(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 3 279 122 A1

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
07.02.2018 Bulletin 2018/06

(21) Application number: **16771419.5**

(22) Date of filing: **01.04.2016**

(51) Int Cl.:
B65H 18/28 *(2006.01)*

(86) International application number:
PCT/CN2016/078326

(87) International publication number:
WO 2016/155664 (06.10.2016 Gazette 2016/40)

(84) Designated 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
Designated Extension States:
BA ME
Designated Validation States:
MA MD

(30) Priority: **02.04.2015 CN 201510153773**

(71) Applicant: **Foshan Baosuo Paper Machinery Manufacture Co., Ltd.**
Nanhai District
Foshan
Guangdong 528251 (CN)

(72) Inventors:
- **PENG, Jinchao**
  Foshan
  Guangdong 528251 (CN)
- **CHEN, Jinhui**
  Foshan
  Guangdong 528251 (CN)

(74) Representative: **Noble, Nicholas et al**
Kilburn & Strode LLP
Lacon London
84 Theobalds Road
London WC1X 8NL (GB)

(54) METHOD FOR FIXING TAIL END OF TOILET PAPER ROLL AND TOILET PAPER ROLL THEREFROM

(57) A method for fixing a tail end (1a) of a toilet paper roll and the toilet paper roll (1) therefrom. The end of the toilet paper roll is not adhered with glue, but the circumference of the toilet paper roll is wrapped by a paper sheet (2) except the toilet paper roll. The head and the tail ends of the paper sheet are not adhered with glue, but joined together in a mechanical combination way, so that the tail end of the toilet paper roll is hooped onto the paper roll by the paper sheet. In this way, there is no need to apply a pressure or any other treatments between the tail end and the external layer of the paper roll when fixing the tail end of the paper roll, the damage of the external layer of the paper roll is avoided, and the quality of the finished paper roll is improved.

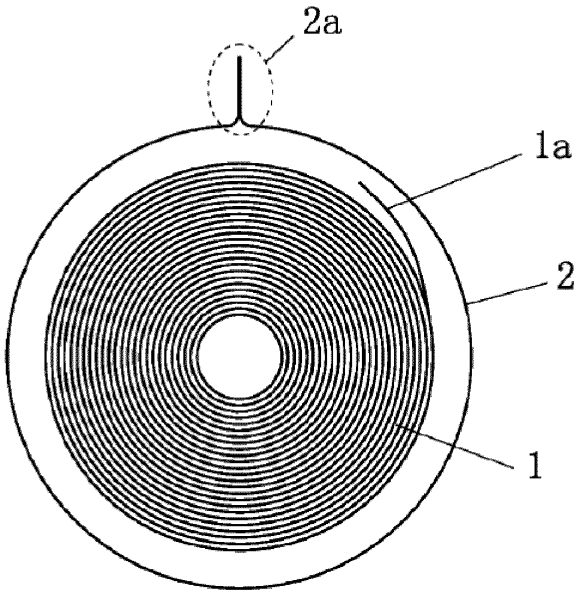

FIG. 1

EP 3 279 122 A1

Description

FIELD

[0001] The present disclosure relates to paper rolls, and more particularly, to a method and mechanism for fixing a tail end of a paper roll.

BACKGROUND

[0002] During the production of paper rolls, a paper roll having a longer axial dimension should be processed such that its tail end is fixed on the roll before being cut into a plurality of rolls of paper having with a shorter axial dimension, to avoid the loose of the paper roll.

[0003] In the manufacturing industry of paper rolls, the tail end of the paper roll is usually bonded on the roll with glue. There are various problems in such method of fixing the tail end of the paper roll with glue. For example, the machine is easy to be soiled by the glue, it is difficult to maintain humidity and concentration of the glue, it is difficult to control the amount of glue to be applied, and there is a heavy workload for machine maintenance and cleaning.

[0004] In a Chinese patent with a publication number of CN101674993B, entitled with "Method and device for closing the tail end of a log of web material", the tail end of the paper roll is fixed by mechanical ply-bonding method. Such method may address issues caused by the use of glue, but the tail end of the paper roll is laminated with the outer layer of the paper roll. When the laminating force is relatively large, the outer layer of the paper roll is easy to be damaged, and when the laminating force is relatively small, it is easy to cause the fixing of the tail end of the paper roll insecure, so that the paper roll may be accidentally loosened in the subsequent cutting process, to cause a shutdown accident.

