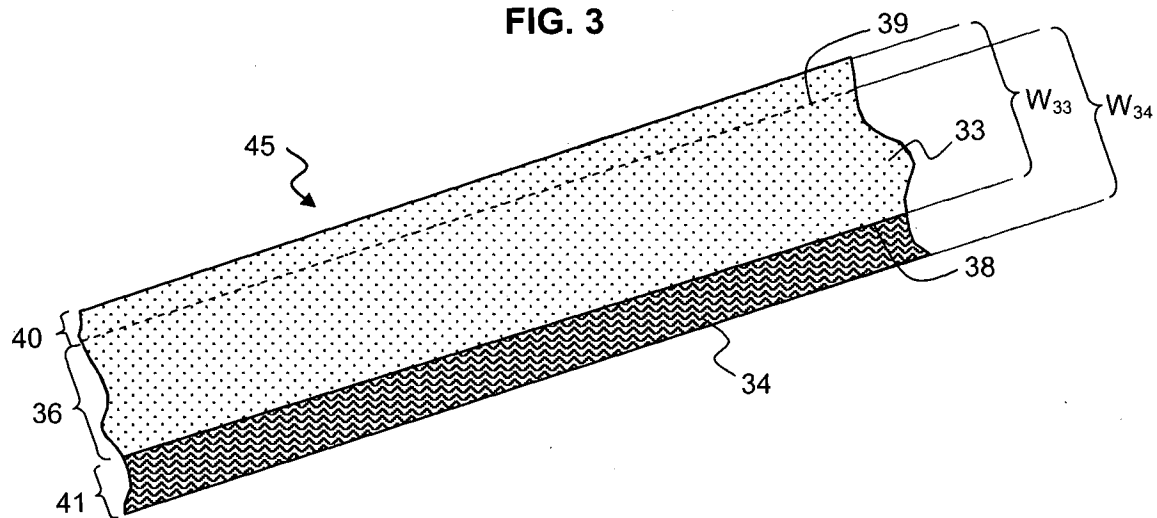


FIG. 6

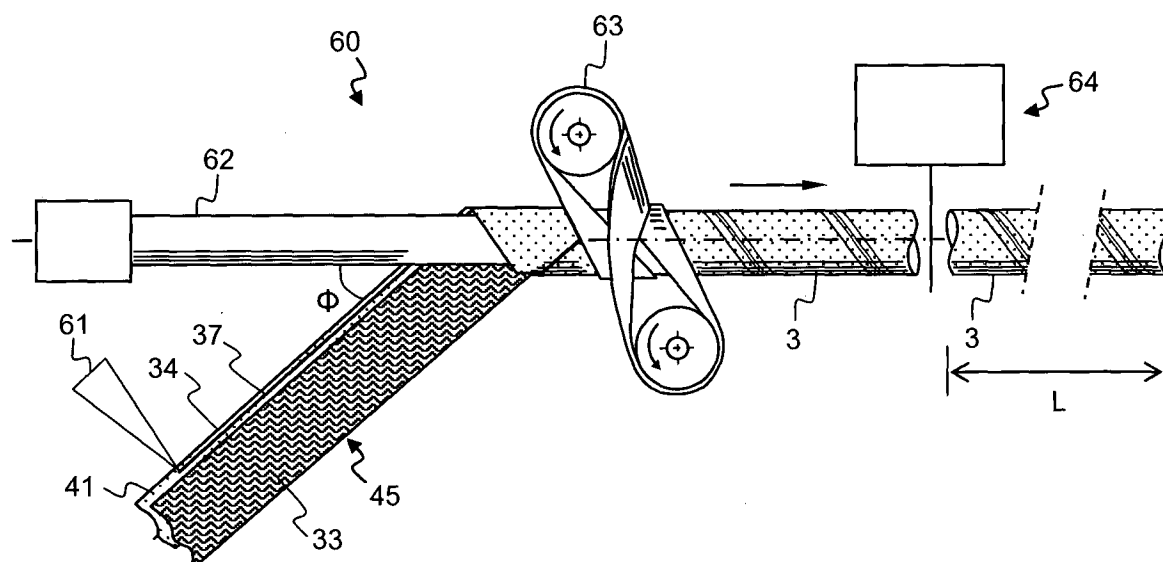


FIG. 7

UN NÚCLEO DESPRENDIBLE, UN ROLLO QUE COMPRENDE TAL NÚCLEO Y
UN MÉTODO DE ELABORACIÓN DE NÚCLEO DESPRENDIBLE

CAMPO DE LA INVENCION

5 Un aspecto de la invención se refiere a un núcleo
desprendible, es decir, un tubo cilíndrico, más
precisamente un tubo cilíndrico de cartón. Tal núcleo
encuentra una aplicación particular, aunque no exclusiva,
en la industria del papel tisú donde una trama de material
10 absorbente, como una trama de papel tisú, o una trama de
material no tejido se enrolla sobre tal núcleo. Otro
aspecto de la invención se refiere a un rollo que comprende
un producto en lámina enrollado sobre un núcleo de la
invención. Todavía otro aspecto de la invención se refiere
15 a un método de elaboración de núcleo.

ANTECEDENTES DE LA INVENCION

Los rollos de producto en forma de lámina
enrollados alrededor de un núcleo se conocen en la materia.
Tales rollos se utilizan, por ejemplo, como toallas de
20 papel, toallitas limpiadoras o rollos de papel sanitario
para aplicaciones tanto domésticas como profesionales. De
acuerdo con un primer tipo de uso, el producto en forma de
lámina puede suministrarse de manera tangencial desde el
exterior del rollo hacia el núcleo del rollo, por ejemplo,
25 mediante rotación del rollo. De acuerdo con un segundo tipo

de uso, el producto en forma de lámina puede suministrarse de manera radial/central desde el interior hacia el exterior del rollo. Este es un así llamado suministro de alimentación central. En este segundo caso, el núcleo debe retirarse del rollo antes de que pueda iniciarse el suministro.