SUMMARY

[0005] It is an objective of the present disclosure to provide a method for fixing a tail end of a paper roll, which can both address issues caused by the use of glue for fixing, and avoid the damage to the outer layer of the paper roll.

[0006] It is another objective of the present disclosure to provide a paper roll obtained in accordance with the method.

[0007] According to one aspect of the present disclosure, a method for fixing a tail end of a paper roll is provided, including: instead of bonding the tail end of the paper roll with glue, wrapping a circumference surface of the paper roll with a paper sheet made of material different from that of the paper roll; and joining a head and a tail ends of the paper sheet together by way of mechanical joining, instead of bonding the head and tail ends of the paper sheet together with glue, so that the tail end of the paper roll is hooped onto the paper roll.

[0008] Preferably, the mechanical joining includes any one of: laminating overlapping portions between the head and tail ends of the paper sheet to form a whole; and pressing the overlapping portions to form convex-concave patterns respectively, and the head and tail ends of the paper sheet are fitted together through the convex-concave patterns.

[0009] According to another aspect of the present disclosure, a paper roll is provided, including a tail end of the paper roll hooped onto the paper roll by a paper sheet made of material different from that of the roll of paper, without bonded with glue, the paper sheet having a head and a tail ends joined together by a mechanically joining mechanism, instead of bonded with glue.

[0010] Preferably, the mechanically joining mechanism includes any one of: a mechanism in which the overlapping portions between the head and the tail ends of the paper sheet are laminated to form a whole; and a mechanism in which the overlapping portions between the head and the tail ends of the paper sheet are pressed to form convex-concave patterns respectively, and the head and the tail ends of the paper sheet are fitted together through the convex-concave patterns..

[0011] At least one end of the head and the tail ends of the paper sheet extends from the overlapping portions to form a lateral wing.

[0012] The present disclosure has following advantages: it addresses issues caused by the use of glue for fixing the tail end of the paper roll that the machine is easy to be soiled by the glue, it is difficult to maintain humidity and concentration of the glue, it is difficult to control the amount of glue to be applied, and there is a heavy workload for machine maintenance and cleaning; and the tail end of the paper roll can be fixed without applying pressing force on the tail end of the paper roll and the outer layer of the paper roll or using other methods like that, to avoid the damage to the outer layer of the paper roll, and facilitate the improvement in the quality of the finished rolls of paper.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013]

FIG. 1 is a structural schematic diagram illustrating a cross section of a paper roll according to a first embodiment of the present disclosure.

FIG. 2 is a structural schematic diagram illustrating a cross section of a paper roll according to a second embodiment of the present disclosure.

FIGS. 3-9 respectively show various embodiments in which both head and tail ends of a paper sheet wrapping a paper roll are joined together by way of mechanical joining.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0014] Refer to FIG. 1. It shows a paper roll 1 and a paper sheet 2 wrapping a circumference surface of the paper roll 1. In order to clearly distinguish the paper roll 1 and the paper sheet 2, it is intended to leave a large gap between the paper roll 1 and the paper sheet 2 in FIG. 1. And, in order to clearly show the tail end 1a of the paper roll 1, it is intended to draw the tail end 1a of the paper roll to have a tilted shape in FIG. 1. In fact, there is no gap between the paper roll 1 and the paper sheet 2, and the tail end 1a a of the paper roll is hooped onto the paper roll 1 by the paper sheet 2.

[0015] Both head and tail ends of the paper sheet 2 are tilted radially outwardly, to from overlapping portions 2a. In the overlapping portion 2a, both the head and the tail ends of the paper sheet 2 are joined together in a mechanically joining mechanism, instead of bonded with glue. In this embodiment, the mechanically joining mechanism is formed by applying sufficient laminating force on the overlapping portions 2a, to bond the paper fibers together, so that the both head and tail ends of the paper sheet 2 are joined together. The whole overlapping portions 2a may be joined together, and alternatively parts of the overlapping portions 2a may be joined together, for example, laminating may be performed on the overlapping portions 2a at regular intervals along the axial direction of the paper roll (i.e., a direction perpendicular to the figure), so that there is no need to join the whole overlapping portions together.