El documento JPH1129263 describe un tubo de papel de liberación de estrato interno. El tubo de papel de liberación de estrato interno facilita el des-ensamble y retiro del tubo de papel en base a una simple tracción de una banda de papel, de superficie circunferencial interna, y la liberación uniforme de un material enrollado desde el lado interno. El tubo de papel de liberación de estrato interno consiste en un tubo de papel en espiral en el cual una banda de papel, de superficie circunferencial externa, a partir de la cual se forma la superficie circunferencial externa del tubo de papel y una banda de papel de superficie circunferencial interna a partir de la cual se forma la superficie circunferencial interna del tubo de papel. Estas bandas se colocan sobreposición en la dirección lateral y se enrollan en una manera helicoidal de tal manera que no se encuentren en sobreposición las costuras de las bandas de papel. La banda de papel de superficie circunferencia externa y la banda de papel de superficie circunferencial interna se unen de manera

intermitente a lo largo de la costura de la banda de papel de superficie circunferencial externa.

El documento WO2011/092590 describe un núcleo que tiene una pared cilíndrica que puede desprenderse de manera axial. El núcleo se conforma de dos bandas sobrepuestas, siendo estas, respectivamente, una banda externa en contacto con el producto y una banda interna. Estas bandas se enrollan entre sí y se unen en conjunto mediante regiones de acoplamiento, por ejemplo, mediante unión. Al menos uno de los bordes longitudinales de la banda interna no se sujeta o se sujeta de manera débil sobre una amplitud determinada con objeto de formar, al menos sobre parte de su longitud helicoidal, una lengüeta libre y accesible de frente a la banda externa.

Ambos núcleos desprendibles, arriba mencionados, requieren de una colocación precisa y cuidadosa de la unión entre la banda interna y la banda externa. Por consiguiente, el proceso de elaboración de núcleo se ajusta finamente y se controla durante toda la producción. Esto es particularmente verdadero cuando ocurre un cambio de ritmo en la producción. Por lo tanto, existe una necesidad de facilitar el proceso de elaboración del núcleo desprendible, en particular, mediante proporción de un núcleo desprendible que pueda producirse fácilmente sin importar el cambio de ritmo en la producción.

BREVE DESCRIPCIÓN DE LA INVENCION

Un objeto de la invención es proponer un núcleo desprendible que supere la desventaja arriba mencionada y, en particular, que facilite la transición del ritmo de producción durante el proceso de elaboración.

De acuerdo con un aspecto, se proporciona un núcleo desprendible, adaptado para enrollado de un producto en lámina, que comprende una pared de cuerpo cilíndrico que define un orificio longitudinal del eje longitudinal XX' , siendo desprendible, de un borde, la pared de cuerpo cilíndrico, comprendiendo la pared de cuerpo cilíndrico una banda externa y una banda interna, siendo la banda externa una parte de la pared de cuerpo cilíndrico desprendible, adaptada para estar en contacto con el producto en lámina, enrollado, siendo la banda interna otra parte de la pared de cuerpo cilíndrico desprendible de frente al orificio longitudinal, enrollándose de manera helicoidal la banda externa y la banda interna una sobre la otra y colocándose en superposición de manera desplazada en una dirección lateral, paralela al eje longitudinal XX' , asegurándose en conjunto la banda externa y la banda interna a través de sus superficies mutuamente de frente mediante una primera región de acoplamiento, en donde:

- las bandas se elaboran de materiales que tienen características tales que, ya sea la banda interna se

elabora de cartón que tiene un peso base superior al peso base de la banda externa, y un descenso de agua inferior al descenso de agua de la banda externa, o la banda externa se elabora de cartón que tiene un peso base superior al peso base de la banda interna, y un descenso de agua inferior al descenso de agua de la banda interna; y

- la pared de cuerpo cilíndrico se construye como un tubo de núcleo al asegurar en conjunto la banda externa, una primera parte de extremo de la banda externa de un giro que se coloca en sobreposición y se asegura a una segunda parte de extremo de la banda externa de un giro adyacente a través de sus superficies mutuamente de frente, por medio de una segunda región de acoplamiento.

La primera y segunda región de acoplamiento puede colocarse de tal manera que dos superficies de frente de la banda externa y la banda interna no se acoplen en conjunto sobre una amplitud definida, en un área de sobreposición helicoidal, donde dos giros adyacentes se colocan en sobreposición a fin de formar una lengüeta libre e internamente accesible en el borde del núcleo desprendible.

La banda externa y la banda interna, y las partes de extremo de la banda externa pueden asegurarse en conjunto mediante unión adhesiva a través de sus superficies mutuamente de frente, elaborándose, de una película de adhesivo, la primera y segunda región de

acoplamiento, siendo continua o discontinua la película de adhesivo.

La banda externa y la banda interna, y las partes de extremo de la banda externa pueden asegurarse en conjunto mediante sujeción mecánica a través de sus superficies mutuamente de frente.

La primera región de acoplamiento puede extenderse desde una primera parte de extremo de la banda externa hasta una segunda parte de extremo de la banda interna. Una amplitud W33 de la banda externa puede ser idéntica o una inferior a la amplitud W34 de la banda interna.

La segunda región de acoplamiento puede extenderse sobre una amplitud que es inferior a una amplitud de la primera región de acoplamiento.

El peso base de la banda interna puede ser aproximadamente 50% mayor al peso base de la banda externa, y el descenso de agua de la banda interna puede ser de unos cuantos minutos mientras que el descenso de agua de la banda externa puede ser de un tamaño no definido.

El peso base de la banda externa puede ser aproximadamente 50% mayor que el peso base de la banda interna, y el descenso de agua de la banda externa puede ser de unos cuantos minutos mientras que el descenso de agua de la banda interna puede ser de un tamaño no

definido.

El peso base por área de unidad de una de las bandas puede variar desde 100 hasta 150 g/m² y el descenso de agua puede ser de aproximadamente 10 minutos, y el peso base por área de unidad de la otra banda puede variar desde 400 hasta 450 g/m² y el descenso de agua puede ser de un tamaño no definido.

De acuerdo con otro aspecto, se proporciona un rollo de producto en lámina que comprende un producto en lámina enrollado sobre un núcleo desprendible de la invención.

El rollo de producto en lámina puede ser una trama de papel tisú.

De acuerdo con un aspecto adicional, se proporciona un método para elaborar un núcleo desprendible bajo la forma de una pared de cuerpo cilíndrico que define un orificio longitudinal de eje longitudinal XX', siendo desprendible, de un borde, la pared de cuerpo cilíndrico, comprendiendo el método de elaboración las etapas de:

- elaborar una banda externa y una banda interna en materiales que tienen características tales que, ya sea la banda interna se elabora de cartón que tiene un peso base superior al peso base de la banda externa, y un descenso de agua inferior al descenso de agua de la banda externa, o la banda externa se elabora de cartón que tiene

un peso base superior al peso base de la banda interna, y un descenso de agua inferior al descenso de agua de la banda interna;

- ensamblar la banda externa y la banda interna mediante colocación en superposición de manera desplazada de la banda externa y la banda interna en una dirección lateral, paralela al eje longitudinal XX' , asegurándose en conjunto la banda externa y la banda interna a través de sus superficies mutuamente de frente, mediante una primera región de acoplamiento;

- enrollar de manera helicoidal las bandas ensambladas, externa e interna, de tal manera que la pared de cuerpo cilíndrico se construye como un tubo de núcleo al asegurar en conjunto la banda externa, una superficie externa de una primera parte de extremo de la banda externa de un giro que se coloca en superposición sobre una superficie externa de una segunda parte de extremo de la banda externa del giro adyacente y aseguradas en conjunto a través de sus superficies mutuamente de frente mediante una segunda región de acoplamiento; y

- cortar el núcleo desprendible en una longitud definida.

El método de elaboración de un núcleo desprendible puede comprender además la aplicación de un adhesivo sobre la superficie externa de la primera parte de

extremo de la banda externa de las bandas ensambladas, externa e interna, ya sea como una línea completa o como una línea punteada.

Con la invención, es posible evitar, al menos
5 reducir enormemente, el control y ajustes requeridos durante el proceso de elaboración de núcleos, en particular, en cambios de ritmo de producción. Esto se logra mediante la combinación del material que constituye las bandas, externa e interna, y la posición de la segunda
10 región de acoplamiento.

La invención permite además mantener la capacidad del núcleo para desprenderse de manera fácil y cualitativa antes de instalarse en un dispensador, es decir, antes de que se inicie el suministro.

15 Otras ventajas se volverán aparentes a partir de la descripción de la invención en lo sucesivo.

BREVE DESCRIPCIÓN DE LAS FIGURAS

La presente invención se ilustra por medio de ejemplos y no se limita a las figuras acompañantes, en las
20 cuales las referencias iguales indican elementos similares:

- Las partes superior e inferior de la FIGURA 1 son vistas en perspectiva que ilustran de manera esquemática un rollo de toallas de papel cuando se está desprendiendo un núcleo desprendible, y un rollo de toallas
25 de papel en un dispensador de alimentación central durante

el suministro radial/central, respectivamente;

• La FIGURA 2 es una vista en corte transversal que muestra de manera esquemática y parcial un rollo que comprende un núcleo desprendible y producto absorbente enrollado de acuerdo con una modalidad de la invención;

• La FIGURA 3 es una vista lateral del núcleo desprendible de la FIGURA 2 que ilustra el área helicoidal de superposición;

• La FIGURA 4 es una vista en corte transversal parcial y en perspectiva del núcleo desprendible de la FIGURA 2;

• Las FIGURAS 5A, 5B, 5C son vistas en corte transversal que muestran de manera esquemática y parcial de una secuencia de extracción del núcleo desprendible de la FIGURA 2;

• La FIGURA 6 es una vista desde lo alto de una banda que comprende bandas de cartón, ensambladas, externa e interna, usadas en la elaboración del núcleo desprendible de la FIGURA 2; y

• La FIGURA 7 ilustra de manera esquemática una máquina y método de elaboración para el enrollado y corte del núcleo desprendible de la FIGURA 2.

DESCRIPCIÓN DETALLADA DE LA INVENCION

La parte superior de la FIGURA 1 es una vista en

perspectiva que ilustra de manera esquemática un rollo de papel tisú 1. El rollo de papel tisú 1 comprende un producto absorbente enrollado, por ejemplo, una lámina de papel tisú 2 enrollada sobre un núcleo desprendible 3, hecho de material de cartón. La lámina de papel tisú 2 puede estar provista con líneas transversales de pre-corte (no mostradas) para facilitar el desprendimiento de láminas individuales de papel tisú. Antes de iniciar el suministro de las porciones de lámina de papel tisú del rollo 1, el núcleo 3 se desprende axialmente mediante aplicación de una fuerza de desgarre por tracción 4 de acuerdo con el eje longitudinal de rollo XX'. Después de que el núcleo se ha desprendido y retirado por completo del rollo 3, los primeros enrollados internos del rollo de papel tisú 1 pueden sujetarse desde el orificio que constituye el interior central del rollo. Después, el rollo se encaja dentro de un dispensador de alimentación central 5.