[0016] FIG. 2 shows another embodiment, which is different from FIG.1 in that the tail end 1a of the paper roll 1 and the paper sheet 2 are joined together by a mechanically joining mechanism. Other structural features of this embodiment are the same as those in FIG. 1. The mechanically joining mechanism of the tail end 1a of the paper roll 1 and the paper sheet 2 is the same as the mechanically joining mechanism of the head and tail ends of the paper sheet 2.

[0017] FIGS. 3-9 show some different embodiments in which the head and tail ends of the paper sheet 2 are joined together by way of mechanical joining. These structural schematic diagrams may be equivalent to partial enlarged view of the overlapping portions 2a of the head and tail ends of the paper sheet in FIG. 1. The following description will illustrate the different embodiments by reference to FIGS. 3-9 respectively.

[0018] In FIG. 3, the overlapping portions of the head and tail ends of the paper sheet 2 are pressed with concavo-convex patterns 3, and the head and tail ends of the paper sheet 2 are fitted together through the concavo-convex patterns.

[0019] FIG. 4 may be seen as a variation of FIG. 3. The concavo-convex patterns in FIG. 4 are bumps each of which is provided with a through-hole 4 formed by puncture with a needle or the like.

[0020] In FIG. 5, one end of the head and tail ends of the paper sheet 2, i.e., the left end in the figure is bent and wraps the other end to form a wrapping mechanism. In order to clearly show how the end of the paper sheet is bent, it is intended to leave a visible gap at the wrapping portion in FIG. 5. In fact, the head and tail ends of the paper sheet are joined together closely, without gap therebetween. The embodiments shown in FIGS. 3 and 4 may also apply the wrapping mechanism shown in FIG. 5.

[0021] In FIG. 6, both the head and tail ends of paper sheet 2 extend from the overlapping portions to form lateral wings 2b, 2c, respectively. As the advantage of such structure, it is convenient for the user to separate the joined head and tail ends of the paper sheet 2 by drawing the lateral wings 2b, 2c. Further, on the basis of FIG. 6, in FIG. 7, each of the lateral wings 2b, 2c is folded to increase the thickness of the lateral wing and enhance the strength.

[0022] In FIG. 8, one end of the head and tail ends of paper sheet 2, i.e., the left end in the figure extends from the overlapping portions to form a single lateral wing 2b. Further, on the basis of FIG. 8, in FIG. 9, the lateral wing 2b is folded to increase the thickness of the lateral wing and to enhance the strength.

[0023] The embodiments shown in FIGS. 3 and 4 may also apply the lateral wing mechanisms shown in FIGS. 6-9.

Claims

1. A method for fixing a tail end of a paper roll, comprising:

   instead of bonding the tail end of the paper roll with glue, wrapping a circumference surface of the paper roll with a paper sheet made of material different from that of the paper roll; and
   joining a head and a tail ends of the paper sheet together by way of mechanical joining, instead of bonding the head and tail ends of the paper sheet together with glue, so that the tail end of the paper roll is hooped onto the paper roll.

2. The method of claim 1, wherein the way of mechanical joining includes any one of:

   laminating overlapping portions between the head and tail ends of the paper sheet to form a whole; and
   pressing the overlapping portions to form convex-concave patterns respectively, and the head and tail ends of the paper sheet are fitted together through the convex-concave patterns.

3. The method of claim 1 or 2, wherein at least one end of the head and the tail ends of the paper sheet extends from the overlapping portions to form a lateral wing.

4. A paper roll, comprising a tail end of the paper roll hooped onto the paper roll by a paper sheet made of material different from that of the paper roll, without bonded with glue, the paper sheet having a head and a tail ends joined together by a mechanically joining mechanism, instead of bonded with glue.

5. The paper roll of claim 4, wherein the mechanically joining mechanism includes any one of:

a mechanism in which the overlapping portions between the head and the tail ends of the paper sheet are laminated to form a whole; and
a mechanism in which the overlapping portions between the head and the tail ends of the paper sheet are pressed to form convex-concave patterns respectively, and the head and the tail ends of the paper sheet are fitted together through the convex-concave patterns.

6. The paper roll of claim 4 or 5, wherein at least one end of the head and the tail ends of the paper sheet extends from the overlapping portions to form a lateral wing.

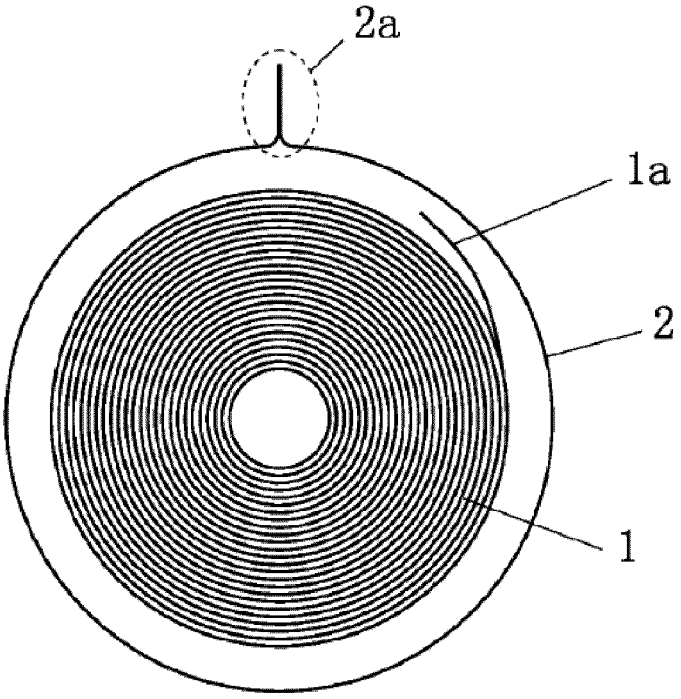

FIG. 1

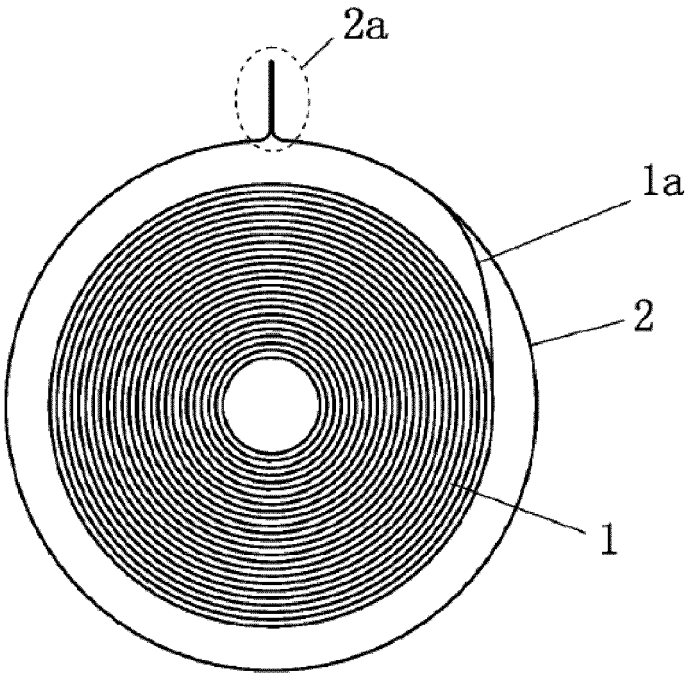

FIG. 2

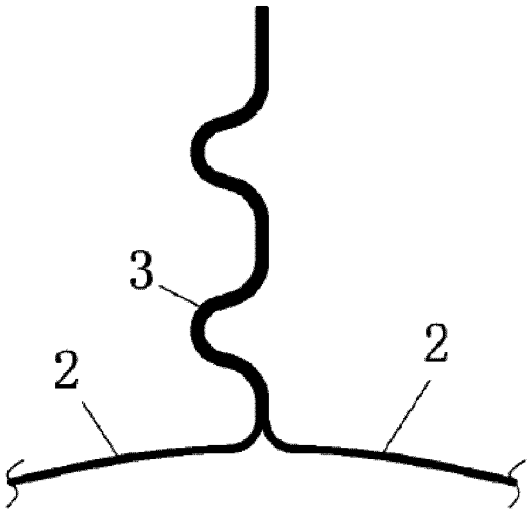

FIG. 3

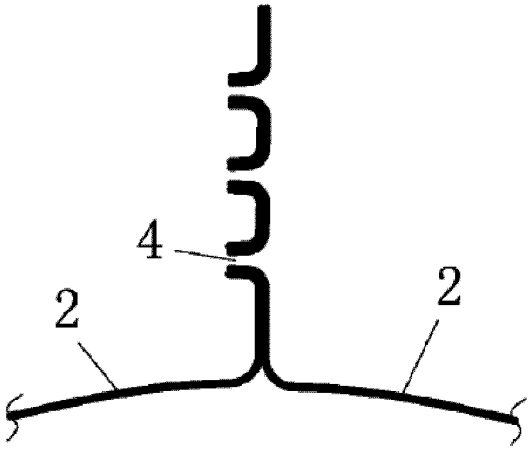

FIG. 4

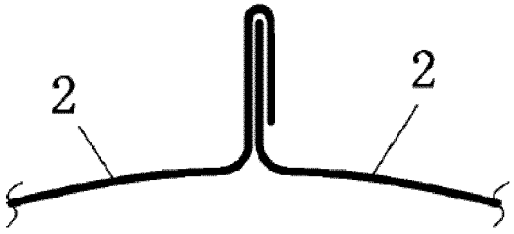

FIG. 5

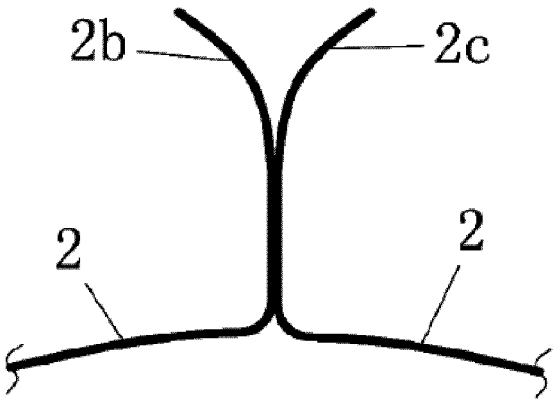

FIG. 6

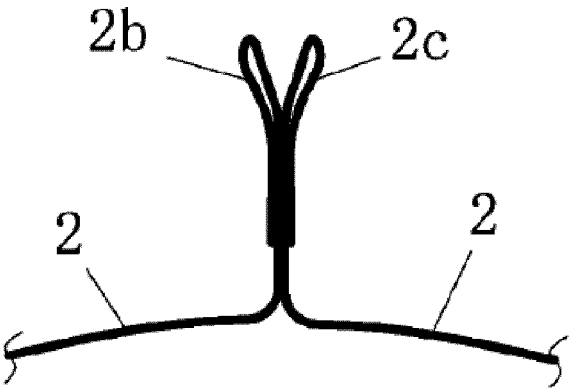

FIG. 7

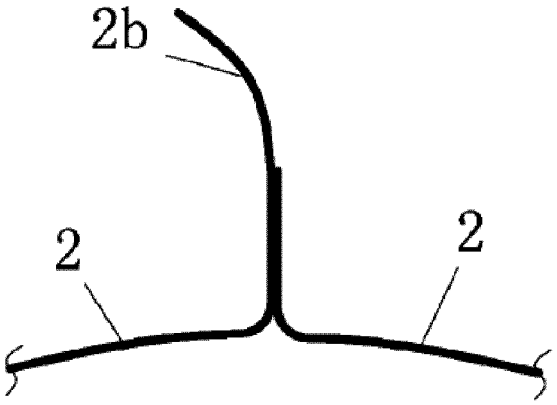

FIG. 8

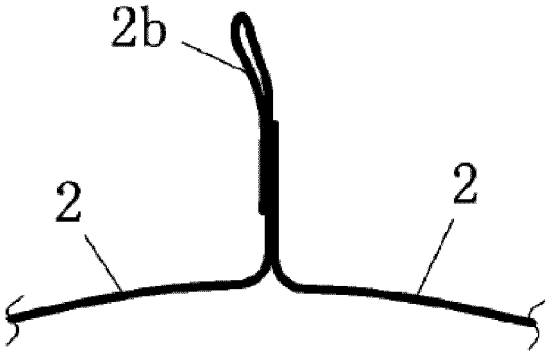

FIG. 9

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2016/078326

A. CLASSIFICATION OF SUBJECT MATTER

B65H 18/28 (2006.01) i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B65H

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

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

CNABS; CNTXT; CNKI; VEN; DWPI; SIPOABS: tail end, pattern, lateral wing, fasten, fix, trail, tail, coil, roll, warp, paper, sheet, press, glue, overlap, side, wing, limb