La parte inferior de la FIGURA 1 es una vista en perspectiva que ilustra de manera esquemática un rollo de papel tisú 1 (ilustrado en línea plana) en un dispensador de alimentación central 5 (ilustrado en línea punteada) durante el suministro radial/central. En esta modalidad ejemplar, el dispensador de alimentación central 5 comprende un cuerpo 6 de forma, por ejemplo, substancialmente cilíndrica, para alojar el rollo de papel

tisú 1. Las porciones no enrolladas de la lámina de papel
tisú 8 se suministran a partir del rollo 1, a través de la
abertura de suministro 7 cuando un usuario aplica una
fuerza de suministro por tracción 9, substancialmente de
5 acuerdo con el eje longitudinal del rollo XX'. El
dispensador de alimentación central 5 puede comprender
además elementos adicionales que no se ilustran por razones
de claridad en las figuras, por ejemplo, un mecanismo de
cierre, una boquilla a través de la cual se suministra la
10 lámina o un dispositivo de corte para facilitar el
desprendimiento de porciones de lámina de papel tisú 8,
etc. Aunque las figuras muestran el eje longitudinal XX'
como un eje horizontal, también son adecuadas otras
direcciones, por ejemplo, el dispensador de alimentación
15 central 5 puede colocarse substancialmente de manera
vertical.

Las FIGURAS 2 a 4 ilustran esquemáticamente un
núcleo desprendible 3 de la invención, de acuerdo con una
modalidad preferida de la invención. El núcleo desprendible
20 3 comprende una pared de cuerpo cilíndrico desprendible 31
que define un orificio longitudinal 35 de eje longitudinal
XX'.

La Figura 2 es una vista en corte transversal que
muestra de manera esquemática y parcial un rollo de papel
25 tisú 1 que comprende el núcleo desprendible 3 y el producto

absorbente enrollado 2. La pared de cuerpo cilíndrico desprendible 31 del núcleo desprendible 3 comprende una banda externa 33 y una banda interna 34. La banda externa 33 es la parte de la pared de cuerpo cilíndrico desprendible 31 en contacto con el producto absorbente enrollado 2. La banda interna 34 es la parte de la pared de cuerpo cilíndrico desprendible 31 de frente al orificio longitudinal 35 a través del rollo de papel tisú 1. La banda externa 33 y la banda interna 34 se colocan en sobreposición de manera desplazada, en una dirección lateral, paralela al eje longitudinal XX'. La banda externa 33 y la banda interna 34 se enrollan de manera helicoidal entre sí en un ángulo de enrollado Φ e inclinación Δ , adecuados. La banda externa 33 y la banda interna 34 se aseguran en conjunto por medio de regiones de acoplamiento específicas 36, 37 a través de sus superficies mutuamente de frente, de tal manera que se forma un tubo de bandas en sobreposición. En la modalidad de la invención actualmente descrita, la banda externa 33 y la banda interna 34 se aseguran en conjunto mediante unión adhesiva a través de sus superficies mutuamente de frente. La unión adhesiva se lleva a cabo mediante aplicación de una película de adhesivo sobre la superficie mutuamente de frente que necesita unirse en conjunto. La película de adhesivo se aplica en una manera continua. Sin embargo, como una

alternativa, puede aplicarse en una manera continua o intermitente.

De acuerdo con una primera y tercera modalidad de la invención, las características del material que constituye las bandas son tales que la banda interna 34 se elabora de un cartón que tiene un peso base superior al peso base de la banda externa 33, y un descenso de agua inferior al descenso de agua de la banda externa 33. Como un ejemplo, la banda externa 33 se elabora de un cartón que tiene un peso base bajo y un descenso de agua alto, mientras que la banda interna 34 se elabora de cartón que tiene un peso base medio y un descenso de agua bajo. De acuerdo con la primera modalidad, el peso base de la banda interna 34 es aproximadamente 50% mayor que el peso base de la banda externa 33, y el descenso de agua de la banda interna 34 es de unos cuantos minutos mientras que el descenso de agua de la banda externa 33 es de tamaño no definido. El descenso de agua (*water drop* en inglés) evalúa la absorción de agua por el material de cartón. Se mide al dejar caer una gota de agua sobre la superficie de cartón y medir el tiempo en segundos/minutos que le toma a la gota ser absorbida por completo. Un descenso de agua de tamaño no definido significa que después de un periodo de tiempo determinado la gota aún no se absorbe por el material de cartón.

De manera más precisa, el método para medir el descenso de agua utiliza como equipo una bureta independiente y un cronómetro. Antes de iniciar la prueba, es necesario verificar que la altura de la gota sea de 7 centímetros más o menos 3 milímetros. Se prepara una muestra de material de cartón. Tres gotas de agua se depositan a una distancia de 3 cm entre sí, sobre un lado de la muestra de material de cartón y se inicia inmediatamente el cronómetro cuando se deposita una gota. El tiempo se registra cuando cada gota se ha absorbido por completo por la muestra de material de cartón. La misma operación de prueba se repite para el otro lado de la muestra. Por cada lado, se calcula el promedio de las mediciones en minutos.

Los ejemplos se dan en las tablas en lo sucesivo, en donde el material de cartón se elabora y comercializa por la compañía Sonoco.

Tabla 1 (primera modalidad):

	Banda externa 33	Banda interna 34
Peso base/peso por área de unidad (g/m ²)	400-450	150-200
Descenso de agua (min)	tamaño no definido	10

De manera alternativa, de acuerdo con una segunda y cuarta modalidad de la invención, puede invertirse la característica anterior del material que constituye la

banda, lo que significa que la banda externa 33 se elabora de un cartón que tiene un peso base superior al peso base de la banda interna 34, y un descenso de agua inferior al descenso de agua de la banda interna 34.

5 *Tabla 2 (segunda modalidad):*

	Banda externa 33	Banda interna 34
Peso base/peso por área de unidad (g/m ²)	150-200	400-450
Descenso de agua (min)	10	tamaño no definido

10 *Tabla 3 (tercera modalidad):*

	Banda externa 33	Banda interna 34
Peso base/peso por área de unidad (g/m ²)	230	180
Descenso de agua (min)	tamaño no definido	10

15 *Tabla 4 (cuarta modalidad):*

	Banda externa 33	Banda interna 34
Peso base/peso por área de unidad (g/m ²)	180	230
Descenso de agua (min)	tamaño no definido	10

20 Un núcleo desprendible de acuerdo con la primera y tercera modalidad es más fácil de extraer que un núcleo desprendible de acuerdo con la segunda modalidad.

De acuerdo con una quinta modalidad de la invención, las características del material que constituye
25 las bandas son tales que la banda interna 34 se elabora de

un cartón que tiene un peso base substancialmente similar al peso base de la banda externa 33, y un descenso de agua inferior al descenso de agua de la banda externa 33. Como un ejemplo, la banda externa 33 se elabora de un cartón que

5 tiene un peso base medio y un descenso de agua alto, mientras que la banda interna 34 se elabora de cartón que tiene un peso base medio y un descenso de agua bajo. De acuerdo con esta modalidad específica, el descenso de agua de la banda interna 34 es de unos cuantos minutos, mientras

10 que el descenso de agua de la banda externa 33 es de tamaño no definido.

Tabla 5 (quinta modalidad):

	Banda externa 33	Banda interna 34
15 Peso base/peso por área de unidad (g/m^2)	180-230	180-230
Descenso de agua (min)	tamaño no definido	10

Además, de acuerdo con la invención, las posiciones de las regiones específicas de acoplamiento 36, 37 se eligen de tal manera que se forma un núcleo fuerte 3

20 para sostener el producto absorbente enrollado 2 y se proporciona, al mismo tiempo una lengüeta internamente accesible y libre 50 para facilitar el desprendimiento axial del núcleo desprendible 3.

La FIGURA 6 es una vista desde lo alto de una

25 banda 45 que comprende bandas ensambladas, externa e

interna, 33, 34, usadas en la elaboración del núcleo desprendible de la FIGURA 2. Ambas bandas, externa e interna, son planas. La banda externa 33 se coloca en sobreposición de manera desplazada y se une a la banda interna 34 por medio de la primera región de acoplamiento 36 que se extiende a partir de una primera parte de extremo 38 de la banda externa 33 hasta una segunda parte de extremo 39 de la banda interna 34, a través de sus superficies mutuamente de frente. En consecuencia, no se unen en conjunto una superficie longitudinal 40 en el borde lateral de la banda externa 33 y una superficie longitudinal 41 en otro borde lateral de la banda interna 34. En esta etapa, las superficies de estas superficies longitudinales 40, 41 son superficies revestidas sin adhesivo. La amplitud W_{33} de la banda externa 33 puede ser idéntica a la amplitud W_{34} de la banda interna 34. De manera alternativa, la amplitud W_{33} de la banda externa 33 puede ser inferior a la amplitud W_{34} de la banda interna 34.

La FIGURA 2 ilustra en corte transversal, tres giros consecutivos A (mostrado parcialmente), B y C (mostrado parcialmente), obtenidos mediante enrollado helicoidal de la banda 45 de la FIGURA 6. La FIGURA 4 es una vista en corte transversal parcial y en perspectiva que muestra lo mismo. En un lado, la banda externa 33 de un giro, por ejemplo, giro B, se coloca en sobreposición y se

acopla a la banda externa del giro adyacente, por ejemplo, giro A, por medio de una segunda región de acoplamiento 37 entre la primera parte de extremo 38 de la banda externa 33 del giro B y la segunda parte de extremo 42A de la banda externa 33 del giro adyacente A. En el otro lado, la banda externa 33 del giro B, se coloca en sobreposición y se acopla a la banda externa del giro adyacente, por ejemplo, giro C, por medio de otra segunda región de acoplamiento 37A entre la primera parte de extremo 38A de la banda externa 33 del giro C y la segunda parte de extremo 42 de la banda externa 33 del giro B. La segunda región de acoplamiento 37, 37A se extiende sobre una amplitud que es inferior a la amplitud de la primera región de acoplamiento 36 que une ambas bandas, externa e interna, 33, 34. En consecuencia, dos superficies de frente 43 de la banda externa 33 y la banda interna 34 no se acoplan en conjunto sobre una amplitud definida en un área helicoidal de sobreposición 44 donde se colocan en sobreposición dos giros adyacentes. La FIGURA 3 es una vista lateral del núcleo desprendible de la FIGURA 2 que ilustra el área helicoidal en sobreposición 44. Además, debe destacarse que la pared de cuerpo cilíndrico desprendible 31 se mantiene como un tubo coherente solo por medio del acoplamiento 37 de la banda externa 33. Con las modalidades mencionadas con anterioridad (que combinan el material usado para las

bandas y la posición de la región de acoplamientos), se crea una asociación (primera región de acoplamiento 36) entre la banda externa 33 y la banda interna 34, que es más fuerte que la asociación (segunda región de acoplamiento 37) entre los giros adyacentes de la banda externa 33. En consecuencia, se crea una zona frágil en la segunda región de acoplamiento 37. La banda interna 34 sirve como un medio para la aplicación de la fuerza de desgarre por tracción que rompe la segunda región de acoplamiento 37. Se forma una lengüeta internamente accesible y libre 50 en el borde (orillo) del núcleo que se ha cortado substancialmente de manera perpendicular al eje longitudinal XX'. Esta lengüeta 50 puede sujetarse fácilmente con objeto de aplicar la fuerza de desgarre por tracción 4 mostrada en la FIGURA 1.