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 204743969 U (BAOSUO PAPER MACHINERY MANUFACTURE CO., LTD.), 11 November 2015 (11.11.2015), claims 1-3	claims 4-6
A	CN 101674993 A (PERINI FABIO S.P.A.), 17 March 2010 (17.03.2010), description, page 3, paragraph 1 to page 5, paragraph 1, and figures 1-7	1-6
A	US 7871485 B2 (GEORGIA-PACIFIC CONSUMER PRODUCTS), 18 January 2011 (18.01.2011), the whole document	1-6
A	US 4925028 A (DOW CHEMICAL CO.), 15 May 1990 (15.05.1990), the whole document	1-6
A	US 3960272 A (CROWN ZELLERBACH CORP.), 01 June 1972 (01.06.1972), the whole document	1-6
A	CH 688622 A5 (TELA PAPIERFABRIK AG), 15 December 1997 (15.12.1997), the whole document	1-6

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

* Special categories of cited documents:

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

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

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

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

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

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

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

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

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
20 June 2016 (20.06.2016)	**06 July 2016 (06.07.2016)**
Name and mailing address of the ISA/CN: State Intellectual Property Office of the P. R. China No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088, China Facsimile No.: (86-10) 62019451	Authorized officer **LI, Fuchang** Telephone No.: (86-10) **62085524**