Las FIGURAS 5A, 5B y 5C son vistas en corte transversal que muestran de manera esquemática y parcial una secuencia de extracción del núcleo desprendible de la FIGURA 2. Un usuario sujeta la lengüeta internamente accesible y libre 50 y aplica la fuerza de desgarre por tracción 4 de acuerdo con una dirección substancialmente paralela al eje longitudinal XX'. La fuerza de tracción 4 tiene el efecto de romper la zona de asociación 52A, en la segunda región de acoplamiento 37, entre las partes de extremo en superposición 38, 42 de la banda externa 33, cerca del borde 51 del núcleo desprendible 3. Aunque se

aplica después la fuerza de tracción 4, el efecto de ruptura continúa propagándose de manera helicoidal y rompe de manera continua la segunda región de acoplamiento 37 (diversas zonas de asociación rotas 52B, 52C y 52D se muestran como etapas en la secuencia de extracción) hasta que se alcanza otro borde del núcleo desprendible 3. Al mismo tiempo, el diámetro del núcleo desprendido y la pared de cuerpo cilíndrico 31 ya no se encuentran en contacto con el producto en lámina 2. Como resultado, el núcleo desprendible 3 se desprende de manera axial y el usuario obtiene acceso al primer producto en lámina, interno, 2, desde el interior 35 del rollo 1.

La FIGURA 7 muestra de manera esquemática la elaboración de un núcleo 3 bajo la forma de un tubo cilíndrico. El núcleo de tubo enrollado en espiral 3 se forma mediante enrollado en espiral de una banda 45 que comprende bandas pre-ensambladas, externa e interna, 33, 34, de cartón, sobre un mandril cilíndrico circular, en un ángulo de enrollado en espiral dado. La banda 45 se enrolla de tal manera que la superficie externa de la primera parte de extremo 38 de la banda externa 33 de un giro se coloca en superposición en la superficie externa de la segunda parte de extremo 42 de la banda externa del giro adyacente y se adhiere en conjunto en el área helicoidal de superposición 44 para construir el tubo cilíndrico.

Como un ejemplo, el núcleo tiene un diámetro de aproximadamente 80 mm, una amplitud W33 de aproximadamente 120 mm, una amplitud W34 de aproximadamente 140 mm, una amplitud de la porción de frente 43 de aproximadamente 10 mm, y una amplitud del área helicoidal en superposición 44 de aproximadamente 40 mm.

De manera más precisa, la FIGURA 7 ilustra de manera esquemática una máquina para enrollado y corte del tubo de núcleo desprendible 3. El núcleo desprendible 3 se enrolla en espiral en la unidad de enrollado 60 y después se corta a la longitud deseada en la unidad de corte 64.

La unidad de enrollado 60 comprende una boquilla de colocación de adhesivo 61, un mandril 62 y una correa de enrollado 63.

La boquilla de colocación de adhesivo 61 se coloca corriente arriba del mandril 62 y la correa de enrollado 63. La boquilla de colocación de adhesivo 61 aplica un adhesivo (pegamento) sobre la superficie externa (superficie longitudinal 41) de la primera parte de extremo 38 de la banda externa 33 de la banda 45 de bandas pre-ensambladas, externa e interna, 33, 34, como una línea completa (según se muestra) o como una línea punteada (no mostrada). La línea puede tener una amplitud de unos cuantos milímetros.

El tubo de núcleo desprendible se forma mediante

el enrollado en espiral 45 sobre el mandril 62. El mandril 62 puede ser un cilindro metálico alargado. El ángulo de enrollado Φ puede ser de 45° , pero puede ser aceptable cualquier otro ángulo.

5 La correa de enrollado 63 embraga la banda 45 y forma un tubo de núcleo desprendible 3. Como resultado de este embrague, el tubo de núcleo avanza a lo largo del mandril en una manera atornillada. La superficie externa de la primera parte de extremo 38 de la banda externa 33 se
10 aplica a fin de adherirse sobre la superficie externa (superficie longitudinal 40) de la segunda parte de extremo 42 de la banda externa del giro adyacente (ver FIGURA 2 para detalles). Esto da como resultado la formación de un tubo de núcleo desprendible, bien definido, 3, corriente
15 abajo de la correa de enrollado 63.

La unidad de corte 64 se coloca corriente abajo de la unidad de enrollado 60. La unidad de corte 64 corta el tubo de núcleo desprendible 3 de la longitud deseada L. La unidad de corte 64 puede comprender una sierra circular,
20 una cuchilla, un dispositivo de demolición, etc. La FIGURA 3 ilustra de manera esquemática y parcial el tubo de núcleo desprendible 3 que se obtiene con la máquina ilustrada en la FIGURA 7.

El proceso total puede ser continuo o
25 discontinuo, lo que significa que la banda 45 puede

elaborarse (pre-ensamblarse) por separado y después almacenarse de manera temporal como un rollo (este no se muestra) antes de enrollarse como núcleos de tubo en la máquina descrita anteriormente.

5 Con la invención, se simplifica la elaboración, dando como resultado la posibilidad de incrementar el ritmo de producción desde 30-35 m/min hasta 80 m/min.

Las figuras y sus descripciones anteriores ilustran en lugar de limitar la invención.

10 Los tamaños, densidades, ángulos y posiciones de las respectivas bandas en las modalidades ilustradas no son ejemplos limitantes. La persona experta reconocerá fácilmente que estos tamaños, densidades, ángulos y posiciones pueden cambiarse si se desea o se considera
15 necesario con respecto al efecto desprendible requerido que se logra, o para ajustar la sección del núcleo a otra dimensión, etc. Además, los ejemplos dados en las tablas son ejemplos no limitantes en base a material de cartón actualmente comercializado; uno puede imaginar que, en el
20 futuro, puede ser posible material de cartón que tiene un peso base decreciente hasta 80 g/m².

Aunque las modalidades ilustradas y descritas muestran la banda externa y la banda interna, y las partes de extremo de la banda externa para asegurarse en conjunto
25 mediante unión adhesiva a través de sus superficies

mutuamente de frente, estas bandas o partes de banda pueden asegurarse en conjunto, de manera alternativa, mediante sujeción mecánica a través de sus superficies mutuamente de frente, por ejemplo, mediante moleteado. En este caso, la deformación de las superficies mutuamente de frente de las bandas o partes de banda, resultante de un proceso de moleteado, constituye la región de acoplamiento, primera y segunda.

El núcleo de la invención puede utilizarse en el enrollado de producto en láminas como "rollos de producto en lámina". Esto tiene un gran significado que abarca, como ejemplos, los rollos de toallas de papel, papeles sanitarios, láminas de plástico o lo similar, láminas de metal (por ejemplo, aluminio), láminas o lo similar, bolsas de preservación de alimentos, envolturas, etc. El producto en lámina puede enrollarse como una lámina no perforada, continua, o láminas pre-perforadas. El "rollo de producto en lámina" puede utilizarse para aplicaciones residenciales o comerciales. Un ensamble de dispensador puede suministrar las láminas de producto provenientes del rollo de producto en lámina, ya sea de manera manual (un usuario puede jalar la lámina de material con una mano) o auxiliada por motor (un motor puede ayudar al suministro automático de la lámina de material a voluntad). Tal ensamble de dispensador y mecanismos no son relevantes a la presente invención y no

se describirán de manera adicional en detalle.

Ningún signo de referencia en una reivindicación debe considerarse como limitante de la reivindicación. La palabra "que comprende" no excluye la presencia de otros
5 elementos diferentes de aquellos mencionados en una reivindicación. La palabra "un" o "unos" o "al menos uno" que precede a un elemento no excluye la presencia de una pluralidad de tales elementos.

REIVINDICACIONES

1. Un núcleo desprendible, adaptado para enrollar un producto en lámina, que comprende una pared de cuerpo cilíndrico que define un orificio longitudinal de eje longitudinal XX', siendo desprendible, de un borde, la
5 pared de cuerpo cilíndrico, comprendiendo la pared de cuerpo cilíndrico una banda externa y una banda interna, siendo la banda externa una parte de la pared de cuerpo cilíndrico desprendible, adaptada para estar en contacto
10 con el producto en lámina enrollado, siendo la banda interna otra parte de la pared de cuerpo cilíndrico desprendible, de frente al orificio longitudinal, enrollándose de manera helicoidal la banda externa y la banda interna entre sí y colocándose en sobreposición de
15 manera desplazada, en una dirección lateral, paralela al eje longitudinal XX', asegurándose en conjunto la banda externa y la banda interna a través de sus superficies mutuamente de frente mediante una primera región de acoplamiento, caracterizado porque: las bandas se elaboran
20 de materiales que tienen características tales que, ya sea la banda interna se elabore de cartón que tiene un descenso de agua inferior al descenso de agua de la banda externa, o la banda externa se elabore de cartón que tiene un descenso de agua inferior al descenso de agua de la banda interna; y
25 la pared de cuerpo cilíndrico se construye como un tubo de

núcleo al asegurar en conjunto la banda externa, una primera parte de extremo de la banda externa de un giro que se coloca en sobreposición y se asegura a una segunda parte de extremo de la banda externa de un giro adyacente a través de sus superficies mutuamente de frente, por medio de una segunda región de acoplamiento.

2. El núcleo desprendible de conformidad con la reivindicación 1, caracterizado porque la primera y segunda región de acoplamiento se colocan de tal manera que dos superficies de frente de la banda externa y la banda interna no se acoplan en conjunto sobre una amplitud definida en un área de sobreposición helicoidal donde dos giros adyacentes se colocan en sobreposición a fin de formar una lengüeta internamente accesible y libre, en el borde del núcleo desprendible.

3. El núcleo desprendible de conformidad con la reivindicación 1 o 2, caracterizado porque la banda externa y la banda interna, y las partes de extremo de la banda externa, se aseguran en conjunto mediante unión adhesiva, a través de sus superficies mutuamente de frente, elaborándose la región de acoplamiento, primera y segunda, de una película de adhesivo, siendo continua o discontinua la película de adhesivo.

4. El núcleo desprendible de conformidad con la reivindicación 1 o 2, caracterizado porque la banda externa

y la banda interna, y las partes de extremo de la banda externa, se aseguran en conjunto mediante sujeción mecánica, a través de sus superficies mutuamente de frente.

5 5. El núcleo desprendible de conformidad con cualquiera de las reivindicaciones 1 a 4, caracterizado porque la primera región de acoplamiento se extiende desde una primera parte de extremo de la banda externa hasta una segunda parte de extremo de la banda interna, y en donde una amplitud W_{33} de la banda externa es idéntica o inferior
10 a una amplitud W_{34} de la banda interna.