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

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2016/078326

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
CN 204743969 U	11 November 2015	None	
CN 101674993 A	17 March 2010	US 2011265954 A1	03 November 2011
		JP 5331793 B2	30 October 2013
		IT FI20070087 A1	14 October 2008
		EP 2139798 A1	06 January 2010
		JP 2010523441 A	15 July 2010
		ES 2546760 T3	28 September 2015
		US 2010101705 A1	29 April 2010
		WO 2008126122 A1	23 October 2008
		US 8652283 B2	18 February 2014
		CA 2682829 C	22 December 2015
		CA 2682829 A1	23 October 2008
		EP 2139798 B1	29 July 2015
		US 8585846 B2	19 November 2013
		BR PI0810650 A2	04 November 2014
		CN 101674993 B	27 March 2013
US 7871485 B2	18 January 2011	US 7803442 B2	28 September 2010
		CA 2559663 C	13 May 2014
		US 2005199761 A1	15 September 2005
		US 2008053598 A1	06 March 2008
		US 2005199759 A1	15 September 2005
		WO 2005089342 A3	21 February 2008
		US 7799402 B2	21 September 2010
		WO 2005089342 A2	29 September 2005
		US 7981234 B2	19 July 2011
		CA 2559663 A1	29 September 2005
		US 2010300605 A1	02 December 2010
		US 7967933 B2	28 June 2011
		US 7811648 B2	12 October 2010
		EP 1824767 A2	29 August 2007
		US 2010300607 A1	02 December 2010
		US 2007095461 A1	03 May 2007
		EP 1824767 A4	08 February 2012
US 4925028 A	15 May 1990	None	
US 3960272 A	01 June 1972	None	
CH 688622 A5	15 December 1997	None	

Form PCT/ISA/210 (patent family annex) (July 2009)

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- CN 101674993 B **[0004]**