 6. El núcleo desprendible de conformidad con cualquiera de las reivindicaciones 1 a 5, caracterizado porque la segunda región de acoplamiento se extiende sobre una amplitud que es inferior a una amplitud de la primera
15 región de acoplamiento.

 7. El núcleo desprendible de conformidad con cualquiera de las reivindicaciones 1 a 6, caracterizado porque la banda interna se elabora de cartón que tiene un peso base superior al peso base de la banda externa.

20 8. El núcleo desprendible de conformidad con la reivindicación 7, caracterizado porque el peso base de la banda interna es aproximadamente 50% mayor que el peso base de la banda externa, y el descenso de agua de la banda interna es de unos cuantos minutos mientras que el descenso
25 de agua de la banda externa es de tamaño no definido.

9. El núcleo desprendible de conformidad con cualquiera de las reivindicaciones 1 a 6, caracterizado porque la banda externa se elabora de cartón que tiene un peso base superior al peso base de la banda interna.

5 10. El núcleo desprendible de conformidad con la reivindicación 9, caracterizado porque el peso base de la banda externa es aproximadamente 50% mayor que el peso base de la banda interna, y el descenso de agua de la banda externa es de unos cuantos minutos mientras que el descenso
10 de agua de la banda interna es de tamaño no definido.

 11. El núcleo desprendible de conformidad con cualquiera de las reivindicaciones 1 a 7 y 9, caracterizado porque el peso base por área de unidad de una de las bandas varía desde 150 hasta 200 g/m² y el descenso de agua es de
15 aproximadamente 10 minutos, y el peso base por área de unidad de la otra banda varía desde 400 hasta 450 g/m² y el descenso de agua es de tamaño no definido.

 12. El núcleo desprendible de conformidad con cualquiera de las reivindicaciones 1 a 6, caracterizado
20 porque la banda interna se elabora de cartón que tiene un peso base igual al peso base de la banda externa.

 13. El núcleo desprendible de conformidad con la reivindicación 12, caracterizado porque el peso base por área de unidad de una de las bandas varía desde 180 hasta
25 230 g/m² y el descenso de agua es de aproximadamente 10

minutos, y el peso base por área de unidad de la otra banda varía desde 180 hasta 230 g/m² y el descenso de agua es de tamaño no definido.

14. Un rollo de producto en lámina, caracterizado porque comprende un producto en lámina enrollado sobre un núcleo desprendible de conformidad con cualquiera de las reivindicaciones 1 a 13.

15. El rollo de producto en lámina de conformidad con la reivindicación 14, caracterizado porque el producto en lámina es una trama de papel tisú.

16. Un método de elaboración de un núcleo desprendible bajo la forma de una pared de cuerpo cilíndrico que define un orificio longitudinal de eje longitudinal XX', siendo desprendible, de un borde, la pared de cuerpo cilíndrico, caracterizado el método de elaboración porque comprende las etapas de:

elaborar una banda externa y una banda interna en materiales que tienen características tales que, ya sea la banda interna se elabora de cartón que tiene un descenso de agua inferior al descenso de agua de la banda externa, o la banda externa se elabora de cartón que tiene un descenso de agua inferior al descenso de agua de la banda interna;

ensamblar la banda externa y la banda interna mediante colocación en superposición de manera desplazada de la banda externa y la banda interna, en una dirección

lateral, paralela al eje longitudinal XX' , asegurándose en conjunto la banda externa y la banda interna a través de sus superficies mutuamente de frente, mediante una primera región de acoplamiento;

5 enrollar de manera helicoidal las bandas ensambladas, externa e interna, de tal manera que la pared de cuerpo cilíndrico se construye como un tubo de núcleo al asegurar en conjunto la banda externa, colocándose en sobreposición una superficie externa de una primera parte
10 de extremo de la banda externa de un giro, sobre una superficie externa de una segunda parte de extremo de la banda externa del giro adyacente y asegurándose en conjunto a través de sus superficies mutuamente de frente, mediante una segunda región de acoplamiento; y

15 cortar el núcleo desprendible a una longitud definida.

17. El método de elaboración de un núcleo desprendible de conformidad con la reivindicación 16, caracterizado porque comprende además la aplicación de un
20 adhesivo sobre la superficie externa de la primera parte de extremo de la banda externa de las bandas ensambladas, externa e interna, ya sea como una línea completa o como una línea punteada.

RESUMEN DE LA INVENCION

Un núcleo desprendible (3), adaptado para enrollado de un producto en lámina (2), comprende una pared de cuerpo cilíndrico (31) que define un orificio longitudinal (35) de eje longitudinal XX'. La pared de cuerpo cilíndrico (31) es desprendible de un borde (51) y comprende una banda externa (33) y una banda interna (34) que se enrollan de manera helicoidal entre sí y se colocan en superposición de manera desplazada en una dirección lateral, paralela al eje longitudinal XX', y se aseguran en conjunto a través de sus superficies mutuamente de frente mediante una primera región de acoplamiento (36). Las bandas (33, 34) se elaboran del material que tiene características tales que la banda interna (34) se elabora de un cartón que tiene un descenso de agua inferior al descenso de agua de la banda externa (33) o la banda externa (33) se elabora de cartón que tiene un descenso de agua inferior al descenso de agua de la banda interna (34). La pared de cuerpo cilíndrico (31) se forma al asegurar en conjunto la banda externa (33), una primera parte de extremo (38) de la banda externa (33) de un giro (A) que se sobrepone y asegura a una segunda parte de extremo (42A) de la banda externa (33) de un giro adyacente (B) a través de sus superficies mutuamente de frente, por medio de una segunda región de acoplamiento (37).